



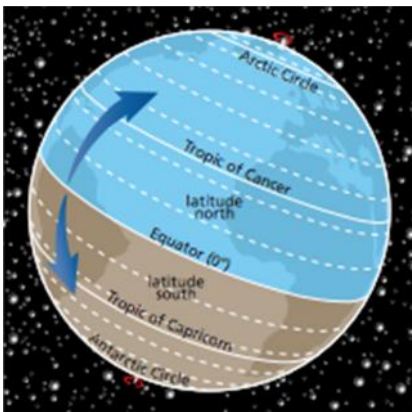
PDF 2

Geographic coordinates¹

The geographic coordinates system is network of imaginary horizontal and vertical lines that are drawn on globes or maps. These lines are called **parallels** (lines of latitude) and **meridians** (lines of longitude).

Parallels and meridians form an imaginary geographical network, in the form of a grid, which allows us to locate the exact position of any place in the world

3.1. Parallels



The Equator is an imaginary circle around the widest part of the Earth. It is 40075 km long. It divides our planet into two equal halves or **hemispheres**, a Greek word meaning half a sphere. The top half is the **Northern Hemisphere** and the bottom half is the **Southern Hemisphere**.

Parallels are imaginary lines that circle the Earth parallel to the **Equator**.

The Equator is 0° latitude. After that, there are 90 parallels to the north and another 90 to the south.

Some of these parallels are very important. In the Northern Hemisphere, there is the Tropic of **Cancer** and the **Arctic Circle**.

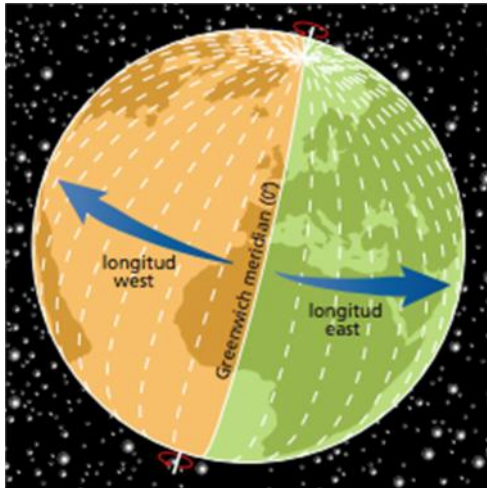
¹ SOURCE:

https://www.blinklearning.com/Cursos/c612899_c28988679_Portada.php FREE SAMPLE TRIAL FOR EDUCATIONAL PURPOSES OF Student's book ISBN: 978-84-673-9257-9



The area between the Equator and the tropics (the Intertropical Convergence Zone) has **low latitudes**; the area between the tropics and the polar circles are **medium latitudes** and the area between the polar circles and the Poles has **high latitudes**.

3.2. Meridians



The **prime meridian or Greenwich meridian** is 0° longitude. It is named after the British observatory at Greenwich because the prime meridian runs through the observatory. This is the point of reference for all other meridians.

There are 180 main meridians to the east and another 180 to the west.

Meridians are imaginary semi-circles that go from pole to pole.

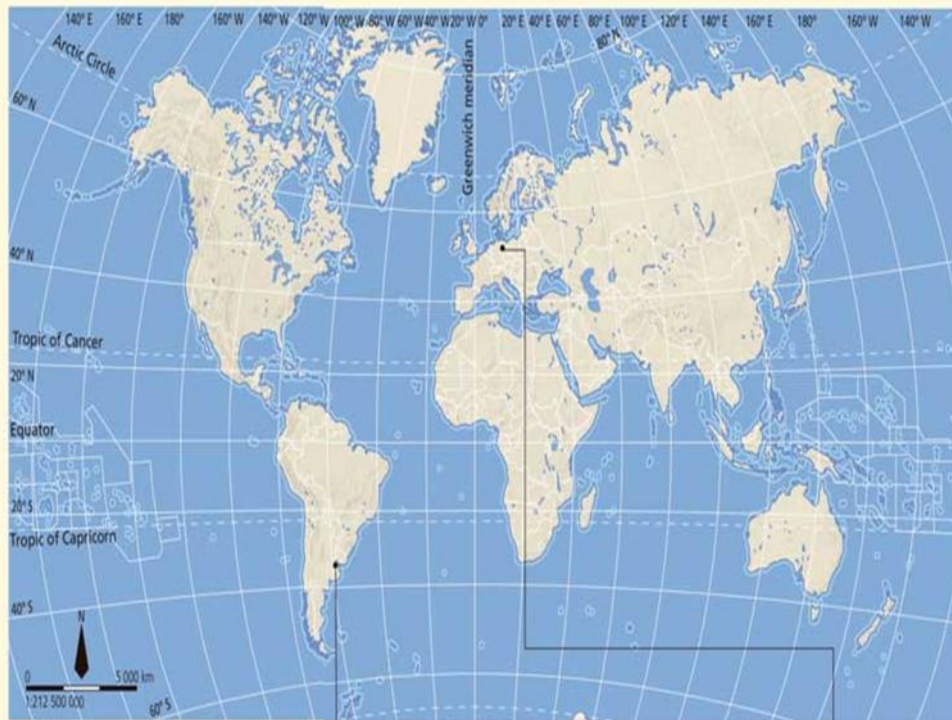


Your way to get along around the Globe. 1 ESO.

Prof. de Grimal.



HOW TO LOCATE A POINT ON EARTH



Any point we want to find on the Earth's surface can be located where a **parallel** (latitude) and a **meridian** (longitude) intersect⁵.

Latitude is the angular distance between any point on Earth and the Equator.

Latitude ranges⁶ between 0° and 90° north and between 0° and 90° south. Because it is an angular distance it is measured in **degrees, minutes and seconds**. The maximum degree of latitude, 90°, corresponds to the poles.

Longitude is the angular distance between any point on the Earth and **prime meridian** or **Greenwich meridian**.

Longitude ranges between 0° and 180° east and between 0° and 180° longitude west. Like latitude, it is measured in degrees, minutes and seconds.

If we measure the latitude and longitude of a place we can find its exact location.

Let's look at these examples:

Buenos Aires A city in the Southern Hemisphere and west of the Greenwich meridian. Its coordinates are latitude 34° 36' 47" south and longitude 58° 22' 38" west.

Berlin A city in the Northern Hemisphere and east of the Greenwich meridian. Its coordinates are latitude 52° 31' 02" north and longitude 13° 24' 37" east.

The representation of the Earth

Talking book

Cartography is the **science** of studying and **making maps**.

The most difficult thing about making maps is how to represent the Earth's sphere on a flat surface. **Map projections** make this possible.

4.1. Map projections

A **projection** is the result of projecting a 3D image onto a flat surface.

There are many types of map projections, but the main three are: **cylindrical**, **conical** and **planar**.



Your way to get along around the Globe. 1 ESO.

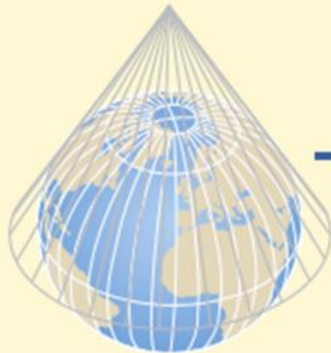
Prof. Dr. Grimalt



TYPES OF MAP PROJECTION

Cylindrical projection

A cylindrical projection is made by wrapping a cylinder around a globe and projecting the details of the globe onto the surface to make a world map. The globe touches the cylinder at the Equator and so there is more distortion in the areas further from it. This type of projection is used to represent the entire world.



Conical projection

In a conical projection, the globe is projected onto a cone. When opened up it is shaped like a fan. The globe touches the cone at the tropics lines, so it is the best type of projection for medium latitudes. On the flat surface, the meridians are converted into straight lines, starting at the pole and the parallels take the shape of arcs of concentric circles.

Planar projection

In a planar (or azimuth) projection, the globe is projected onto a flat surface. The result is a circular projection. The globe only touches the flat surface at the pole which is being mapped. This is the best type of projection for the polar regions. It also shows a whole hemisphere.



4.2. Maps

A **map** is the true **representation** of the whole or part of an area on a **flat surface**.



Since the ancient past, people have used maps to represent the world. Often, these primitive maps represented what people knew about the world at the time, more than the geographic reality. Until Columbus discovered America in 1492, maps only represented the continents of the Old World: Europe, Africa and Asia.

Nowadays there are many types of maps.

- **Topographic maps** represent in detail the relief, cities, towns or villages, roads and railways and other features of an area.
- **Thematic maps** show specific aspects of an area. For example, they can be political (with borders or administrative divisions), show infrastructures (with motorways or railway lines), show relief, climate or population.



Political map of Spain



Road map of Spain

Weblink 5: Maps home page

Video 5: Reading a map

4.3. Street maps and plans

Talking book

Street maps represent smaller areas than other maps, such as cities or towns. **Plans** show us how the inside of buildings are organised.



Street maps are used to show the location of monuments, museums, public buildings and bus or metro lines.

Plans show us the interior organisation of buildings or facilities such as hospitals, museums and schools.

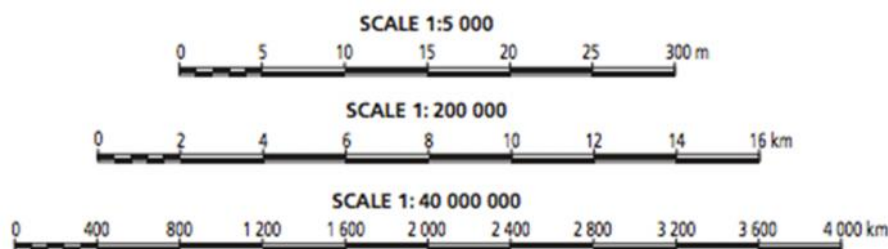
4.4. The scale of maps and plans

Talking book

Maps and plans represent large areas on small surfaces, so we need to know the relation between real size and the size shown on the map.

Scale is the ratio between the size of the area represented on the map and the real size of the area. It can be expressed numerically and graphically.

- **Numeric scale** is expressed using a fraction in which the numerator is the unit of size on the map and the denominator shows the number of equivalent units in real size. A scale of 1:25 000, means that one unit, for example 1 cm, represents 25 000 centimetres in real size.
- **Graphic scale** indicates the distances on a map using a straight line divided into equal parts, like a ruler.



Depending on the ratio between the size on the map and the real size of the area, we use three kinds of scale: small, medium and large.

- Large scale maps show a lot of detail because they represent small areas and their denominator is also small. They have a scale of up to 1:50 000 and are used to represent towns, cities, provinces or sections of rivers.



- Small scale maps show few details because they represent large areas and their denominator is very large. They are used to represent the world, continents, large regions of the Earth or medium to large countries.

SCALE	RATIO	PLACES REPRESENTED
Large	from 1:10 000 to 1:100 000	cities, towns, provinces
Medium	from 1:100 000 to 1:500 000	not very large regions and countries
Small	from 1:500 000 to 1:50 000 000	large countries, continents, world maps

PLANS AND MAPS

Section of a street map of Madrid

Main road
Local road
Asphalt track
Main track
Secondary track
Dangerous track
Footpath
Trail
Railway
Chairlift
Ski station
Construction
Telecommunications tower
Water pipe
Regional border
Municipal border
National park border
Contour line
Peak
Survey point
Car park
Railway station
Hotel
Shelter
Hut
Spring
Church
Long distance footpath
Short distance footpath
Forest
Scrub and meadows
Farmland and rocks

Topographic map of Sierra de Guadarrama with a scale of 1:25000, by Editorial Alpina (adapted)

World map with a scale of 1: 40 000 000 (detail of Europe)



Your way to get along arround the Globe. 1 ESO.

Prof. Dr. Grimal.



WORLD-TREKKERS