

1. Maps of the Earth

This chapter

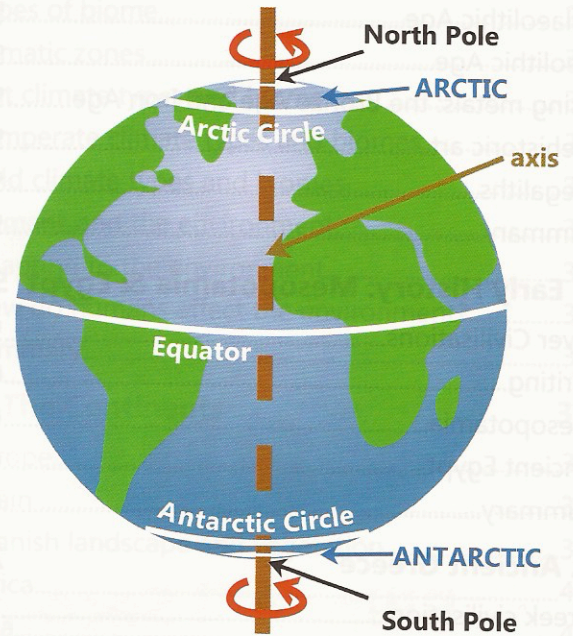
This first chapter is about the **Earth**, and how we show it on **maps**. The Earth is part of the **Solar System**, which includes **the Sun and eight planets**. We will look at:

- the Equator, the Poles and the Earth's hemispheres
- the points of the compass, latitude and longitude
- different types of maps and how to read a map

The Earth

The Earth is a **sphere***. It **rotates on its axis**. The **axis** is an **imaginary line through the centre of the Earth**.

- **POLES**: the places where the axis meets the surface of the Earth are called the **North Pole** and the **South Pole**.
- **ARCTIC**: the area around the North Pole. The **Arctic Circle** marks the edge of the Arctic.
- **ANTARCTIC**: the area around the South Pole. The **Antarctic Circle** marks the edge of the Antarctic.
- **EQUATOR**: an imaginary line around the Earth. It is the same distance from the North Pole and the South Pole.
- **HEMISPHERES**: the Earth has **two hemispheres**:



Everything north of the equator is in the **Northern Hemisphere**.

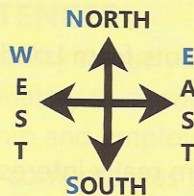
Everything south of the equator is in the **Southern Hemisphere**.

*The **Earth** is **not a perfect sphere** because it is slightly **flattened** at the poles.

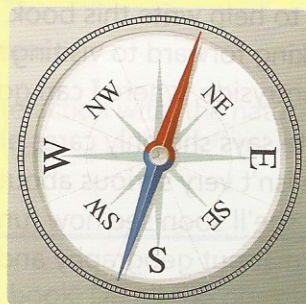
POINTS OF THE COMPASS

Navigation is **finding the way from one place to another**. To help us, we can use a **compass**.

A **compass** shows us the **directions north, east, south and west**. These are the four main **compass points**. They are often abbreviated to **N, E, S and W**.



The points between N, S, E and W are called **north-east (NE)**, **south-east (SE)**, **south-west (SW)** and **north-west (NW)**.



Questions

1 3

- Copy the sentences and **fill in the gaps** with the words from the box.
 - The Earth is a **★★★★**.
 - The Earth **★★★★** on its axis.
 - The **★★★★** is a line going around the middle of the Earth.
 - The **North Pole** is in the **★★★★**.
 - The **South Pole** is in the **★★★★**.
- Which **hemisphere** is **Spain** in?
- Which **hemisphere** is **Australia** in?
- Match up the directions that are **opposite each other** on the compass.

north	south-east
east	south
north-west	south-west
north-east	west

equator
sphere
Arctic
rotates
Antarctic

Latitude

Latitude is how far north or south of the equator a place is. Lines that connect places with the same latitude are called **lines of latitude**. Lines of latitude are parallel to the equator. Sometimes they are also called **parallels**.

- We measure **latitude** in **degrees**.
- The **equator** has a latitude of **0 degrees (0°)**.

Northern Hemisphere

- Places to the **north of the equator** have a latitude of **between 0° and 90 degrees north (90°N)**.
- The **North Pole** has a latitude of **90°N**.

Southern Hemisphere

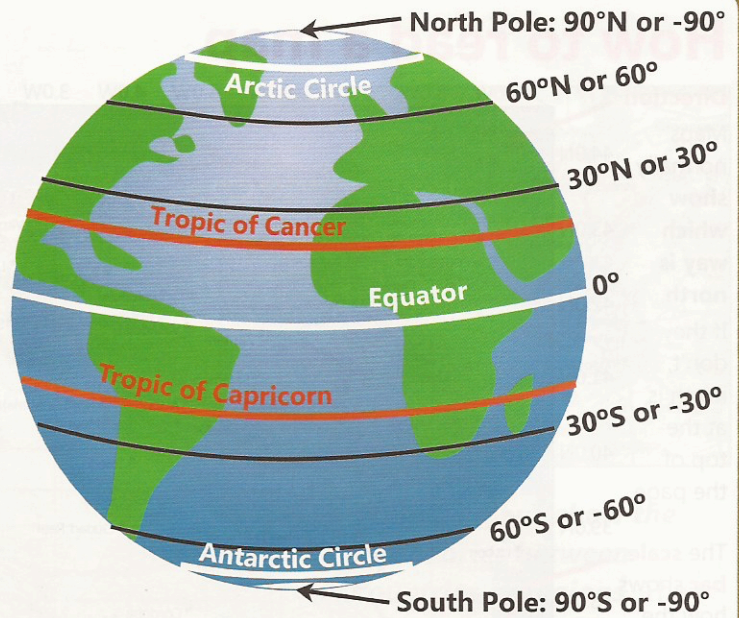
- Places that are **south of the equator** have a latitude of **between 0° and 90 degrees south (90°S)**.
- The **South Pole** has a latitude of **90°S**.

Instead of **N** and **S**, we sometimes use:

- **positive** latitudes for the **Northern Hemisphere**
- **negative** latitudes for the **Southern Hemisphere**



You are most likely to find positive and negative latitudes used on Internet maps.



The most important **lines of latitude** are:

- the **equator**
- the **Tropic of Cancer** and **Tropic of Capricorn**
- the **Arctic Circle** and the **Antarctic Circle**

Questions



5. What is the **latitude** of **Madrid**? 40°N or 40°S?
6. What is the **latitude** of the **Tropic of Capricorn**?
 - a) between 0° and 30°N
 - b) between 0° and 30°S
 - c) between 60°S and 90°S

Longitude

Longitude is how far east or west a place is. Lines that connect places with the same longitude are called **lines of longitude** or **meridians**. They go between the North Pole and the South Pole.

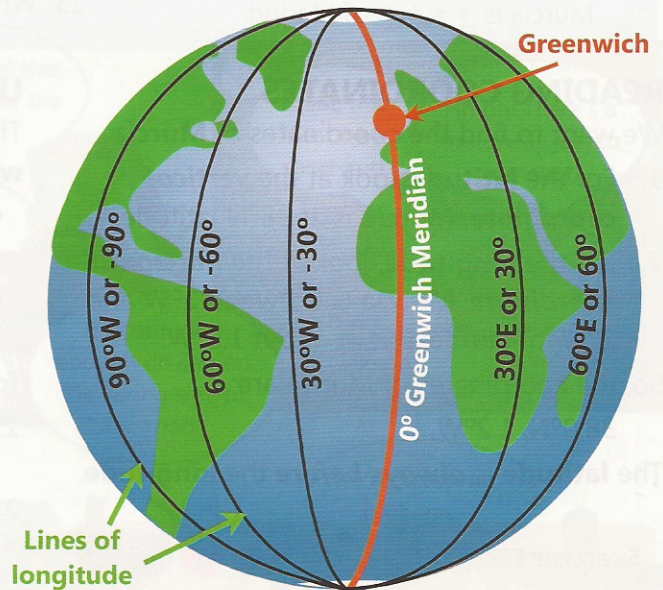
- We measure **longitude** in **degrees**.
- The **Greenwich Meridian** or **Prime Meridian** has a longitude of **0 degrees (0°)**. The Greenwich Meridian goes through **Greenwich** in London.
- Places that are **east of Greenwich** have a longitude of **between 0° and 180 degrees east (180°E)**.
- Places to the **west of Greenwich** have a longitude of **between 0° and 180 degrees west (180°W)**.

Instead of **E** and **W**, we sometimes use:

- **positive** longitudes for places to the **east of Greenwich**
- **negative** longitudes for places to the **west of Greenwich**



You are most likely to find positive and negative longitudes used on Internet maps.



Questions



7. What is the **longitude** of **New York**?
 - a) 74°E
 - b) 74°W
8. What is **another way** to write the **longitude** of **New York**, +74° or -74°?

How to read a map



The **key** (or **legend**) tells us what the **symbols** on the map mean.

Direction

Maps normally **show which way is north**.

If they don't, north is at the top of the page.

The **scale bar** shows how the **distances on the map relate to real distances**.



The **grid lines** are the **lines of latitude and lines of longitude**.

They show exactly where places on the map are.

The **vertical coordinate** tells us the latitude.

The **horizontal coordinate** tells us the longitude.

Questions

- Copy the sentences and **fill in the gaps** with the correct **directions**.
Example: Madrid is **north** of Linares.
Mérida is ★★★★★ of Albacete.
Salamanca is ★★★★★ of Gijón.
Murcia is ★★★★★ of Madrid.
- Which **city** on the map is **furthest south**?
- Which **city** on the map is **closest to the Greenwich Meridian** (0° longitude)?
- Write down **four cities** with a **latitude** of approximately 39°N.
- What is the **longitude** of San Sebastián?

READING COORDINATES

We want to find the coordinates of **Murcia**.

- For the **latitude**, look at the **vertical coordinate**. **Murcia** is at 38°N latitude.
- For the **longitude**, look at the **horizontal coordinate**. **Murcia** is **between 1°W and 2°W** longitude. It is at about 1.2°W.

So, the coordinates of Murcia are:
38.0°N, 1.2°W.

The **latitude** is **always before** the **longitude**.

Exercise 1

Copy the table and fill in the coordinates:

Place	Latitude	Longitude
Madrid	★★★★★	★★★★★
Bilbao	★★★★★	★★★★★
Barcelona	★★★★★	★★★★★
Almeria	★★★★★	★★★★★

USING THE SCALE

The map on this page has a **scale bar**, but we can also **write the scale in different ways**, for example:

- 1 cm = 100 km (this means that 1 cm on the map is 100 km)
- 1:10,000,000 (this is the same as 1 cm = 100 km because there are 10 million cm in 100 km)

To work out the real distance:

- Measure the distance with a **ruler**. The distance between **Cádiz** and **Málaga** is 1.8 cm.
- For a scale of **1 cm = 100 km**, we calculate:
Real distance (in **km**) = Map distance (in **cm**) x **100**
= 1.8 x 100 = 180 km

Exercise 2

What is the **distance** from Madrid to Burgos?

- Distance on the map = ★★★★★ cm
- Real distance (in km) = Map distance (in cm) x 100
= ★★★★★ x 100 = ★★★★★ km

Globes and maps

A globe is a **small version of the Earth**. It is the **most accurate** way to represent the Earth.



A **map shows the Earth on a flat surface**. Maps are more useful than globes because:

- they are **cheaper to make**
- they are **easier to store**
- it is **easy to make** a map for a small or large area

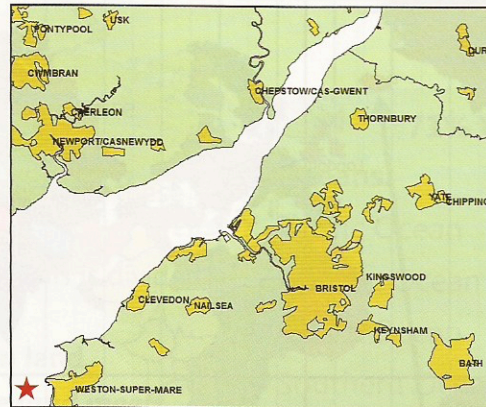
There is also a **disadvantage**. When we make a flat map of the curved Earth, shapes and distances get **distorted**:

- For a **large area** (for example, the whole Earth), the map is **very distorted**.
- For a **smaller area** (for example, your home town) the map is **much less distorted**.

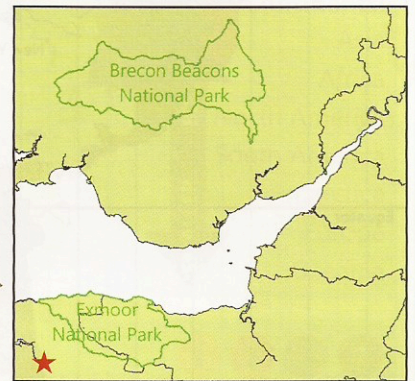
TYPES OF MAP

Physical maps show the **shape of the land**, and water features like **seas** and **oceans**.

More detailed physical maps are called **topographic maps**. They also show features such as roads, rivers and place names.



Political maps show the **boundaries between countries or regions**. They also show **towns and cities**.

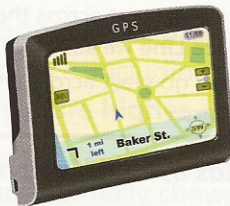


Thematic maps show a **specific thing**, for example: population, climate, types of industry or types of agriculture. This map shows the location of National Parks.

Maps marked with ★ contain Ordnance Survey Data
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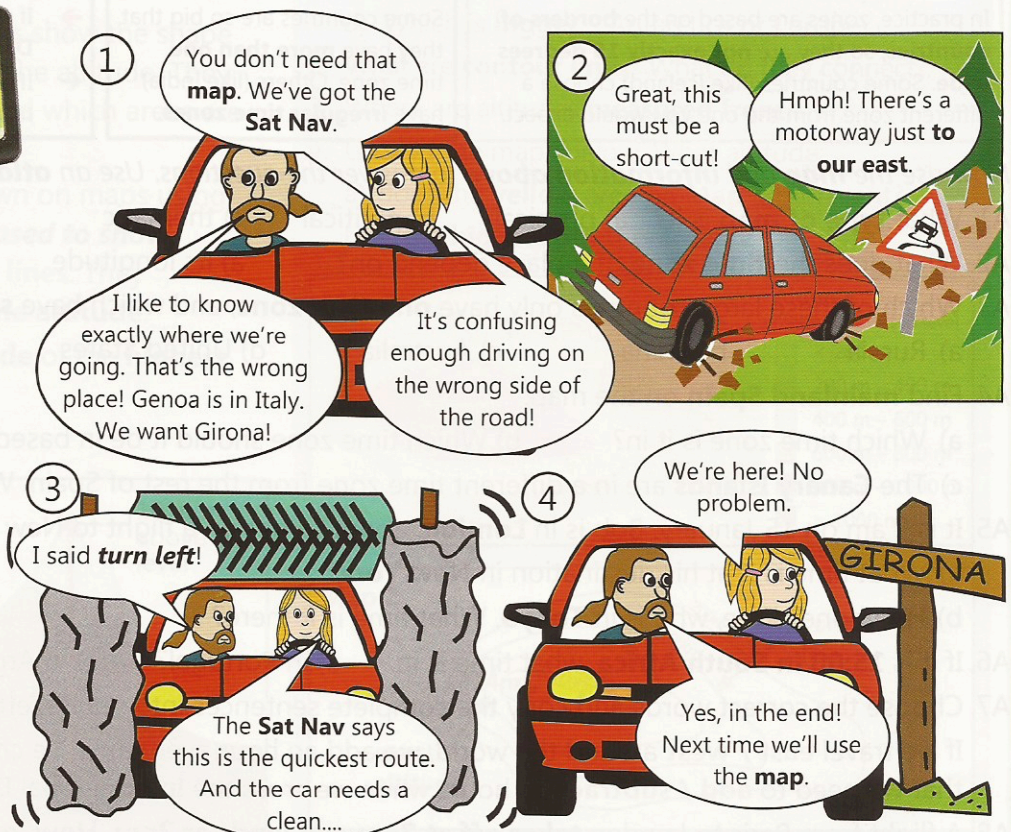
GPS

GPS is now very popular. It stands for **Global Positioning System**, and it uses **satellites** for **navigation**. This is why most people call it **"Sat Nav"**.



Exercise 3 1 2 3 4

Computer navigation systems like Sat Nav are very useful but they don't always get things right! Use an online route finder. Enter your **normal journey from home to school**. Is the route the same as the one you normally take? Is it a good route?



MAPS OF THE EARTH - SUMMARY

In this chapter about **maps of the Earth**, you learned about:

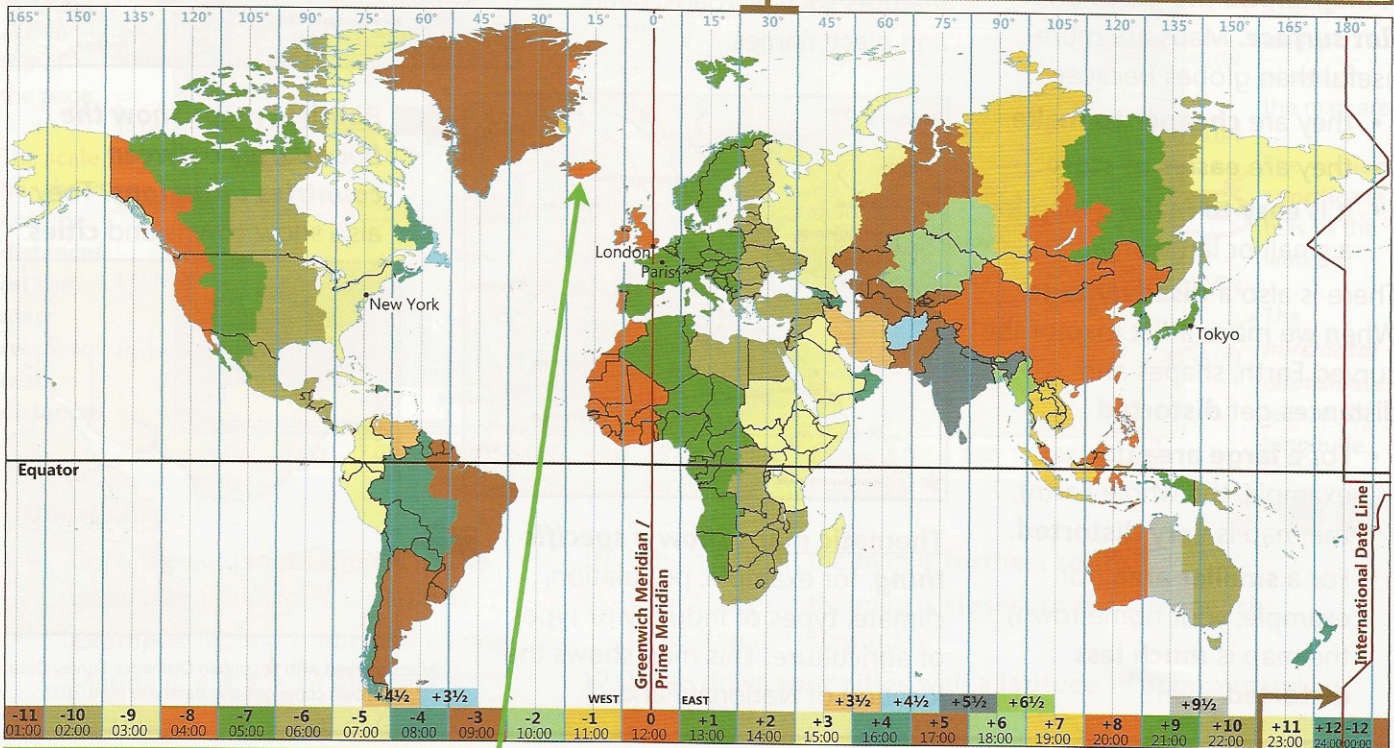
- the **points of the compass, latitude and longitude**
- different **types of map** and **how to read a map**

A. TIME ZONE MAP

1 2 3 7

The Earth is divided into **time zones** with different local times. This is because when it is day on one side of the Earth, it is night on the other side.

Standard time zones are **15 degrees of longitude wide**. If you go **east** → from the Greenwich Meridian, the time becomes **one hour later** each time you enter a new zone. If you go **west** ←, it becomes **one hour earlier**.



In practice, zones are based on the **borders of countries**, so they are **not exactly 15 degrees wide**. Some countries (like Iceland) choose a different zone from the one you would expect.

Some countries are so big that they have **more than one** time zone. Others (like India) have **irregular time zones**.

→ If we go **east** across the **International Date Line** we **subtract 24 hours**.
 ← If we go **west** across it we **add 24 hours**.

Now use the **map and information above** to answer the questions. Use an **atlas** as well if you need to.

- A1. What **type of map** is it? a) physical b) political c) thematic
- A2. What does the **time zone** of a place depend on? a) its longitude b) its latitude
- A3. Which of these large countries only have **one time zone**, and which have **several different time zones**?
 a) Russia b) China c) Australia d) United States e) India
- A4. Find **mainland Spain** on the map:
 a) Which time zone is it in? b) Which time zone should it be in based on its geographical position?
 c) The **Canary Islands** are in a different time zone from the rest of Spain. Why?
- A5. It is 9 am on 15 January. Bob is in **London**, about to get on a flight to New York.
 a) What time is it at his destination in **New York**?
 b) He phones Kate, who is in **Tokyo**. What time is it there?
- A6. If it is **15:00 in South Africa**, what time is it: a) in Portugal? b) in Argentina? c) in New Zealand?
- A7. Choose the correct words and copy the complete sentences into your exercise book:
 If we travel **east / west** around the world, we add an hour every time we cross a time zone. This means that we need to **add / subtract** 24 hours when we cross the International Date Line.
- A8. A flight from Paris to London **takes off at 2pm** and **lands at 2pm**. **How long** was the flight?