

**GRADE 8**  
**TERM 1 GEOGRAPHY**  
**MAPS AND GLOBES**

## 1. MAPS AND ATLASES

### Definitions:

**Globe:** A round model of the Earth.

**Atlas:** A book of maps.

**Satellite Images:** Pictures of world taken from space.

### Introduction:

Maps and globes help us to see where we are in the world. Using maps has always been an important factor in the lives of human beings but, through the development of digital tools, maps are becoming more common-place, more detailed and more easily accessible. Applications such as Google Earth, Google Maps and car navigation systems are being used more often. In this section, you should learn the basics of how to use a map or atlas properly – this is a skill that will benefit you for the rest of your life.

**Globes** accurately show us, in a smaller version, the correct position of the continents on Earth. Earth is one of eight planets in our solar system and it is the third planet from the sun.

There are many different types of atlases. A **world atlas** contains map of different places in the world. A **street atlas** contains maps of streets in a settlement (city, town, village, etc.). A **road atlas** focuses on roads and routes between settlements. You will learn to use latitude and longitude to locate places on maps using the index in world atlas.

**Satellite images** can help to forecast the weather, to make maps, to show damage caused by natural disasters and to examine how land is used.

### 1.1 LATITUDE AND LONGITUDE – DEGREES AND MINUTES

You should know from primary school that lines of **latitude** go around the world **from east to west** and that lines of **longitude** go around the world **from north to south**.

#### Lines of Latitude:

The **Equator** is the line of **0°** latitude and is the starting point for measuring latitude. The latitude of the **North Pole is 90° N** and that of the **South Pole is 90° S**.

Each line of latitude between the Equator and the Poles run parallel to each other and has a value in degrees. The angle of each line of latitude is measured from an imaginary point in the centre of Earth (Figure 1).

Two other important lines of latitude which will be dealt with later is the **Tropic of Cancer** which lies at **23½° N** and the **Tropic of Capricorn** which lies at **23½° S**.

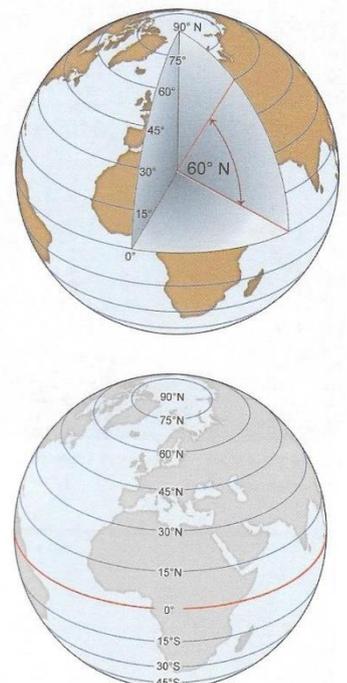
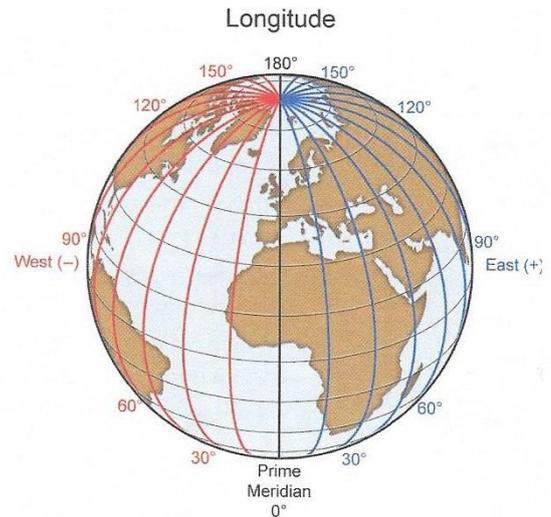


Figure 1 Lines of latitude are measured in degrees north and south of the equator.

### Lines of Longitude:

Lines of longitude run through both the North and South Poles. They are not parallel lines. They are often referred to as **meridians**. Earth is divided equally into 360° of longitude

The most important line of longitude is the Greenwich Meridian. This is the meridian from where the world time zones are calculated. The **Greenwich Meridian** is also called the **Prime Meridian** and is the **0° line of longitude**.



**Figure 2** Lines of longitude are measured east and west of the Greenwich Meridian.

The Earth is therefore divided into different hemispheres. Places North and South of the Equator and places East and West of the Greenwich Meridian. America, for example, is North of the Equator but West of Greenwich.

In which two hemispheres is South Africa? \_\_\_\_\_

### Degrees and Minutes:

Lines of latitude and longitude on maps and globes make it easier to find places.

- Each line of latitude and longitude has a value in degrees.
- A degree of longitude at the equator covers about 111 km.
- One degree of latitude also covers about 111 km.
- Each degree of latitude and longitude can be divided into 60 minutes.

By using degrees and minutes, we can pinpoint places to within less than 2 km of accuracy. We do not show minutes on most maps because this would cover the map with too many lines. We usually need to estimate where the lines will be.

### ACTIVITY 1

Study Figure 3 on page 4 and state the latitude and longitude of the places numbered 1-7. Write your answers in the spaces below. **(7)**

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_
4. \_\_\_\_\_
5. \_\_\_\_\_
6. \_\_\_\_\_
7. \_\_\_\_\_

1. Study Figure 1.3 and state the latitude and longitude of the places numbered 1–7.

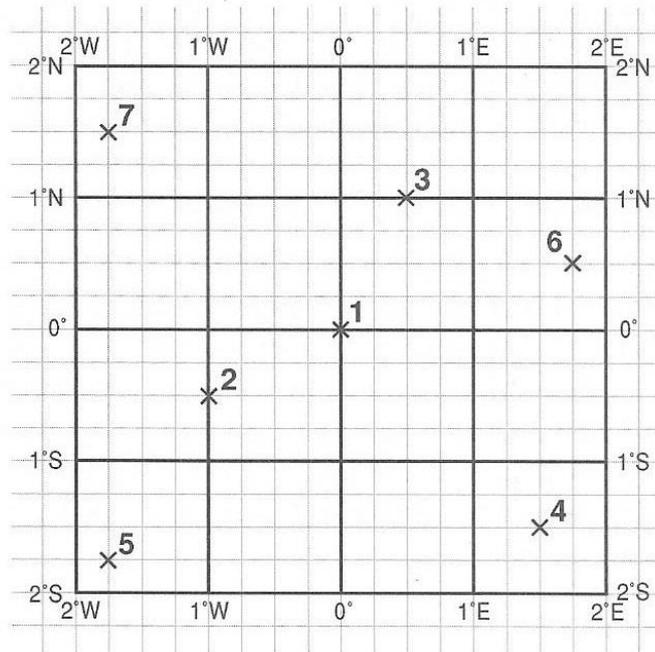


Figure 1.3: Latitude and longitude

## **1.2 USING THE ATLAS INDEX TO FIND PLACES ON A MAP:**

At the back of an atlas, you will find the atlas index. A good atlas index lists most of the place names in the atlas. The names are in alphabetical order. Next to each place name are the latitude and longitude coordinates in degrees and minutes.

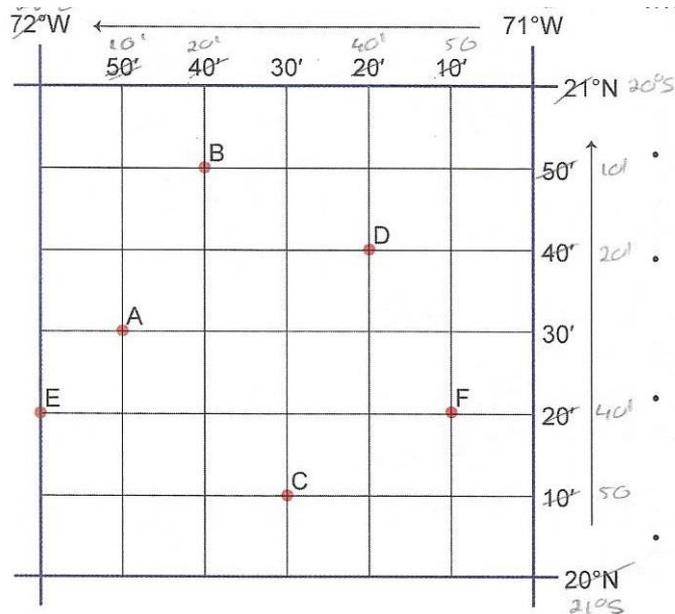
### **How to use the index of an atlas:**

- Look up the name of the place you want to find in the index. Go to the correct part of the alphabetical index: for example Port Elizabeth is in the P section.
- Write down the coordinates that are next to the name Port Elizabeth – 33°55' S, 25°25' E.
- Go to the correct page in the atlas indicated in the index, e.g. page 42.
- Look for 33 and 34 degree lines of latitude.
- Because minutes are not marked on maps, you have to estimate where 55 minutes will be. You will have to estimate that this will be between the 33 and 34 degree lines of latitude. Fifty-five minutes is almost 60 minutes. Sixty minutes is one degree. You can see that the 33°55' line of latitude is very close to the 34° line of latitude.
- Now estimate Port Elizabeth's longitude position - 25°35' E. Because you know that there are 60 minutes in a degree, you know that there will be 30 minutes in half a degree. So, 35 minutes will be just over half way between 25° and 26° east.

**NB: Give the degrees first and then the minutes. Start with latitude (S) first and then longitude (E)**

**ACTIVITY 3:**

Study the grid below (Figure 4) and answer the following questions.

**Example:**

The latitude position of **point A** is **21°30' S**

The longitude position of **point A** on the above grid is **29°10' E**.

When we combine these latitude and longitude position of a place, we are giving their **coordinates**. Therefore the coordinates of Point A are **21°30'S 29°10'E**.

**NB: Always give the latitude position before the longitude position.**

Because South Africa is in the Southern and Eastern Hemispheres of the Earth, we follow the 'Down Right' rule ( ) – latitude (South – down) first and longitude (East – right) second.

Now give the coordinates for the letters B, C, D, E and F in Figure 4 above. Write your answers in the space below. One mark for the correct latitude and one for the correct longitude. (10)

B. \_\_\_\_\_

C. \_\_\_\_\_

D. \_\_\_\_\_

E. \_\_\_\_\_

F. \_\_\_\_\_

### 1.3 KINDS OF SCALES – WORLD, REGIONAL AND LOCAL

**Scale:** a way of accurately representing objects smaller than their real size.

Not all maps in an atlas are drawn to the same scale. The scales are different because the maps show different sizes of land. For example, some maps show the whole world. Others show only a province or a country. The size of the area covered by the map influences the map scale.

**The larger the area covered by the map, the smaller the map scale.**

### 1.4 DIFFERENT WAYS OF SHOWING SCALES ON A MAP:

#### a) Word/Statement Scale:

This tells you what the scale of the map is in a sentence, e.g. ***One centimetre on the map represents fifty thousand centimetres on the ground*** (in reality  $\frac{1}{2}$  a kilometre).

#### b) Line/Linear Scale:

This is a straight line at the bottom of the map. The line is divided into subsections that show the length on the ground of a distance shown on the map.



#### c) Ratio/Representative Scale:

This shows scale in the form of a ratio, e.g. 1: 50 000.

Both amounts in the ratio are the same unit (cm). So the ratio scale 1:50 000 means that 1 cm on the map represents 50 000 cm on the ground. The smaller the ratio, the more detail the map shows.

### Calculating Distance on a Map:

Distance on a map is calculated between two specific points, for example the distance between a school and a bus stop.

- The two points are joined with a line as in the case of 'A' above.
- Measure the length of A using a rule with clearly marked cm or mm units.
- Write down the reading you got after measuring line A, e.g. 4 cm.
- Check the scale of the map on which the school and the bus stop are shown. In South Africa, in schools, we usually use the 1:50 000 ratio scale.
- This means that 1 cm on the map is equal to  $\frac{1}{2}$  a kilometre in reality.
- Take the 4 cm that you measured and divide by 2. ( $4 \div 2 = 2$  km).
- Please note that your answer needs to be converted into the units of distance in reality. 4 cm on the map at a scale of 1:50 000 equals 2 km in reality.

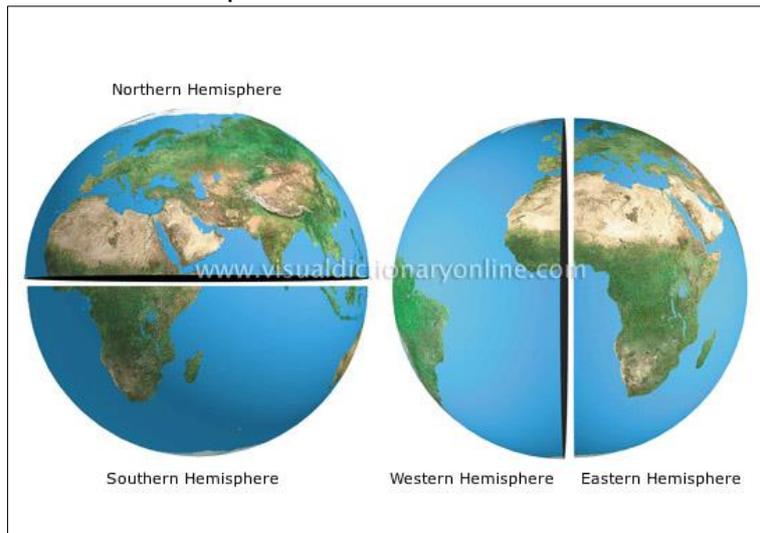
Sometimes distance can be calculated along a winding river or path. It is difficult to do with a rigid ruler, but it can be done by using a piece of string. You place the string along the winding object and afterwards stretch it out along the units of your ruler. You then calculate the distance as shown in the previous steps.

## 2. THE GLOBE

### 2.1 HEMISPHERES

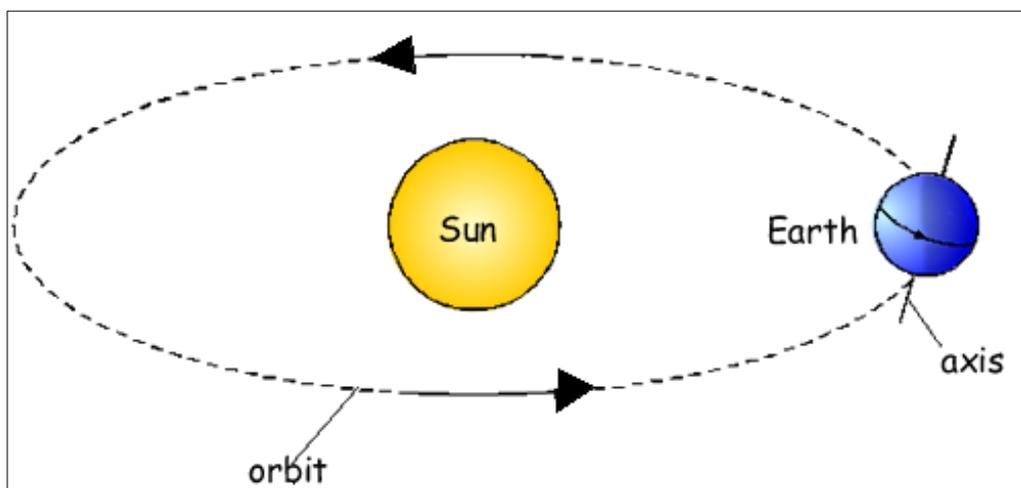
The world has four hemispheres:

- The Equator divides the earth into the northern and southern hemispheres.
- The Greenwich Meridian and 180° line of longitude also divide the world into the eastern and western hemispheres.



### 2.2 THE EARTH'S ROTATION ON ITS AXIS – DAY AND NIGHT

- The earth tilts on its axis at an angle of  $23\frac{1}{2}^{\circ}$ .
- The earth rotates on its axis – we know this because the position of the sun in the sky changes during a day.
- The earth takes 24 hours to complete one  $360^{\circ}$  rotation.
- During 24 hours, different places on the earth move into the sun's rays.
- It rotates from west to east or anticlockwise.



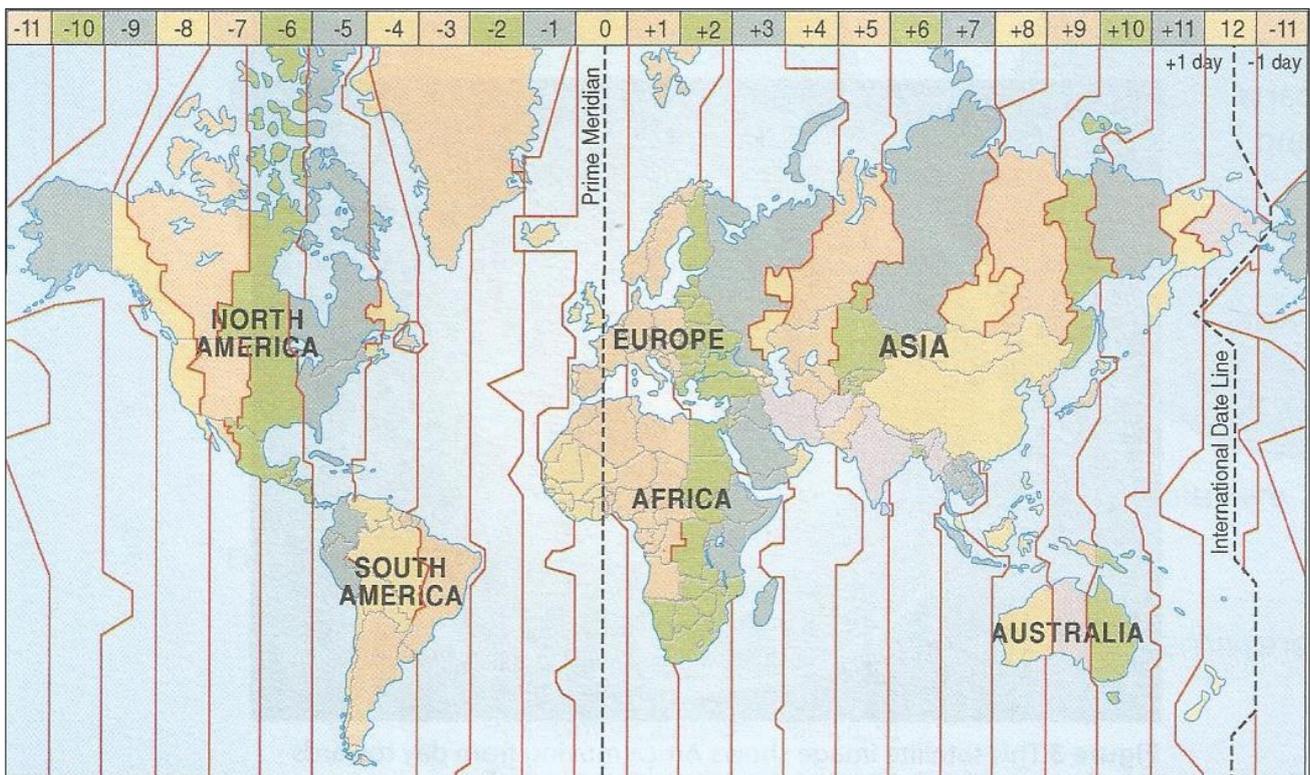
## 2.3 WORLD TIME, TIME ZONES AND THE INTERNATIONAL DATE LINE.

Earth is constantly moving in and out of the sun's rays. The sun appears to move across the sky from sunrise to sunset, but we know that it is Earth that is moving – not the sun. We measure time against the position of the sun. When it is midday in South Africa, it is already midnight in New Zealand. The Earth's rotation on its axis means that **time changes by one hour for every 15° of longitude.**

The **eastern** hemisphere will always be **ahead** of **Central Africa Time (CAT)** and experiencing a later time in the day. The **western** hemisphere will always be **behind** CAT and experiencing an earlier time in the day.

Each country calculates their time according to their time zone. All time is calculated in relation to the time at Greenwich Meridian. In theory, the world's time zones should change by 1 hour for every 15° of longitude, but Governments of countries adjust time zones to fit into the borders of their country. Time zones are also adjusted to fit around internal borders such as states or provinces.

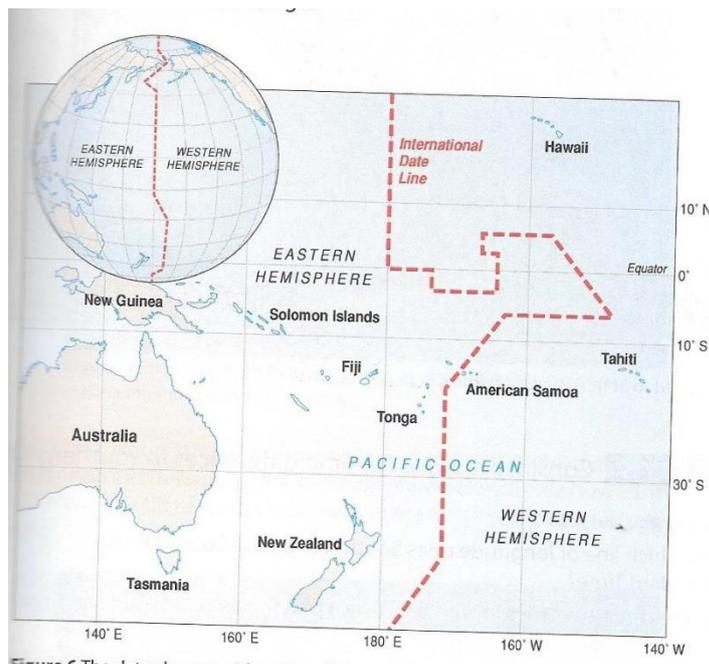
Large countries like the United States of America and Australia have several time zones. The Chinese government decided that China should only have one time zone even though the longitude position of China means that it should have four time zones.



### The International Date Line:

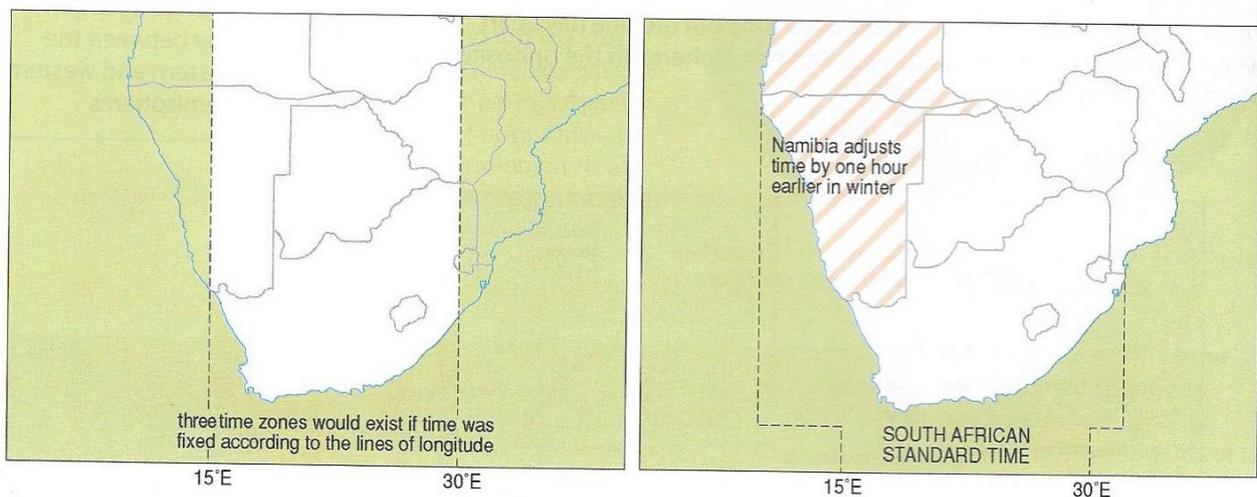
This line of longitude is on the **opposite** side of the world to the **Greenwich Meridian**. It follows the 180° line of longitude for most of its length. Like the other time zones, the International Date Line is adjusted to go around certain islands and countries. The International Date Line divides the world into the eastern and western hemispheres on the Pacific Ocean part of the world. Places in the eastern hemisphere are a day earlier than places in the western hemisphere.

Tonga and American Samoa have the same time, but are one day apart. This is because American Samoa is in the Western Hemisphere, on the opposite side of the International Date Line from Tonga.



### 2.4 SOUTH AFRICAN STANDARD TIME

South Africa should have two time zones because both the 15° and 30° lines of longitude pass through the country. The South African government decided to adjust the time zones to fit its borders. South African Standard Time is based on the 30° line of longitude. It is two hours ahead of the time on the Greenwich Meridian.





**ACTIVITY 4: You need access to an atlas or a wall map.**

1. Using the ratio scale 1:50 000, calculate the following distances. Answer in the spaces provided and show calculations.
- a) 8 cm on the map is \_\_\_\_\_ in reality.
- b) 5,5 cm on the map is \_\_\_\_\_ in reality.
- c) 9,5 cm on the map is \_\_\_\_\_ in reality.

**Answers:**

- a) \_\_\_\_\_
- b) \_\_\_\_\_
- c) \_\_\_\_\_

2. Rewrite the ratio scale 1:50 000 as a word scale.

\_\_\_\_\_

3. In to which of two of earth's hemispheres will you find the following places?

E.g.: South Africa: South East

Russia: \_\_\_\_\_

Egypt: \_\_\_\_\_

Portugal: \_\_\_\_\_

Canada: \_\_\_\_\_

4. Use the time zones on page 7 to help you answer the following questions.

- a) Is it earlier or later to the east of the Meridian? \_\_\_\_\_
- b) What time will it be in South Africa if it is 12 noon at Greenwich? \_\_\_\_\_
- c) When it is 8 am in Western Australia, what time is it in South Africa? \_\_\_\_\_
- d) If your friend phones you at midnight in Japan, what time will it be in South Africa?  
\_\_\_\_\_

5. What line of longitude does the IDL follow? \_\_\_\_\_

6. Look at the diagram of the IDL on page 8 of your notes. How many degrees of longitude has the IDL been adjusted where is it 5° south of the equator? Why was this adjustment made?

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

7. Explain why Tonga and American Samoa have the same time, but a different date?

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

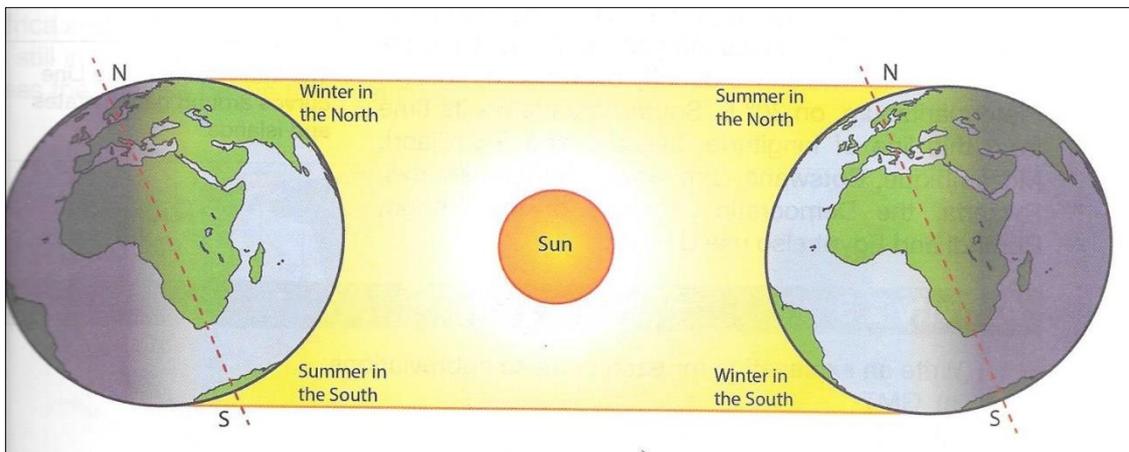
## 2.5 THE EARTH'S REVOLUTION AROUND THE SUN

### Angle of Axis

The Earth rotates on its axis which is always at an angle of  $23, 5^{\circ}$ . The tilt of the Earth's axis is maintained for the **365, 25** days it takes to complete one orbit in its revolution around the sun. This takes **one year**.

It takes the earth 365, 25 days to make one revolution around the sun. We drop the, 25 ( $\frac{1}{4}$ ) of a day from our calendar but **every four years, we** make up for it by **adding one full day to the month of February**. This is called a Leap Year. **February has 29 days in a Leap Year**.

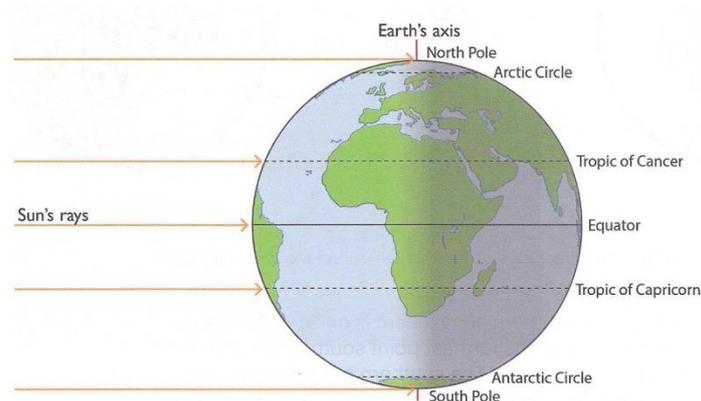
The angle of axis and the orbit causes the northern hemisphere to be tilted towards the sun when the southern hemisphere is tilted away from the sun. The opposite occurs six months later when the northern hemisphere is tilted away from the sun.



### EQUINOX, SOLSTICE AND THE CHANGE OF ANGLE IN THE MIDDAY SUN

The Earth's revolution around the sun and the tilt of its axis makes it *appear* as though the sun is moving between the tropics. Each tropic is the farthest boundary, north and south, where the sun can be directly overhead at noon, at different times of the year.

An **equinox** occurs when the sun's rays shine directly over the Equator at noon. Because of the Earth's revolution around the sun, this occurs twice a year – **21 or 22 March and 22 or 23 September**. On these days, every place in the world receives an equal amount of daylight and darkness (12 hours of daylight and 12 hours of darkness).



A **solstice** occurs when the sun's rays are directly over the tropics at noon. This happens twice a year – on **21 or 22 June** and **21 or 22 December**.

The **summer solstice** for the **southern hemisphere** is on **21 or 22 December**. This is when the sun reaches its furthest point south, shining directly over the **Tropic of Capricorn** at noon. The southern hemisphere receives the **longest hours** of sunshine. Within the **Antarctic Circle** the sun never sets but **shines for 24 hours**.

**South Africa** has its **winter solstice** on **21 or 22 June**, when the sun is at its furthest point away, shining directly over the **Tropic of Cancer** in the north at noon. The southern hemisphere has the **shortest hours of sunshine**, while the northern hemisphere has the longest hours of sunshine. Within the **Arctic Circle** the sun never sets and it is **light for 24 hours**.

***When the southern hemisphere has its summer solstice, the northern hemisphere has its winter solstice.***

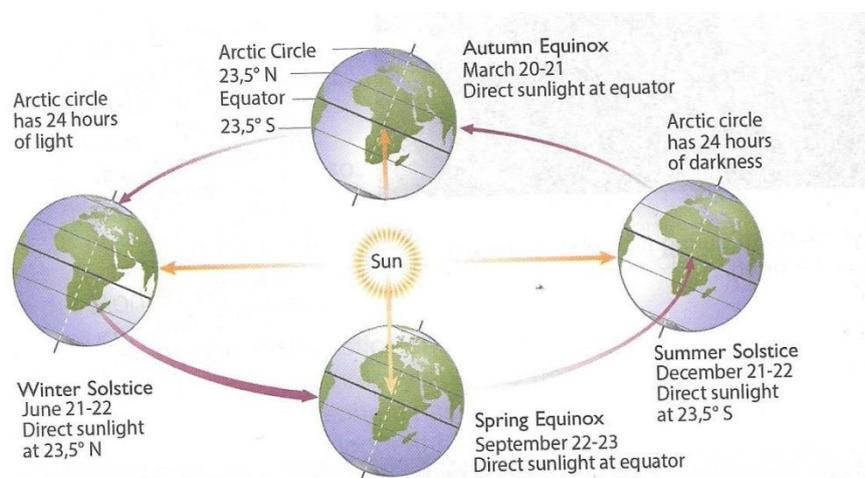
Oceans take longer to warm up and cool down than the land does. That is why the hottest summer temperatures for South Africa are not on 21 or 22 December (the summer solstice), but in January and February of the following year.

### **SEASONAL CHANGES IN LENGTH OF DAY AND NIGHT**

There are **four seasons in a year** and each season lasts approximately three months. In reality there is **no sudden change** where one season ends and another begins.

In the **southern hemisphere**, the sun shines directly over the Tropic of Capricorn on 21 or 22 December. This is the furthest point south on Earth on which the sun's rays can shine directly. The **longest hours of sunlight are experienced in the high latitudes** of the south because the southern hemisphere is tilted towards the sun.

**As the sun moves further north** back towards the Equator, **the days become shorter**. By **21 or 22 March**, the sun is directly over the Equator and all places on earth receive **12 hours of daylight and 12 hours of darkness**. This is **autumn** in the southern hemisphere.



This diagram shows the solstices and equinoxes.

Winter follows autumn as the **sun moves** even **further north** and shines directly over the **Tropic of Cancer on 21 or 22 June**. This is the **winter solstice** for the southern hemisphere and the summer solstice for the northern hemisphere. The days are the shortest and the nights are the longest in the south because the **south is tilted away from the sun**.

As the sun moves southwards again, the days begin to grow longer. When the sun is back over the Equator, on **22 or 23 September**, the **spring equinox** occurs for the southern hemisphere. When the sun is directly over the **Tropic of Capricorn on 21 or 22 December**, it is the **summer solstice** in the southern hemisphere.

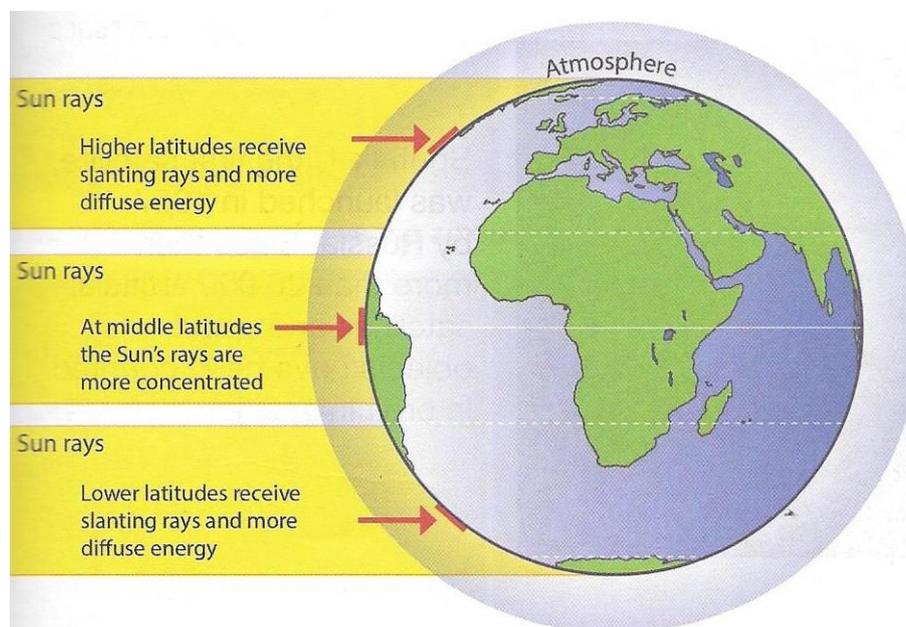
### SEASONAL TEMPERATURE CHANGES

Temperatures on Earth are controlled by how much **insolation** the Earth receives. The amount of insolation is greatest during the summer solstice and least at the time of winter solstice.

**Insolation: the amount of heat and light that enters the Earth's atmosphere from the sun.**

**Insolation is greatest over the over the Equator and between the tropics.** Here, the sun has less atmosphere to shine through and the rays are directly focused. Less heat is lost getting to the Earth's surface. This is why it is so warm at the Equator and in the tropics all year round.

**Insolation is least in the high latitudes near the Poles.** The angle at which the sun's rays strike the Earth is greater and this spreads the heat over a wider area making it less intense. Heat is lost because the sun's rays must travel through more atmosphere to reach the Earth's surface.



This diagram shows that the most direct rays of the sun fall between the tropics and that at higher latitudes the insolation is less direct

### **3. SATELLITE IMAGES**

#### **3.1 What do satellite images look like?**

A satellite is a highly complex piece of technology which is positioned above Earth in space. Sensors on the satellite collect information about Earth and send it back to satellite-receiving stations on the ground. The information is used to make different kinds of satellite images.

Satellite images are not photographs. The images are made from a collection of data obtained by sensors on the satellite. The satellite sends information to receiving centres on the ground. Computers process this data and produce different images that we can view and interpret.



*Satellite Image of Cape Town taken in 2010.*

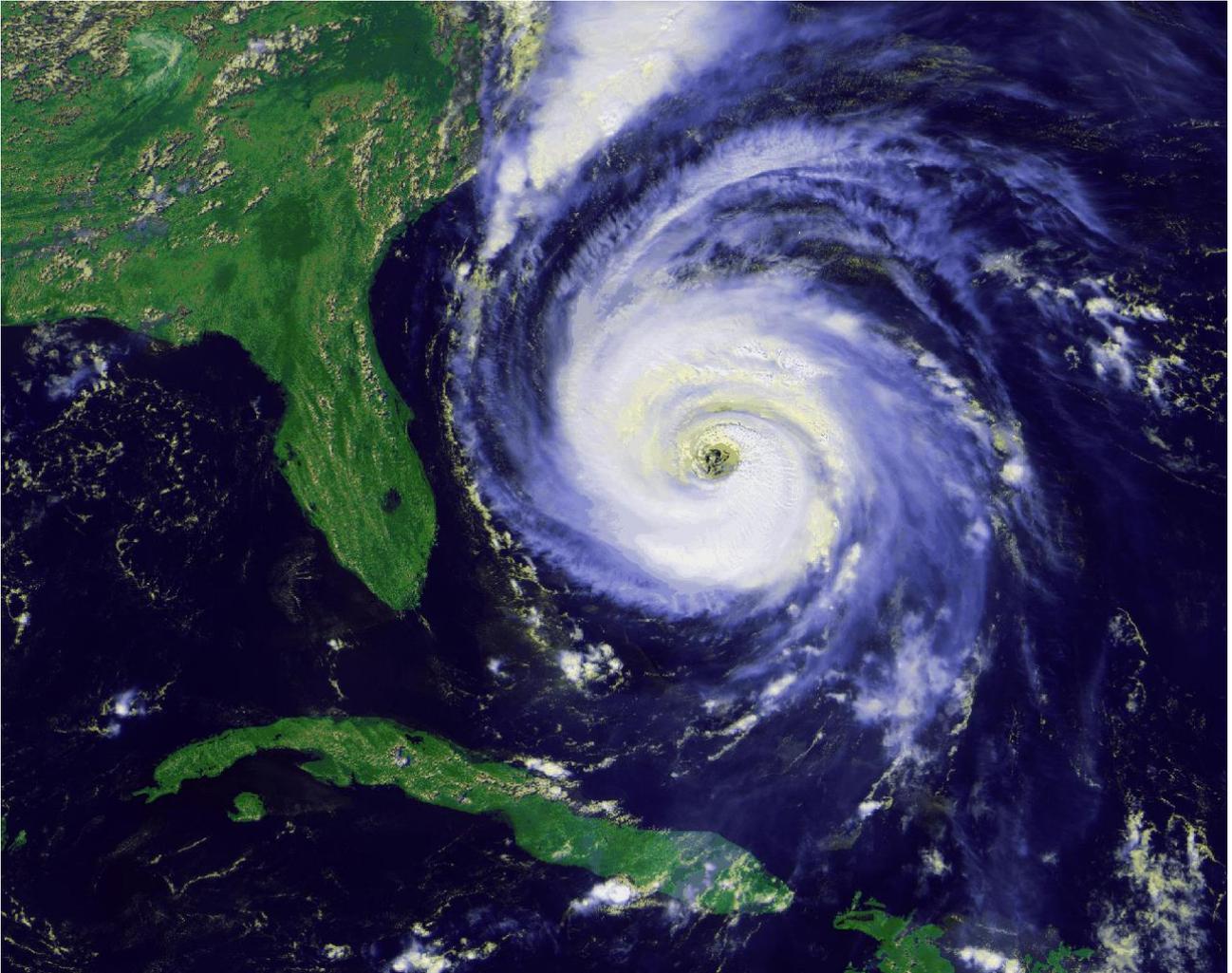
#### **3.2 Information from Satellites Images:**

Satellite images have many applications: mapping, weather forecasting and cloud patterns, land use, agriculture, geology, vegetation studies and forestry, biodiversity, conservation, regional planning, education, intelligence and warfare. It is also used in seismology and oceanography in deducing changes to land formations, water depth and sea bed, changes by earthquakes, volcanoes and tsunamis. Often a series of satellite images can be put together to make a composite image.

#### **3.3 How Satellite Images are used:**

Satellite images help scientists identify areas where there is water and vegetation and if rocks contain valuable resources such as oil, iron and gas deposits, as well as providing information about approaching cloud patterns and storms. All of these uses can take place from examining satellite images without people having to actually visit the areas in question.

One of the most common uses of satellites is in weather forecasting. Weather satellites provide information about the position and types of clouds in the atmosphere, wind speeds, pressure differences and temperature. A weather satellite can supply regular information about how conditions in the atmosphere change over a short time. A trained meteorologist can interpret a weather satellite image and make informed predictions about what the weather will be like in different places. Cloud patterns provide information about approaching rain or snow storms. This information can help people prepare for what could be a natural disaster.



Satellite image of a hurricane off the Florida Coast, USA.

# Countries and Continents Of the World



<http://geology.com/world/world-map-clickable.gif>

# Africa



Second largest continent  
On earth  
(30,065,000 Sq. Km)

Most countries of  
Any other  
continent Home to The  
Sahara,

The largest desert in  
the world and The Nile,  
the longest river in the  
world

The Sahara: covers 4,619,260 km<sup>2</sup>  
The Nile: 6695 kilometers long  
there are over 1000 languages  
Spoken in Africa





# North America



Third largest  
Continent  
on earth  
(24,256,000 Sq. Km)

Composed of  
23 countries

Most North  
Americans speak  
French, Spanish, and  
English

Only continent that has every  
kind of climate

# Asia



Largest continent in size and population

(44,579,000 Sq. Km)

Contains 47 countries

Contains the world's largest country, Russia, and the most populous country, China

The Great Wall of China is the only man made structure that can be seen From space

Home to Mt. Everest (on the border of Tibet and Nepal), the highest point on earth

Mt. Everest is 29,028 ft. (8,848 m) tall

# Europe

Second smallest continent in the world

(9,938,000 Sq. Km)

Home to the smallest country

(Vatican City State)

There are no deserts in Europe

Contains mineral resources: coal,

Petroleum, natural gas,

Copper, lead, and tin



# Oceania/Australia



Smallest continent on earth

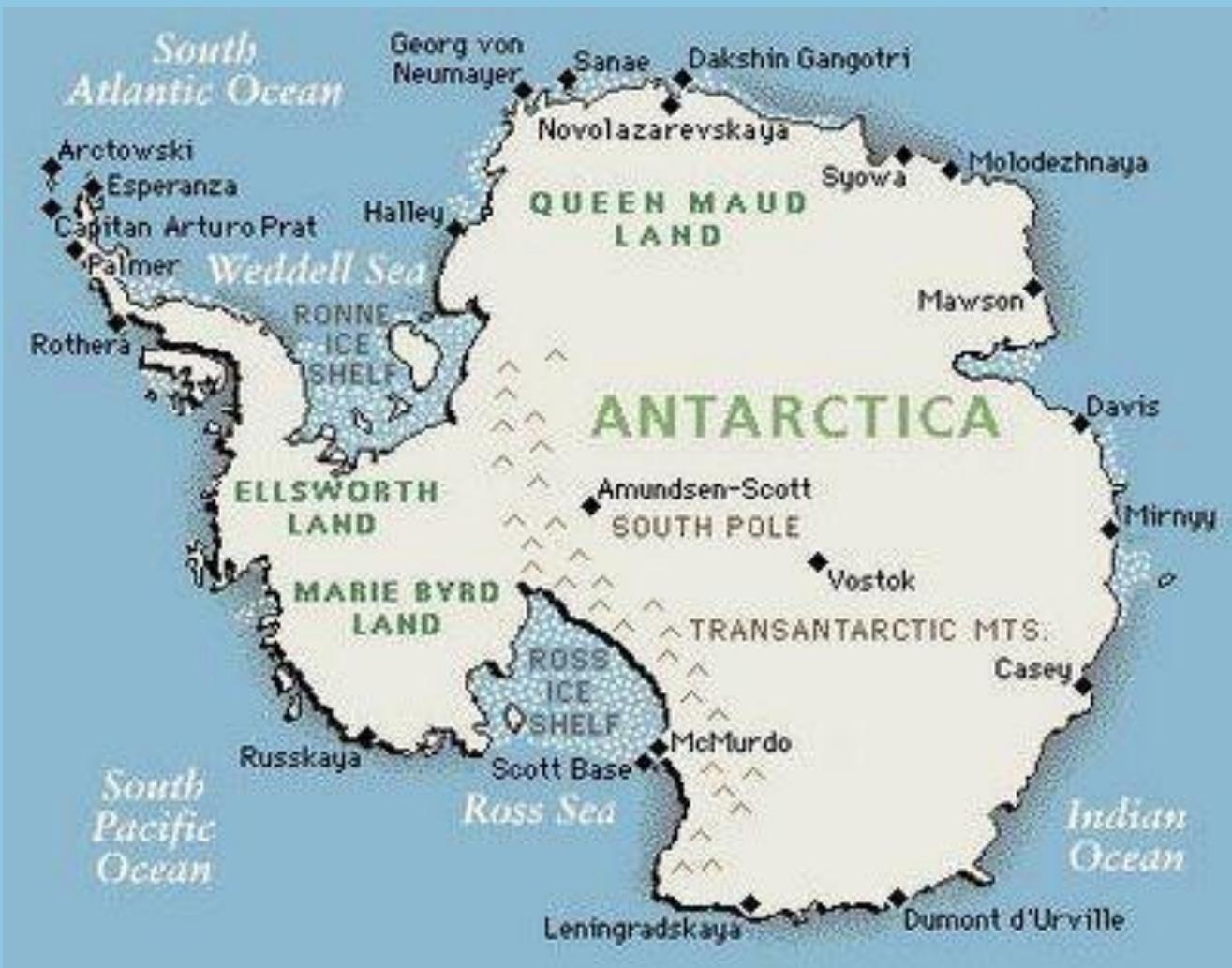
(7,687,000 Sq. Km)

Australia is known for its vast wildlife

Home to rare species of animals including kangaroos

“The Great Barrier Reef” is the world’s largest coral reef and is located off the coast of Australia

# Antarctica



Third smallest continent on earth

(13,209,000 Sq. Km)

The lowest point on Earth is on Antarctica located 8,327 ft (2,538 m) below sea level

There are no countries in Antarctica. The U.S. and many other countries operate science stations there, but no nation owns the land

Antarctica is a desert due to its cold climate  
Coldest, windiest, and driest continent

# South America



Fourth smallest continent on Earth

(17,819,000 Sq. Km)

Home to The Andes: world's second largest mountain range

The second largest river- The Amazon also runs through South America

The largest forest area in the world is seen in South America

# World Oceans

