Do not write in this book. Do all the activities in your notebook.
<table>
<thead>
<tr>
<th>Unit</th>
<th>Introduction</th>
<th>Contents</th>
<th>Key Competences</th>
</tr>
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</table>
| 1 Planet Earth | "I see Earth!" | 1. The Earth and the Solar System  
2. The movement of the Earth  
3. How do we represent the Earth?  
4. The geographic coordinates  
5. How do we use scale on a map? | • Use a city map  
• Why do we change the time when we travel? |
| 2 The Earth’s relief | Surtsey, the birth of an island | 1. The Earth’s crust  
2. What is the Earth’s relief?  
3. Internal forces of relief  
4. How does relief change? | • Read a topographic profile  
• Compare relief and population maps |
| 3 Water | The sources of the Nile | 1. Water  
2. The course and flow of a river  
3. Lakes, groundwater and glaciers  
4. Oceans and seas | • Analyse sea currents, climate and population  
• The Three Gorges Dam |
| 4 Climate | How will climate change affect us? | 1. The atmosphere  
2. Temperature  
3. Precipitation  
4. Atmospheric pressure and wind  
5. The Earth’s climates  
6. Climate and human activity | • Make a climograph |
| 5 Natural landscapes | The Amazon rainforest: the threat to biodiversity | 1. Natural and humanized landscapes  
2. The equatorial rainforest  
3. A tropical landscape: the savannah  
4. The desert  
5. Mediterranean landscapes  
6. Oceanic landscapes  
7. Continental landscapes  
8. Polar landscapes  
9. Mountain landscapes | • Analyse changes in a landscape using aerial photos |
| 6 The continents | The exploration of Antarctica | 1. Africa  
2. Asia  
3. America  
4. Europe  
5. Oceania  
6. Antarctica | • Europe: are political frontiers influenced by relief?  
• Around the World in 80 Days |
| 7 The physical relief of Spain | Spain, seen from space | 1. The Central Plateau  
2. Peninsular relief  
3. Coasts and islands  
4. Rivers in Spain  
5. Climates and landscapes | • Muniellos, natural landscape and cultural heritage  
• Investigate Spain’s natural environments |
<table>
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<tr>
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<td>8 Prehistory</td>
<td>Atapuerca, a World Heritage Site</td>
<td>1. What is Prehistory? 2. Life in the Palaeolithic Age 3. Palaeolithic beliefs and art 4. The Neolithic Revolution 5. The Metal Age</td>
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<td>Who were the legionaries?</td>
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<td>• Analyse a map  • Write a biography  • A journey through Hispania</td>
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The book is organised into 12 units. Every section of a unit helps the students to develop their key competences.

Opening double page: presentation of the unit

The contents of the unit are presented at the beginning.

A CD symbol shows that the recorded text is on the student CD.

The Work with the image section checks the student’s understanding of the visual material and the text.

The content pages

Think about it invites the students to reflect about challenging concepts.

A series of activities cover all the main contents of the page.

The Did you know? section widens the students’ range of knowledge.

The main contents are clearly presented.
Activity Round-up: learning to learn

This section always begins with a summary of the key ideas.

Numerous activities provide a full round-up of the unit, and encourage learner autonomy.

The final section analyses environmental problems in the Geography units, and our heritage from the past in the History units.

Know how to...: key competences

The students develop key skills in Geography and History.

The students do individual activities, pairwork and group projects, making full use of internet resources.

Key Competences

- Linguistic competence
- Competence in mathematics, science and technology
- Digital competence
- Social and civic competence
- Cultural awareness and expression
- Learning to learn
- Initiative and entrepreneurship
“I see Earth!”

Today, we all know what the Earth looks like from space. But until the 20th century, no-one was sure.

In 1961, the astronaut Yuri Gagarin became the first person to see the Earth from space. His first words were: “I see Earth! It is so beautiful!” Since Gagarin’s flight, hundreds of men and women have gone into space.

Artificial satellites now collect images of the Earth all the time. Satellite images are important in meteorology, environmental conservation, military intelligence, and many other fields.
• What does the Earth look like from space? Why do we call it the “blue planet”?
• Who was Yuri Gagarin?
• How do we use the information provided by satellites?

Maps are representations of the Earth’s surface. One of the first world maps was made by Ptolemy, a Greek geographer and astronomer, in the second century AD.

• Where is the Iberian Peninsula?
• Which continents are shown?
• Why is America missing?
The Solar System

The Solar System consists of a single star, the Sun, and the planets that orbit it. The Sun is a huge mass of hot gases, which sends out energy to the rest of the Solar System. There are eight planets: Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus and Neptune.

Our own planet, the Earth, is the fifth biggest planet in the Solar System. It has a surface area of 510 million square kilometres (km²). It is the third closest planet to the Sun, which is 150 million km away.

Most planets in the Solar System have one or more satellites, which are astronomical bodies that orbit them. The Earth only has one satellite: the Moon.

The Earth and the Solar System

The biosphere: life on Earth

The Earth is the only planet in the Solar System where life exists. The following conditions make this possible:

- The Earth has the ideal temperature for life. It is the right distance from the Sun so it is not too hot or too cold.
- The atmosphere is a layer of gases that protects the Earth from the Sun’s radiation. It contains essential gases, like oxygen.
- Water is necessary for all living things.

The biosphere is the ecological system in which life exists. Nearly all living things are found between an altitude of 3,000 metres (m) above sea level, and 2,000 m below sea level.

ACTIVITIES

1. List the planets in order of distance from the Sun. (Begin with the nearest planet.) Which is the largest planet? Which is the smallest planet?

2. What is the meaning of the following terms?
   - Solar System
   - orbit
   - satellite

THE SOLAR SYSTEM

THE BIOSPHERE

The outer structure of the Earth

The Earth’s surface is made up of three parts: a layer of gases and clouds, large bodies of water, and land.

- **The atmosphere** is the layer of gases that surrounds the Earth. It consists of nitrogen (78%), oxygen (21%), and carbon dioxide and other gases (1%).
- **The hydrosphere** is all the water that exists on our planet: oceans and seas, rivers and lakes, ice, groundwater and water vapour.
- **The lithosphere** is the Earth’s solid outer layer. It consists of the continents and submerged land under the oceans and seas.

WORK WITH THE IMAGE

3 Which parts of the Earth can we see from space? List and describe them.

WORK WITH THE CHART

4 Which two gases make up most of the atmosphere?

ACTIVITIES

5 Match the two columns. Listen and check your answers.

- The lithosphere • The biosphere • The atmosphere • The hydrosphere • The Earth’s ecological system • All the Earth’s water • The Earth’s solid surface • A layer of gases

6 What is the difference between an artificial satellite and a natural satellite?

THINK ABOUT IT

Imagine that our planet had both an atmosphere and liquid water – but extreme temperatures. Would life on Earth be possible in those circumstances?
Rotation and revolution

Like other objects in the Solar System, the Earth moves all the time. It has two types of movement:

- **Rotation** on its own axis.
- **Revolution** around the Sun.

**Rotation**

The Earth spins continually on its own axis in a west-to-east direction. It takes 24 hours to complete one rotation.

The rotation of the Earth causes the alternation of day and night. The Earth is spherical so the Sun cannot illuminate the whole planet simultaneously. Consequently, it is always day on only one side of the Earth’s surface, where it receives the Sun’s rays. On the other side, it is night.

**Revolution**

At the same time as the Earth rotates on its axis, it also moves around the Sun in an elliptical orbit. It takes the Earth 365 days and six hours to complete one revolution. As a calendar year only has 365 days, there is a **leap year** every four years, when we add an extra day to the month of February.

The Earth is tilted so the angle of the Sun’s rays changes in each hemisphere during the year. This causes the **seasons**.

**ACTIVITIES**

1. What is the rotation of the Earth? How long does it take?
2. Why does the rotation of the Earth cause the alternation of day and night?
3. Does the length of day and night change more at the Equator or at the poles during the year? Why?
4. What is the revolution of the Earth? How long does it take?
5. Why does the revolution of the Earth cause the seasons?
The seasons

At the Equator, the Sun’s rays reach the Earth vertically all the year round so there is little difference between the seasons.

However, further from the equator, the seasons are reversed in the two hemispheres:

- In **summer**, the Sun’s rays reach one hemisphere almost vertically. At the same time, it is **winter** in the other hemisphere. For example, it is summer in Spain when it is winter in Chile.
- In **spring** and **autumn**, the Sun’s rays reach both hemispheres at a similar angle.

The four seasons begin at the solstices and equinoxes:

- Summer and winter: at the two **solstices** (around 21 June and 21 December), the Sun’s rays are vertical at one of the tropics. Days are long and warm in one hemisphere, but short and cold in the other.
- Spring and autumn: at the two **equinoxes** (around 21 March and 23 September), the Sun’s rays are vertical at the equator. Both hemispheres receive the same amount of sunlight, and day and night are equally long.

**ACTIVITIES**

6. At what angle do the Sun’s rays reach the northern hemisphere in summer?

7. What do the following terms mean?
   - equinox
   - solstice
   - leap year

8. June-September is not the period when the Earth is closest to the Sun. So why is it summer in the northern hemisphere at that time of the year?

9. Bring a torch and spherical objects to the class.
   Use them to explain the rotation and revolution of the Earth.
Globes and maps

The Earth is spherical. However, it is not a perfect sphere because it is flat at the poles. We call this shape a **geoid**.

- **Globes** are accurate representations of the Earth because they have a similar shape to our planet.
- **Maps** provide information about a small area, a country, a region or the whole world. However, maps have a flat surface but our planet is three-dimensional. Consequently, they distort shapes and distances.

The main features of a map

A map has the following features: a title, a scale, a key, an arrow pointing north, and a grid of imaginary lines (parallels and meridians).
Types of maps

There are two main types of maps. They give us different kinds of information:

- **Topographic maps** show the main features of the natural environment, like mountains and rivers. They also include man-made features, such as cities and roads.

- **Thematic maps** provide visual information on a particular subject, for example climate or population. They often use colours, symbols and text.

**WORK WITH THE MAPS**

1. What types of relief can you see on the topographic map?
2. What type of information does the thematic map give us?
3. What is the difference between a topographic map and a thematic map?

**DID YOU KNOW?**

**Orientation in nature**

We establish direction by using the **cardinal points**: north, south, east and west. If we are lost in the countryside without a compass, map or GPS, we can use the position of the Sun for orientation. The Sun rises in the east and sets in the west. At night-time, the North Star always indicates north.

- Look on internet for a map of star constellations. Can you find the North Star? (First, look for the Big Dipper.) Try to identify it in the night sky tonight.

**ACTIVITIES**

4. Name two ways of representing the Earth. What are the advantages and disadvantages of each one?
5. Make a list of the main parts of a map. What type of information do we get from each of the following?
   - map key
   - scale
   - parallels and meridians
6. Investigate the colours and symbols used on maps. Look for one example of each of the following:
   - a line
   - a symbol
   - a green area
   - a very small circle
7. Do you use maps in your own life? Are they printed on paper, or displayed on an electronic screen? In which situations do we use each kind of map?
**The geographic coordinates**

**Parallels and meridians**

Parallels and meridians form a grid of imaginary lines that help us to find the exact location of a place on Earth.

- **Parallels** are imaginary circles running in an east-west direction. The **Equator** (0°) divides the Earth into two **hemispheres**: the northern hemisphere and the southern hemisphere. There are 90 parallels between the Equator and each pole. Other important parallels, from north to south, are: the **Arctic Circle**; the **Tropic of Cancer**; the **Tropic of Capricorn**; the **Antarctic Circle**.

- **Meridians** are imaginary semicircles running in a north-south direction from the North Pole to the South Pole. The **prime meridian** (0°) is also called the **Greenwich meridian**. This line divides the Earth into two hemispheres: the western hemisphere and the eastern hemisphere. There are 360 meridians: 180 in each hemisphere.

**Latitude and longitude**

Latitude and longitude indicate the **geographic coordinates** of a place – its exact location on the Earth’s surface.

- **Latitude** is the distance from a parallel to the Equator:
  - Latitude can be north (N) or south (S).
  - Parallels show latitude.
  - It is measured in degrees (°), minutes (’), and seconds (”).
  - Its values go from 0° at the Equator to 90°.

- **Longitude** is the distance from a meridian to the Greenwich meridian:
  - Longitude can be east (E) or west (W).
  - Meridians show longitude.
  - It is measured in degrees (°), minutes (’), and seconds (”).
  - Its values go from 0° at the Greenwich meridian to 180°.

**THINK ABOUT IT**

We put latitude before longitude when we give the geographic coordinates. For example, Rio de Janeiro (Brazil) is in the southern hemisphere and west of the Greenwich meridian. Its approximate geographic coordinates are latitude 22° south (S) and longitude 43° west (W). Its exact geographic coordinates are 22° 54’ 10” S, 43° 12’ 27” W.

- Is it sometimes useful to give approximate figures? Why?
How do we locate a place on a map?
We can locate a place on a map if we have its **geographic coordinates**: its latitude and longitude.

**An example: Saint Petersburg**
1. The map shows it is near the 60º parallel in the northern hemisphere. So its latitude is 60º north.
2. It is near the 30º meridian in the eastern hemisphere. So its longitude is 30º east.
3. Its geographic coordinates are therefore 60º N, 30º E.

**DID YOU KNOW?**

**GPS** (Global Positioning System) is a satellite navigation system. Each GPS receiver is in contact with several satellites. It gives highly accurate calculations of latitude and longitude.
- When and where do you think GPS is used?

**ACTIVITIES**

1. Copy the table in your notebook. Complete it with the missing information.

<table>
<thead>
<tr>
<th>City</th>
<th>Latitude</th>
<th>Longitude</th>
</tr>
</thead>
<tbody>
<tr>
<td>Saint Petersburg</td>
<td>60º N</td>
<td>30º E</td>
</tr>
<tr>
<td>London</td>
<td>21º S</td>
<td>38º W</td>
</tr>
<tr>
<td>Rome</td>
<td></td>
<td>150º E</td>
</tr>
<tr>
<td>Quito</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kinshasa</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

2. Imagine that a ship is in difficulty west of the Canary Islands. Is it necessary to know its geographic coordinates before rescuing it? Why?

3. Look for the ship and the plane on the map. Then copy and complete the sentences in your notebook.
   - **The lost ship is in the _____ hemisphere and its approximate coordinates are _____ It was going to 20º S, 120º E. Its direction should be _____**
   - **The rescue plane is in the _____ hemisphere, and its approximate coordinates are _____**
   - **Its direction will be _____ towards the ship.**
Map scale

A map is a reduced representation of a real area. Scale indicates the difference between the size of something on a map and its size in the real world.

Scale can be indicated in two different ways on a map:

- **Numeric scale** is expressed as a fraction. The numerator represents a unit on the map. The denominator represents its distance in the real world.

  ![Scale Diagram](image)

  In this case, a scale of 1/200,000 means that 1 cm on the map is equal to 200,000 cm on the ground.

  Numeric scale can be written in three ways:

  \[
  \frac{1}{200,000} \quad 1:200,000 
  \]

- **Graphic scale** (bar scale) shows the equivalent distance on a bar divided into equal segments, usually 1 cm. The bar looks like a small ruler. The numbers on the bar indicate the actual distance that each segment represents.

  ![Scale Diagram](image)

  In this case, 1 cm on the map represents 20 km in the real world.

### ACTIVITIES

1. Compare the maps.
   a. Study Maps A and B. These show Merseyside – the region around Liverpool (England). With a partner, find Litherland and the Kirkby Industrial Estate on map A. Use a ruler to measure the distance on the map. Then calculate the distance in kilometres.
   b. Compare maps A and B. Why is Widnes only on map B?
How to use scale to calculate distances

a Interpret the map scale. The scale on this map is 1/8,250,000. So 1 cm on the map is equivalent to 82.5 km (or 8,250,000 centimetres) in the real world.

b Measure the distance you wish to calculate. For example, use a ruler to measure the distance between Madrid and Lisbon. (In this case, it is 6 cm.)

c Do the calculations. Work out the figure that is proportional to six centimetres. x represents the distance that you want to calculate:

\[
\frac{1}{8,250,000} = \frac{6 \text{ cm}}{x}
\]

\[
x = \frac{8,250,000 \times 6}{1}
\]

\[
x = 49,500,000 \text{ cm}
\]

d Change centimetres into kilometres.

49,500,000 cm = 495 km.
The distance between Madrid and Lisbon is 495 km if we go in a straight line.

**ACTIVITIES**

2 You are going on a car trip around Europe.

a Look at the map and the scale.

b Calculate the distance in a straight line between each city.

c Copy and complete the table.

<table>
<thead>
<tr>
<th>Distance</th>
<th>map</th>
<th>km</th>
</tr>
</thead>
<tbody>
<tr>
<td>Madrid-Paris</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Paris-Berlin</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Berlin-Prague</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Prague-Vienna</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vienna-Zagreb</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Zagreb-Athens</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
1. Copy and complete the diagram.

2. What is the biosphere?

3. Explain the difference between the following terms. Listen and check your answers.
   - The hydrosphere and the lithosphere
   - Numeric scale and graphic scale
   - Parallel and meridian
   - Latitude and longitude
   - Solstice and equinox

4. Look at the photo and describe the outer structure of the Earth.


6. Use an atlas to find the following capitals on a political map. Work out their geographic coordinates.
   - Cairo (Egypt, Africa)
   - Madrid (Spain, Europe)
   - Washington (United States, America)
   - Singapore (Asia)
Copy and complete this table on the Earth’s movements in your notebook. Then answer the questions.

<table>
<thead>
<tr>
<th>Rotation</th>
<th>Revolution</th>
</tr>
</thead>
<tbody>
<tr>
<td>What type of movement is it?</td>
<td>......</td>
</tr>
<tr>
<td>How long does it take?</td>
<td>......</td>
</tr>
<tr>
<td>What does it cause?</td>
<td>......</td>
</tr>
</tbody>
</table>

a. Why do day and night alternate on Earth?
b. What would happen to Earth if rotation did not occur?
c. What causes the seasons? How important are they for life on our planet?
d. What are leap years? Why do they occur?

Visit the world on the internet.

a. Use an internet search engine to find ‘Google Maps’.
b. Type your own address in the box at the top. Click on "Satellite" for a satellite image of your house. Click on "Maps" to see what your neighbourhood looks like on a map.
c. Using Google Maps, make a “virtual” visit to Helsinki, Cairo and Rio de Janeiro. Do they look similar to each other?

Look at the map and answer the questions.

a. What do you think the symbols mean?
b. Use the scale to calculate the distance between Barton and Bradwell.
c. Is this a topographic map or a thematic map?

Which of the following conditions are necessary for life on Earth?
- The Earth is not too near and not too far from the Sun.
- It has one satellite: the Moon.
- It has an atmosphere.
- The water cycle takes place.

Why do you think so many space missions are jointly organised by various countries?

Why is so much money invested in space research?

Why do you think the Canary Islands are a good place to observe the night sky? Find out about the "Instituto de Astrofísica de Canarias" by using an internet search engine to look for their website.
City maps (also known as street plans) help us to find our way around a city. They have to include a lot of detail, so they are very large scale representations.

• Which Spanish city does the map below represent?

Street plans are divided by vertical and horizontal lines. We can find a place by looking for the letter at the top and the number at the side.

1 Find the places on the city map:
   a Look at D5 and H2. Which buildings are on these squares?
   b What are the references for San Ginés Church and Carmen Church?
   c Can you find a museum? Is it near a metro station?

2 Use the scale.
   a What is the scale of this map?
   b What is the distance in a straight line from the Convent of the Descalzas Reales to the Royal Theatre?

3 Work in groups, and choose your role. You are a foreign tourist (A), or you live in Madrid (B).

Think about the language we use for directions: *How do I get to...?*, *Turn right...*, *Go straight ahead...*

   a A is in the main square and asks B for directions.
      B explains how to get to the Royal Theatre.

   b B then uses the map to suggest other places that are worth visiting. A and B talk about how to get there.
**Time zones**

As a result of the Earth’s rotation, it is daytime on one side of the Earth when it is night-time on the other.

**Time zones** were created to make the time around the world correspond to the position of the Sun.

The Earth is a sphere (360°), and takes 24 hours to rotate on its axis. It takes one hour to move the equivalent of 15° because $24 \times 15 = 360$. Consequently, the Earth is divided into 24 time zones, which go from pole to pole. It is the same time everywhere inside a time zone.

Time zones are measured from the **Greenwich meridian**:

- If we go **east**, we move the clock forward by one hour as we go through each time zone.
- If we go **west**, we move the clock back by one hour as we go through each time zone.

Time zones are influenced by political factors.

- Some countries, like China and Argentina, have the same time across the whole country, even though they are in more than one time zone.
- Other countries, such as the United States, have several time zones.

**1** Look at the map and answer the questions.

a. You take a flight from Madrid at 10 am, and arrive in New York eight hours later. What time do you arrive?

b. You fly from San Francisco to Paris. How many time zones will you cross? Do you put your watch forward or back when you arrive?

c. Look at China on the map. If the Sun rises at 5 am in Kashgar, what time does it rise in Yanji?

d. Why do they say “and one hour earlier in the Canary Islands” in the Spanish media?

**2** Find out the time in the following cities using internet. (Type the key words “world clock” in an internet search engine.)

- London (United Kingdom)
- Mumbai (India)
- Lima (Peru)
- Casablanca (Morocco)