

## UNIT 10

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### PRACTICAL **LS**

Participating in a debate

.....

### REVISION ACTIVITIES

### KEY CONCEPTS

### WORK ON YOUR KEY COMPETENCES **LS**

Achieving the Sustainable Development Goals

**Q U I Z**

# Sustainability and the environment

## Think and discuss



- 1 What environmental problems in Hazaribagh does the article mention?
- 2 What's being dumped into the river? Find out more information about the types of waste.
- 3 How did the government respond? Has it done enough? Why/Why not?
- 4 How have the environmental problems mentioned in the text affected the local population's health and well-being?
- 5 The article mentions that children often work in the factories where animal skins are soaked in harmful chemicals and processed with dangerous machinery. How does this make you feel? Do you think that their human rights are being violated?

## Enough is enough! 🌍❤️

At the end of 2016, the Buriganga River screamed 'Enough is enough!' Overexploited at the hands of leather factories in neighbouring Hazaribagh, and poisoned by their toxic waste and the population's habit of using it as a dumping ground, this artery into the capital city of Bangladesh can no longer support life. A decrease in oxygen levels, coupled with the large presence of the carcinogen chromium, often results in dead fish floating up to the surface.



Rubbish on the Banks of the Buriganga River

In Hazaribagh itself, air pollution was so bad that environmental groups named it one of the most polluted places on the planet. This pollution has led to significant increases in respiratory and skin conditions among the population. A serious health and environmental crisis followed, eventually forcing the government to take action. In April 2017, it relocated around 150 factories to the outskirts of Dhaka. Many of these factories used child labour. It also promised two new sewage treatment plants to help lower toxic waste levels in the river.

However, the government still hasn't solved the problem of factories dumping their toxic waste in the river. You can see their pipes along the banks spewing out dense white foam, as well as liquid in shades ranging from crimson to blue. The smell is intense. Nevertheless, locals wait expectantly for these discharges to begin. They do this because the outpouring of waste kills the fish instantly. This means that it's an easy way to catch them. These fish end up in local markets. It's interesting to note that most of these factories also rely on child labour. Many of the challenges the world faces today are related.

**Zigor ALDAMA**

elpais.com (17 January 2020) (Translated and adapted)

Human activity is the direct and indirect cause of serious environmental problems. Industrial processes lead to the emission of hazardous substances into the air and into our water supply. These problems not only damage the environment, but also our own health and well-being.

Nowadays, we're more aware of the need for sustainable development. This has resulted in governments and international organisations introducing more environmental policies. It has also led to the development of the UN's Sustainable Development Goals.

# 1 Human activity and its environmental impact

Human activity affects the land. It has **serious consequences for the environment** and puts the planet's survival at risk. Economic activities, such as production, distribution and consumption, affect the environment. It's therefore necessary to rethink our economic activities in the context of **sustainable development**.

One of the key objectives of sustainable development is to maintain **economic growth with minimal impact on the environment**. Therefore, sustainable economic activity should cause minimal pollution and use resources carefully rather than wasting them. This will help preserve the Earth's resources for future generations.




Society should **evaluate the impact** of human activity on the environment. Many studies offer information about how economic activity contributes to climate change, air and water quality, noise pollution, soil contamination and the loss of biodiversity.

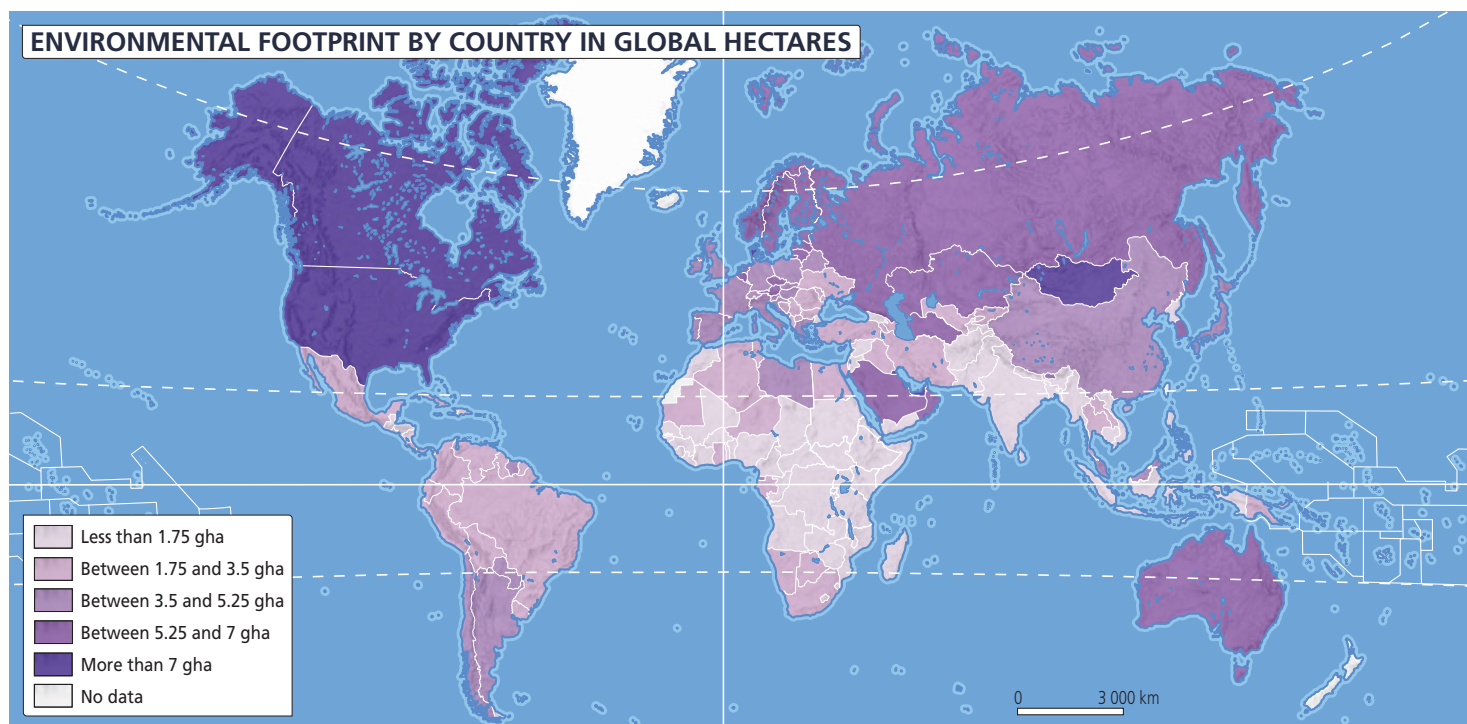
## The environmental footprint

The **environmental footprint** tells us how many hectares of productive land (urban land, agricultural land, pasture and forest, as well as fishing zones) are needed to provide enough resources for the population of a region and to absorb its waste. The **per capita environmental footprint** measures the impact of human activity on the environment by dividing the environmental footprint of a region by its total population.

The resources we currently consume require 1.6 planets to produce them. In 2017 the consumption and waste generated by Spain's population was equivalent to that of a country with three times the surface area of Spain.

## CLIL activities

-  Look at the map and answer the questions in your notebook.
  - In which continents is the environmental footprint the highest?
  - Why do you think it's high in these places?
  - What's Spain's environmental footprint like?
-  How do you think the environmental footprint is related to biocapacity?
-  Answer the questions with a classmate.
  - What different types of waste exist?
  - What are their effects on the environment?



SOURCE: WWF

<http://inicio.oupe.es/19arcgis242>



## Biocapacity

Although each population has specific needs, not all places produce the same quantity of resources or are able to absorb the same amount of waste.

The environmental footprint of a country or region varies due to its **biocapacity**, which is the capacity of an area of land to generate resources and absorb waste without sustaining damage.

To maintain our standard of living without harming the environment, we must fulfil these conditions.

- **Regeneration:** the rate of consumption of resources can't be more than the regeneration rate.
- **Renovation:** the rate of consumption of resources can't be higher than the rate of creation of resources to replace those that have been used.
- **Assimilation:** the rate at which waste or pollutants are produced can't be higher than the capacity of the environment to absorb them.

By studying biocapacity, we can determine whether or not the population is self-sufficient or has an environmental deficit.

In addition, we can use the indicators above to identify where human activity is unsustainable. This may be due to the population size or the level of economic activity. Efficient consumption can help prevent this situation. Efficient consumption includes **responsible consumption** and the use of **alternative energy sources** that reduce overexploitation and pollution.

## Waste

Human activity leads to the overexploitation of land and its pollution due to waste. We can classify waste into different types.

- **Urban waste:** this is produced by homes, offices and on the street. It can be solid, such as organic material and packaging; liquid, such as detergents; or gaseous, such as vehicle emissions.
- **Agricultural waste:** this is produced by the intensive farming of poultry and pigs, as well as by certain chemicals present in fertilisers.
- **Industrial waste:** this includes many forms of waste. Industrial waste is usually treated before it's disposed of, although this isn't always the case.
- **Nuclear waste:** this is waste material that contains or has been contaminated by radioactive material.
- **Other waste:** in the future this may include electric car batteries.

## #ForABetterWorld

The development of a **green consciousness** shows that many people are concerned about the environment. This green consciousness has grown significantly since the mid-20th century.

If it's our intention to preserve our planet for future generations, we must be willing to act. We can achieve this by being conscious of the environmental consequences of our actions. In addition, we can put pressure on governments to promote sustainability.

In recent years, there have been many large international demonstrations organised by the Swedish group FridaysForFuture. This group is led by the teenager Greta Thunberg. It's supported by young people all around the world.



- Find out more about youth-led environmental groups. How do you feel about them? What do you think about their goals? Do you agree with their actions? Would you ever join one?

## Learn +

We can reduce the amount of waste we generate by following the rule of the 3Rs.

1. **Reduce** consumption.
  2. **Reuse** materials and objects so that they last longer before we throw them away.
  3. **Recycle** waste into new products.
- Name some of the things that you can do to reduce, reuse and recycle.

## 2 Human activity and atmospheric deterioration

Gas emissions produced by human activities, such as agriculture, industry and the burning of fossil fuels, pollute and damage the atmosphere. This damage to the atmosphere affects the climate.

### POLLUTION

Gas emissions from industry, heating and vehicles damage and pollute the atmosphere. This is very evident in cities, where the high population density and human activity produces pollution in the lower layers of the atmosphere. This pollution leads to poor air quality and causes health problems for the urban population.



### ACID RAIN

When the gas emissions produced by human activity mix with the water in the atmosphere, they form sulphuric acid and nitric acid.

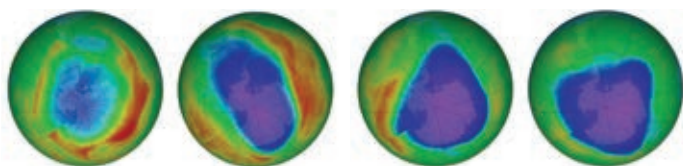
This mixture returns to the Earth's surface as acid rain. It damages vegetation, fauna, the soil and buildings.

The only way to reduce acid rain is to increase our use of renewable energy sources.



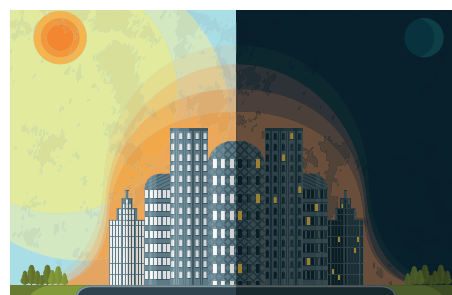
### THE HOLE IN THE OZONE LAYER

The ozone layer is a part of the stratosphere with a high concentration of the gas ozone. The ozone layer protects Earth from ultraviolet radiation, which is harmful to health. The emission and accumulation of gases in the atmosphere, especially CFCs (chlorofluorocarbons), has reduced the amount of ozone in the atmosphere. Because ozone is sensitive to cold temperatures, the damage is greater in the polar regions. This is known as the hole in the ozone layer.



### URBAN HEAT ISLANDS

Urban heat islands can form in large cities. Heat accumulates in the buildings during the day and is released into the atmosphere during the night. This causes higher temperatures in cities than in the surrounding areas.



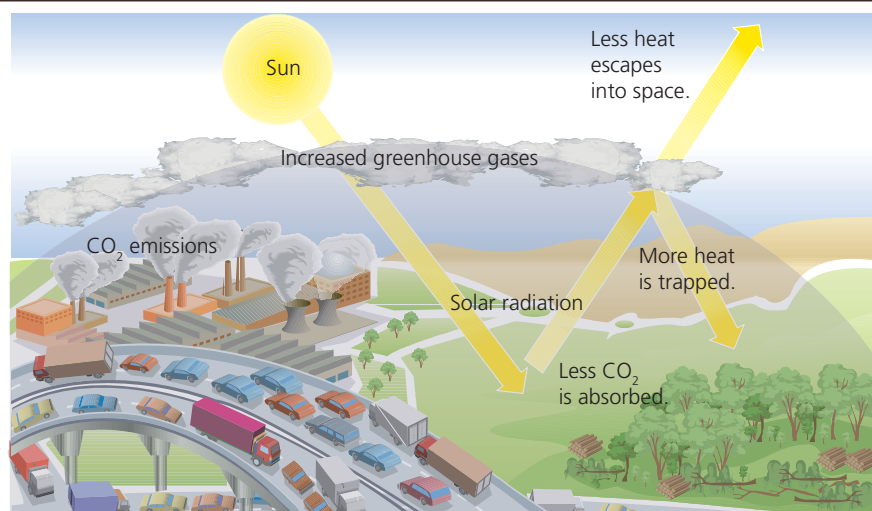
### THE INCREASE OF THE GREENHOUSE EFFECT

When we burn fossil fuels, the gases that are emitted accumulate in the upper layers of Earth's atmosphere.

As a result, these layers behave in a way that's similar to the walls of a greenhouse: they trap the Sun's heat.

When Earth returns some of the Sun's heat to the atmosphere, these greenhouse gases reflect some of that heat back to Earth. As a consequence, average temperatures across the whole planet have increased.

The greenhouse effect is one of the main causes of climate change.



## Climate change

The temperature of the Earth has never been stable. The Earth has always experienced natural variations in its temperature.

However, since the mid-20th century, there has been an increase in the global temperature of about 1 °C. This phenomenon, known as **global warming**, has been caused by human activity.

Global warming is the most serious environmental problem we're facing. Globally it affects our ability to produce food, the economy and the safety of the population. It's the result of an increase in the greenhouse effect caused by higher levels of carbon dioxide (CO<sub>2</sub>) in the atmosphere. It hasn't been caused by natural events such as volcanic eruptions.



The main consequences of climate change are:

- the melting of the polar ice caps, which is causing sea levels to rise.
- extreme weather conditions in certain regions, such as less frequent but heavier rainfall, which causes flooding and prolonged droughts. It also causes extreme weather events, such as hurricanes.
- a loss of biodiversity. Species are unable to adapt to the changes because they're happening too quickly.



The Antarctic ice shelf

### CLIL activities

- 4 In your notebook, summarise the negative effects of human activity on the environment.
- 5  Listen and answer the questions.
  - a. What gas causes damage to the ozone layer?
  - b. How much of the damage is China responsible for?
  - c. What are the consequences?
- 6  Discuss these questions with a classmate.
  - a. Do you agree that countries that pollute the atmosphere should be penalised? Why/Why not?
  - b. What penalties do you suggest?  
*I agree/disagree with this because...*  
*I would suggest that these countries should...*  
*On the other hand...*

### Working with sources

#### Europe says goodbye to CFCs

*As of yesterday, these chemical substances can't be created or imported in the EU. This is one of the most dramatic achievements so far of increasing environmental awareness.*

*CFCs are gases which have been used in aerosols, dyes, insulation, fridges and air-conditioning. They will go down in history as the main cause of the deterioration, or hole, in the ozone layer.*

*El País, 2 January 1995 (Translated)*

#### Scientists accuse China of damaging the ozone layer by using illegal gases

*A new study published in the scientific journal Nature shows that China emitted illegal greenhouse gases between 2014 and 2017. This may have compromised the advances made in recent years.*

*These emissions could be responsible for between 40% and 60% of the global increase in trichlorofluoromethane, or CFC-11, a gas that destroys the ozone layer.*

*El Confidencial, 23 May 2019 (Translated)*

- a. Do you think that the emission of CFCs can be considered a crime?
- b. Do you think that the international community should impose sanctions on China?
- c. What can China do to encourage its businesses to use environmentally-friendly alternatives. Make a list in a small group.

### 3 Human activity and the deterioration of inland ecosystems

Inland ecosystems suffer from the pollution and overexploitation that result from human activity.

Natural phenomena and human activity both cause damage to the soil, which becomes degraded. This leads to damage to forests and causes deforestation, which is a very serious problem.

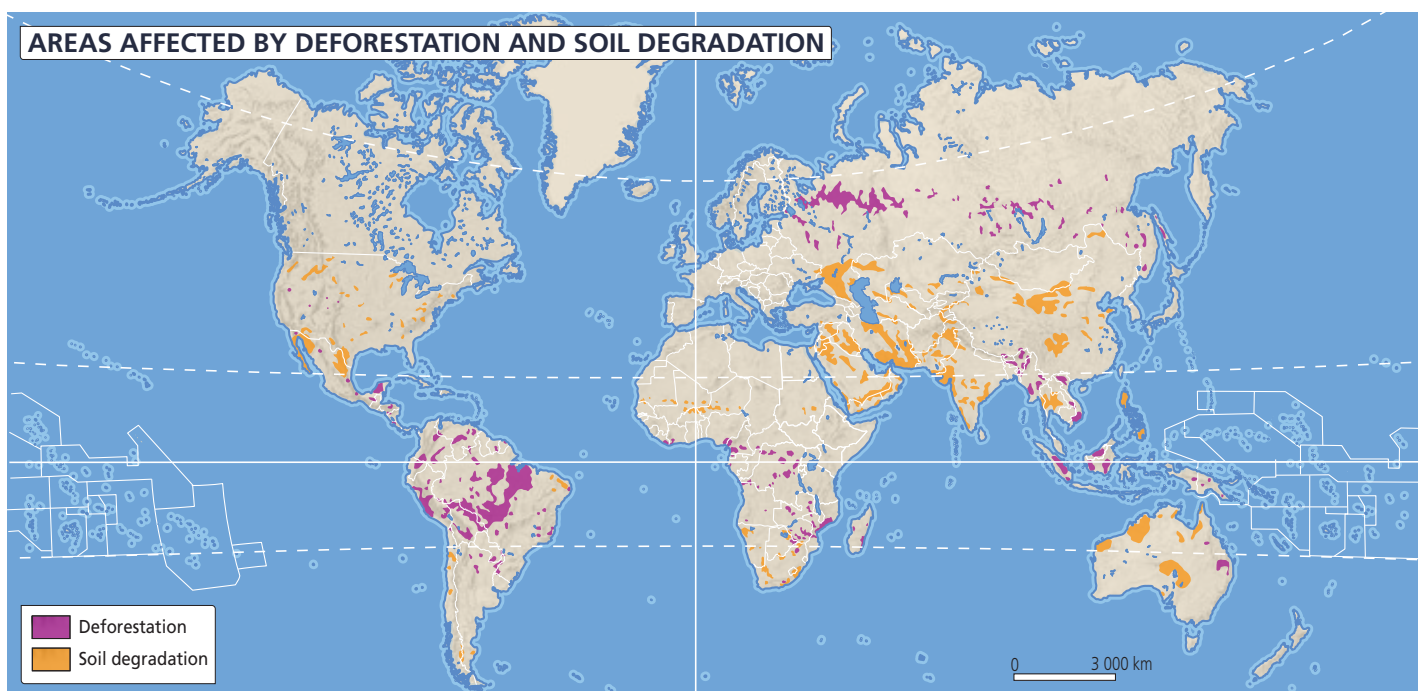
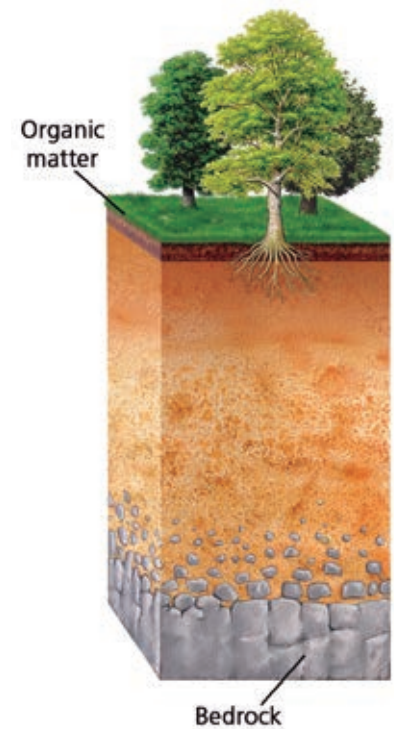
#### Soil degradation

The soil is the superficial part of the Earth's crust. It's made up of organic and mineral matter. Plants need soil to grow.

These are some of the negative processes that cause soil degradation.

- **Soil contamination:** this can be caused by different factors. For example, it can be the result of acid rain, the use of pesticides in agriculture or the large-scale production of non-**biodegradable** waste (such as tin cans and plastic). Excessive organic waste also causes problems because the soil can't absorb it all.
- **Soil erosion:** this is the loss of the top layers of the soil. It's a natural process caused by the action of water and wind. It's a problem in areas where there are steep slopes, and areas where there are torrential rains and little vegetation. It's also an issue in areas where there isn't much rainfall. Irresponsible farming practices can accelerate erosion and result in desertification.
- **Desertification:** this is the process of soil deterioration in dry areas. It causes a decrease in soil fertility. Sometimes natural processes can cause desertification, but it's usually worsened by intensive land use. Mining and overexploitation in the agricultural and forestry sectors are examples of intensive land use. Desertification is also caused by forest fires.

**'biodegradable':** can be broken down by biological organisms (bacteria, algae, fungi) into natural chemical elements.



## Deforestation

Forests play a fundamental role in the healthy development of our planet. In addition, they're home to much of the biodiversity on Earth. Forest vegetation absorbs a significant amount of carbon dioxide and releases oxygen. It also affects rainfall, filters fresh water and prevents soil erosion.

Deforestation is the process of reducing or destroying forests. It's normally caused by human activity:


- the indiscriminate **felling**, or **cutting down, of trees** to provide wood for fuel or industry in developed countries or for fuel in less-developed countries.
- **the clearing of forests**, which is very common in less-developed countries. Forests are cleared to create farmland or to use the land for unsustainable agriculture, such as the production of palm oil.
- **mining and the construction** of infrastructure.
- **forest fires** caused by the pressure to construct residential housing and tourist accommodation.

Other causes of forest reduction are naturally occurring fires, acid rain and climate change. The oscillation of temperatures makes it impossible for some species to survive and causes a loss of biodiversity.

Deforestation leads to the deterioration of the soil and increases the greenhouse effect. The reduction of forests reduces the amount of carbon dioxide that's absorbed globally and also reduces the production of oxygen. This accelerates climate change. It also causes land abandonment and the forced removal of indigenous people from their natural habitats.

Protecting forests and reforesting the zones that have been deforested are two actions that will contribute to a reduction in the impact of climatic change. In developed countries, rural depopulation has permitted some forests to regenerate naturally, so forests are actually increasing in some places.

### CLIL activities

- 7 In your notebook, write a description of the human activities that cause the deterioration of the soil.  
*... in the sectors of ... has led to...*
- 8  Listen and describe how rural depopulation can help to solve the problem of deforestation.

### #ForABetterWorld

#### The problem

Primary forests, or untouched forest landscapes, **are being destroyed or degraded because of human activity.**



This is especially due to the **expansion** of land used for **farming** in order to produce raw materials such as soy, palm oil, meat, rubber and sugar cane. It's also caused by **demand for wood as a raw material, mega hydroelectric projects, mining and petroleum exploitation.**

#### The solution

We need to take measures urgently to save the world's virgin forests. There are various possibilities as to how we can do this, but the most promising are:

- prioritising the **protection of these areas** and the rights of the indigenous peoples that live in them over the economic interests of business and governments.
- promoting **business responsibility** for protecting the environment and human rights, and fighting corruption. This will discourage businesses from investing in projects that have a negative impact on these ecosystems.
- putting pressure on governments to stop importing forestry products produced by the **illegal cutting down of trees**. We can also put pressure on governments to enforce policies of **zero deforestation**.
- promoting **sustainable consumption**, avoiding unnecessary consumption, not wasting resources and discouraging consumers from buying products that damage the environment or were made in conditions that violate human rights.

<https://es.greenpeace.org> (Translated and adapted)

- 9   Do research to answer the questions.
  - a. What environmental and health problems are caused by palm oil production?
  - b. What products contain palm oil?
  - c. How can you consume less palm oil?



## Human impact on inland water

Fresh water makes up only 3% of the total amount of water on Earth. The **lack** of fresh water and the **contamination** of inland water are two major environmental problems.

Water is a resource that's becoming **scarcer**<sup>1</sup>. This is the result of natural causes (such as drought, high temperatures and lack of rainfall), but also because of the unrelenting growth of the global population. The increasing population puts pressure on our water resources in various ways. We need water for domestic use and for agricultural use. We also use it to generate energy. In addition, we use water for industry, tourism and leisure.

This leads to the **overexploitation of aquifers**, or subterranean fresh water present in permeable rock. This means that we use more water than can be replaced naturally. When the level of fresh water in an aquifer falls in coastal regions, it's replaced by salt water from the sea. This contaminates the freshwater supply. The aquifer can then no longer be used.

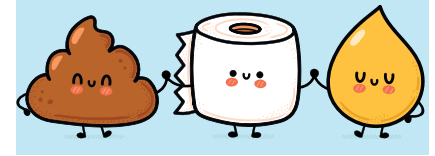
Another problem is **water pollution**, which is caused by the dumping of waste generated by human activity, such as pesticides, industrial chemical products and dyes. Sometimes this waste is dumped directly into the water and sometimes it filters through the soil and pollutes aquifers, rivers and eventually the sea.

Water pollution and the lack of access to fresh water aren't just an environmental problem. They also make it difficult to eradicate extreme poverty and certain illnesses.

When the demand for water is greater than the available supply, we call this situation **hydric stress**. To address this, we need to develop infrastructure that doesn't damage the environment and avoids unnecessary water loss. Water treatment plants can help reduce freshwater pollution.

<sup>1</sup>**scarce**: available only in small quantities.

#ForABetterWorld



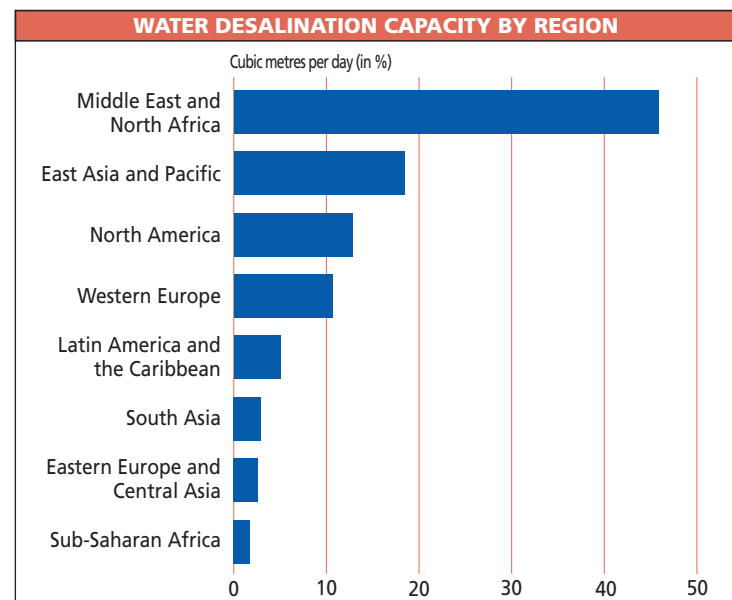
The Canal Isabel II is a public company that's in charge of the water supply in Madrid. On its web page you'll find a section called *Looking after water*. In this section, there's information about things you can do to reduce your water consumption and avoid wasting water. Some examples are:

- reducing consumption at home.
- the rule of the 3Ps: only toilet paper can be put in the toilet.
- ways to recycle excess water.
- the 'disposable wipes monster', which also threatens fish.
- don't use the toilet as a rubbish bin.

### Learn +

Even though water is a renewable resource, it's unevenly distributed. Technological advances mean that we can desalinate sea water (remove the salt to turn it into drinking water). There are more than 19 000 desalination plants in the world. They're found in over 100 countries. The main environmental problem caused by desalination is that it produces hypersaline water, called brine. This brine is poured back into the sea, where it causes pollution and reduces biodiversity. 55% of all brine is produced in Saudi Arabia, the United Arab Emirates, Kuwait and Qatar.

- Explain what the graph shows and how it relates to the text.
- Find out where there are water problems in Spain. Do these places use desalination?



SOURCE: BBC

## Loss of biodiversity

The collection of living things that inhabit an ecosystem is referred to as **biodiversity**.

The deterioration of the environment can cause the extinction of a species. This affects, in turn, the rest of the organisms that make up the ecosystem. This process reduces biodiversity.

These are the main causes of the loss of biodiversity in the world today.

- **Climate change** is happening so rapidly that many species don't have time to adapt to changes in temperature and climatic conditions. This has also led to the destruction of ecosystems.
- **Pollution** of the air, water, and soil: the increase in the use of chemical substances has had severe consequences for many species.
- The **overexploitation** of forests, land and water: intensive agricultural and fishery systems, construction and mining have led to the extinction of species and changes in landscapes.
- The introduction of **foreign species** harms autochthonous species.

The loss of biodiversity results in a reduction in natural processes. Examples of these natural processes are water filtration and collection, pollination, protection from flooding, soil fertility and climate regulation. We must combat and reduce the effects of these problems on a global scale through **environmental restoration**.

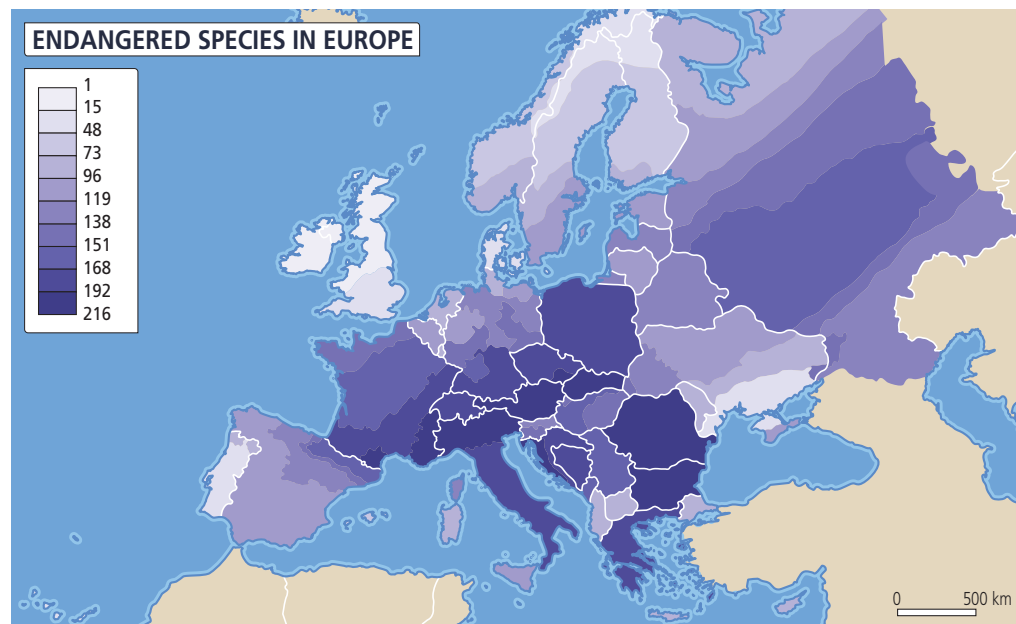
## Learn +

The pollination of flowers is vital for our food supply. In addition, pollination helps to maintain the Earth's biodiversity. According to data from the UN's Food and Agriculture Organization (FAO), pollination is necessary for more than 75% of the crops in the world.

Bees are the best pollinators on the planet, and they're disappearing as a result of climate change, new invasive species and the hazardous substances present in some pesticides. The reduction of habitats caused by intensive agriculture and growing cities is also affecting them. Each year 20–30% of European bees disappear. In the United States this is as high as 50%. If the number of bees continues to fall, agriculture might be in danger.



## CLIL activities



- 10 Answer the questions in your notebook.
  - a. What causes freshwater scarcity and water pollution?
  - b. What causes reduced biodiversity?
  - c. Look at the map. Which countries have high numbers of endangered species?
- 11 Listen and describe the threat to biodiversity caused by invasive species.
- 12 In a small group, discuss the consequences of reduced biodiversity.

## 4 The deterioration of marine ecosystems

Oceans and seas have numerous benefits. They affect the weather, regulate the climate and produce oxygen. In addition, the oceans and seas provide habitats for millions of living things.

Marine ecosystems are deteriorating and, as a result, habitats and species are disappearing. The oceans and seas are threatened by:

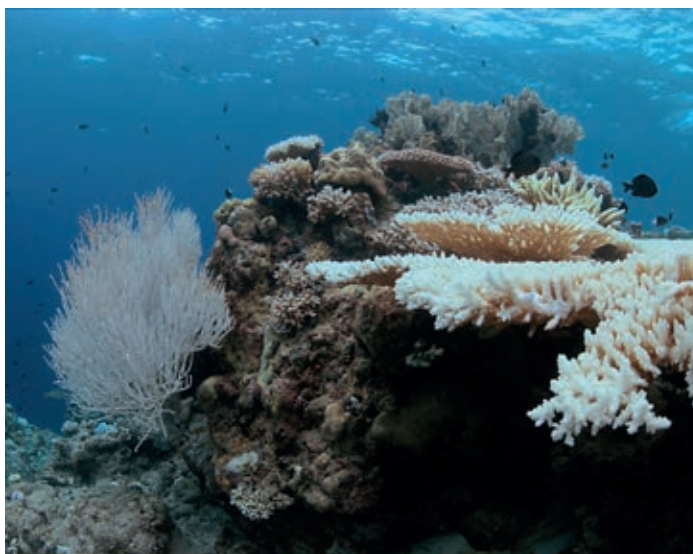
- **pollution** created by human activity, including domestic waste, **pesticides** and **fertilisers**. Another source of pollution is **nuclear waste**, which is dumped into marine trenches.
- **waste** that's **generated** by **ships**. Ships also leak oil and cause accidental oil spills, both of which pollute the oceans and seas.
- **plastic waste that accumulates** in oceans, which is one of the biggest problems. It impedes the production of oxygen and plankton. Oxygen is necessary for marine organisms and plankton is a major food source. Animals sometimes mistake plastic for food and die after ingesting it. They can also get tangled up in it.
- **overfishing** of certain fishing zones, which causes the extinction of some species. This is because the fish are caught more quickly than they can reproduce. On the other hand, some fishing techniques, such as bottom trawling, cause a significant amount of **bycatch**<sup>1</sup>. In addition, they destroy the sea floor.
- the **overdevelopment of coastal regions**, which destroys sand dunes and salt marshes, and leads to the **salinisation of coastal aquifers**.

Although marine ecosystems are extremely important, two thirds of the seas and oceans in the world aren't protected. In 1982 the **United Nations Convention on the Law of the Sea** was created. This provides a legal framework for the conservation and sustainable use of oceans by all the participating nations.

<sup>1</sup>**bycatch**: fish or other marine animals caught by accident.






Oil spills damage the environment and can lead to the death of flora and fauna.



The rise in sea temperatures causes the bleaching of coral reefs, which will lead to the death of these unique ecosystems.

### CLIL activities

- 13 In your notebook, make a mind map to show the threats to marine ecosystems.
- 14  Listen and answer the questions.
  - a. What's the source of most of the plastic waste in the oceans?
  - b. How can we consume less plastic?
- 15   Do research to find out about an organisation that works to clean up the coast. Answer these questions and write a short report.
  - a. What's the name of the organisation?
  - b. What does the organisation do? What are its main aims?

# On the front page

## Oceans of plastic? 🌍

It's increasingly worrying how much plastic there is in our oceans. Around the world, 270 million metric tonnes of plastic are produced each year. Most of this plastic ends up in landfills and eventually in the oceans and seas.

The key to solving this problem is to prevent plastic reaching the oceans and seas. If this doesn't happen, by 2050 there will be more plastic than fish in the oceans and seas.



### Islands of waste

The Great Pacific Garbage Patch is a gyre (spiral or vortex where plastic and other waste collects) in the North Pacific Ocean, where 80 000 tonnes of plastic waste have accumulated. It covers an area of 1.6 million km<sup>2</sup>. It's equivalent to the combined area of France, Spain and Germany. It's mostly made up of discarded fishing equipment (fishing lines and nets) and large pieces of plastic waste.

There have been various initiatives aimed at cleaning up the plastic in the oceans and seas. One of these was invented by a Dutch 20-year-old called Boyan Slat, who was the founder of The Ocean Cleanup. His objective is to remove 50% of the plastic in the oceans in five years.

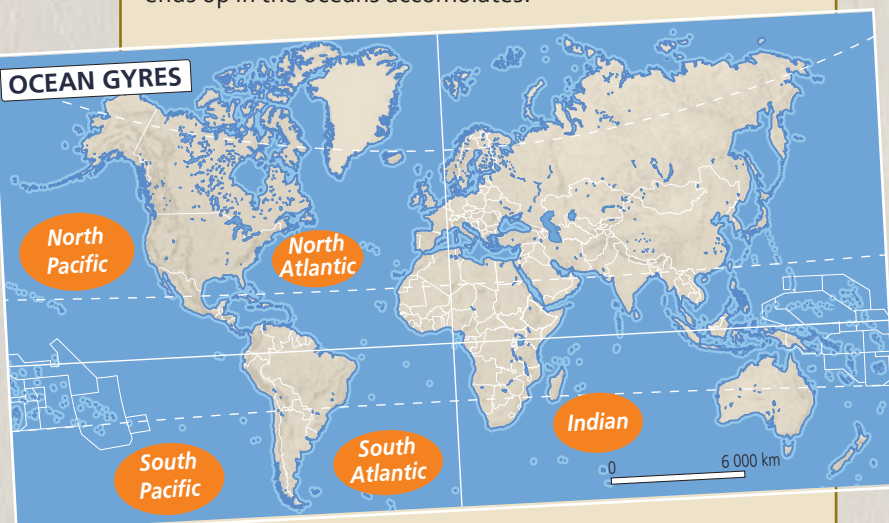


Rubbish and plastic floating in the Pacific Ocean are threatening marine life.

### Where has all the plastic waste accumulated?

Most plastic waste accumulates in areas of the oceans where the wind creates circular currents in the water. These are known as gyres. They trap any floating waste in the ocean.

There are five gyres where most of the plastic waste that ends up in the oceans accumulates.



BBC (Translated and adapted)

### Suggestions made by secondary-school students to solve the problem

#### Information campaigns to:

- inform people of the risks.
- reduce the use of plastic and substitute it with other materials, such as glass, paper or cotton.
- encourage recycling.
- discourage people from buying products which are wrapped in plastic, eating chewing gum and using plastic drinking straws.

#### Other ideas:

- clean up the oceans.
- develop a type of plastic that dissolves in water.
- increase fines for people who throw plastic into rivers, seas or oceans and for those who buy or sell plastic bags.
- we should all try to reduce plastic pollution any way we can because we're destroying the environment. Our generation and future generations will live in a polluted environment unless we do something now.

## 5 Globalisation, the environment and sustainable development 🌍

During the 1970s, people began to worry about the effects of mass consumerism and wasted resources on the environment.

There are various factors that make environmental sustainability difficult to achieve. Some of these factors are related to the consequences of **globalisation**. There's a widespread belief in **growthism**<sup>1</sup>. As a result, businesses usually prioritise being competitive at the expense of the environment.

Other factors that affect sustainable development are socioeconomic, such as standards of living.

As a consequence, we need to **manage** and **plan** our use of the Earth's resources and, at the same time, **reduce our impact** on the environment.

There are three key actions we can take in order to achieve sustainable development.

- **Prevention:** anticipating environmental problems before they happen.
- **Protection:** implementing conservation and the protection of natural landscapes.
- **Rehabilitation:** undoing some of the damage caused by human activities. For example, we could turn old landfill sites into parks.

We should take action on both a local and a global level. In addition, it should involve all the relevant agents: individuals, businesses and governments.

Education should include **environmental awareness**, starting with school children, so that people are aware of the need to preserve and protect nature and the environment for future generations.

In addition to environmental issues, **sustainable development** also includes issues related to world peace and security, the law and human rights, as well as development in itself.

Negative impacts on the environment have already helped to raise awareness of this problem among the public. This has resulted in various initiatives, including the work of environmental NGOs such as Ecologists in Action and Greenpeace.

In the 1970s, the UN created the **United Nations Environment Program (UNEP)**. It began to hold the UN Climate Action Summit, also known as Earth Summits. At these international meetings, sustainable development goals are discussed and agreed.

**growthism:** belief that economic growth is the main purpose of human civilisation.



One of the main goals of sustainable development is ensuring that future generations can satisfy their needs.



Environmental education is essential for sustainable development.

## Earth Summits

In 1972 the first UN environmental summit was held in Stockholm, Sweden. At the **1992 Rio de Janeiro Earth Summit** in Brazil, the Rio Declaration on Environment and Development was adopted. Most of the world's leaders at that time supported taking action to resolve the environmental problems the planet was facing. One of the results of this declaration was the **Earth Charter**. The notion of the **'green economy'** also emerged at this time, with the objective of reducing the impact of human activity on the environment.

The **1997 Kyoto Protocol** was signed in order to try to reduce greenhouse gas emissions. However, the objectives were difficult for countries to achieve and some countries decided not to sign it. Of those that did sign, many haven't been able to reach the protocol's objectives. Despite this, many countries later signed the **2015 Paris Agreement**. The objective of this agreement was to limit global warming to 1.5 °C or less by 2030.

At the **2000 Millennium Summit**, many world leaders agreed to help to fight poverty and to create a more peaceful, prosperous and fair world over the course of the next 15 years. Although progress was made, the objectives weren't achieved and, in 2015, the UN adopted its **Sustainable Development Goals**. These form part of the 2030 Agenda. 2030 is the date by which these goals will hopefully have been achieved.

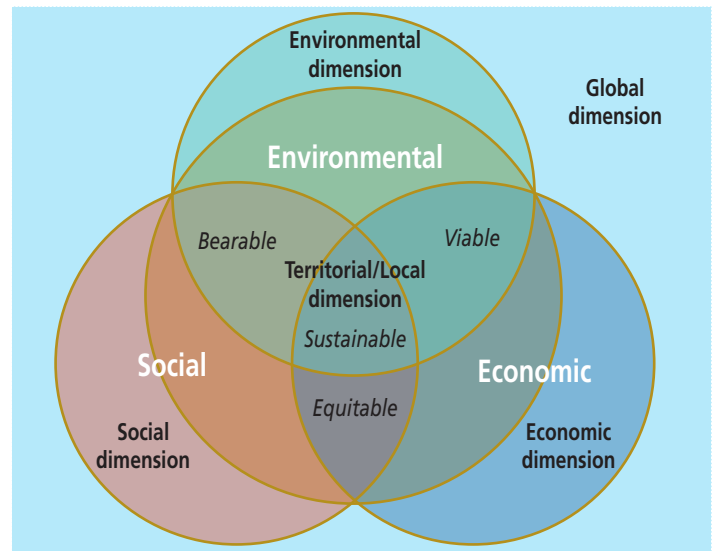


A Greenpeace campaign to protest against climate change

## The objectives of sustainable development

The Sustainable Development Goals were created by the UN in 2015. They include **environmental and national protection**, as well as combatting socioeconomic inequality in order to make the world a fairer place. The goals therefore cover **all the problems** that affect the future of humankind. They ask questions such as: *will there be enough food for the 11.2 billion people who will live on Earth in 2100?*

All environmental issues are interrelated with other problems. This means that any given issue is connected to various Sustainable Development Goals.



How the three dimensions of sustainable development are related

**'green economy':** low-carbon, resource-efficient and socially-inclusive economic model.

## CLIL activities

- 16 In your notebook, suggest ways we can:
  - a. prevent environmental problems.
  - b. protect the environment.
  - c. rehabilitate a damaged environment.
- 17 Listen and describe the objectives of the Paris Agreement. Explain what consequence this has had in the UK.
- 18 Discuss these questions with a classmate.
  - a. How many of the 17 Sustainable Development Goals can you name?
  - b. Which do you think are the most important?

## 6 Protecting natural spaces

Around the world there are natural spaces which are almost untouched by human activity. They're invaluable, and their flora and fauna must be protected. Various international bodies are involved in achieving long-term conservation. Organisations such as the International Union for the Conservation of Nature (IUCN) and UNESCO have created different conservation schemes in order to protect these natural spaces.

### THE NETWORK OF NATIONAL PARKS

These are the main protected areas within a country. The objective of creating a national park is to protect the area, on the one hand, and to allow the public to access and enjoy it, on the other hand. National parks help to improve scientific understanding of the natural and cultural impact of such places. They also promote greater public awareness of the need for conservation.

The first national park ever to be created was Yellowstone (US, 1872). After that, Yosemite National Park and Sequoia National Park were also established (US, 1890).

The **European Foundation for National Parks** (EUROPARC) was founded in 1973. The foundation helps to connect the different organisations responsible for managing and protecting natural spaces in over 40 different countries.



 <http://inicia.oupe.es/19arcgis242>

### UNESCO PROTECTED AREAS

UNESCO is an organisation that forms a part of the UN. UNESCO works to protect natural places and places of cultural interest. It uses these terms to categorise protected areas.

- **Biosphere reserves:** these are inland, coastal and marine ecosystems (or a combination of these) which are categorised within the Man and the Biosphere Programme (MAB).
- **World heritage sites:** these are places that have exceptional cultural or natural value (or both).
- **Geoparks:** these are areas with important geological features which aim to promote sustainable tourism.



Las Bardenas Reales (Navarra) has been a biosphere reserve since 2000.



The Alhambra was declared a world heritage site in 1984.



The Charco Verde or Laguna de los Clicos in the Lanzarote geopark and the Chinijo archipelago





## 7 Natural disasters and humanitarian crises

Natural disasters are catastrophes that are caused by unexpected natural phenomena. No country can avoid natural disasters; they can occur anywhere. Developed countries, however, are better prepared to deal with their consequences. In order to minimise the impact of natural disasters, we need to understand them.

### Types of natural disasters

- **Volcanic eruptions** occur when matter from deep down in the Earth's crust and mantle is ejected through the crust. Volcanic eruptions expel magma, gases, ash and pieces of rock. These materials can cover a wide area and they destroy whatever they find in their path. They also emit large quantities of gases into the atmosphere. These gases disperse over a wide area.
- **Earthquakes** are sudden, strong movements of the Earth's crust. They're caused by a release of energy from below the crust. Earthquakes can destroy buildings and infrastructure. In addition, they can cause mudslides and avalanches. When earthquakes occur on the sea floor, they're known as **seaquakes**. Seaquakes can cause huge waves called **tsunamis**. When tsunamis reach the coastline, they cause significant destruction.
- **Tornadoes** are areas of low pressure which are smaller but stronger than hurricanes. Tornadoes are funnel-shaped and destroy everything in their path.
- **Hurricanes** are winds that form when air pressure is low. They move very quickly and destroy everything in their path. When hurricanes occur near the sea, they can cause huge waves. In addition, hurricanes cause torrential rainfall, which can result in floods.
- **Floods** are caused by snow and ice in mountainous areas melting quickly, and also by torrential rainfall. Floods can affect farms and urban areas. When there are large volumes of water from ice melt, this can cause mudslides, which can destroy houses.
- **Droughts** can be caused by a lack of rain or by the overuse of water in rivers and lakes. Droughts can affect crops and cause famine. They can also cause migration: people move to areas with more food.
- **Forest fires** start quickly and in an uncontrolled manner. They can be caused by lightning, high temperatures or a lack of rain. However, many are caused by humans. People aren't always careful enough when discarding waste or when extinguishing camp fires. Fires are also lit to clear land for construction or farming.



Natural disasters have become more frequent because of climate change. Nowadays, 70% of natural disasters are related to climate. This is twice as many as 20 years ago.



## 8 Environmental problems in Spain

The magnitude and frequency of an environmental problem determine its consequences. These, in turn, determine its economic and human impact.

### ENVIRONMENTAL PROBLEMS WITH NATURAL CAUSES

#### Forest fires

Spain has more forest fires than most other European countries. In recent years, their number has increased due to climate change and a lack of preventive measures, such as controlling vegetation growth. More houses have also been built in mountainous areas. Extinguishing fires as they occur doesn't solve the problem. We need to prevent them from happening.



#### Torrential rains

On the Mediterranean coast and in the Balearic Islands, torrential rains can cause floods. These happen when rivers and streams burst their banks as a result of heavy rainfall. Torrential rains can also cause mudslides and soil erosion. Some heavy rains have caused deaths, such as when the Tous Dam burst in 1982. The Aras de Biescas Ravine flood in Huesca in 1996 and the Badajoz floods in 1997 also resulted in numerous deaths.



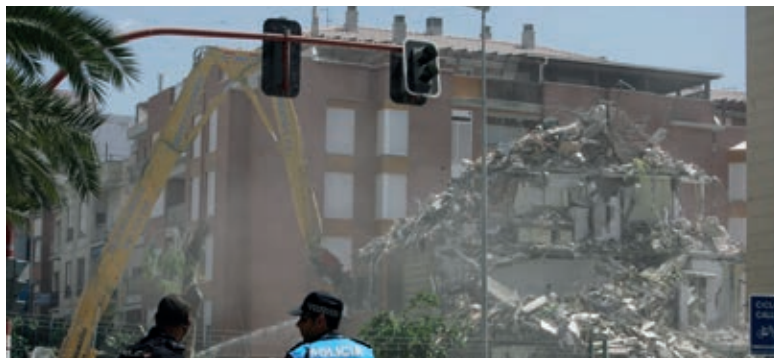
#### Droughts

Droughts are common in Spain. They're the result of long periods without rain. Droughts can destroy crops, grazing land and reduce the water supply for agricultural, domestic and industrial use.



#### Seismic activity

Seismic activity causes earthquakes and seaquakes. One of the worst earthquakes in Spain took place in Lorca, Murcia in 2011. Earthquakes in Spain are usually less serious, however, than the earthquakes that occur in other parts of the world.



#### Volcanic eruptions

Volcanic eruptions aren't common in Spain, except on the Canary Islands. The last volcanic eruption took place in La Palma in 2021. There are also active volcanoes in Girona (Olot) and Ciudad Real (Campo de Calatrava).



Cumbre Vieja erupting in La Palma (2021)

#### Other phenomena

**Blizzards** and **hailstorms**, extreme temperatures, **high winds**, **tornados** and tropical weather, which is common in the Canary Islands, can also cause mudslides, avalanches and erosion.





## 9 Protecting natural spaces in Spain 🌍

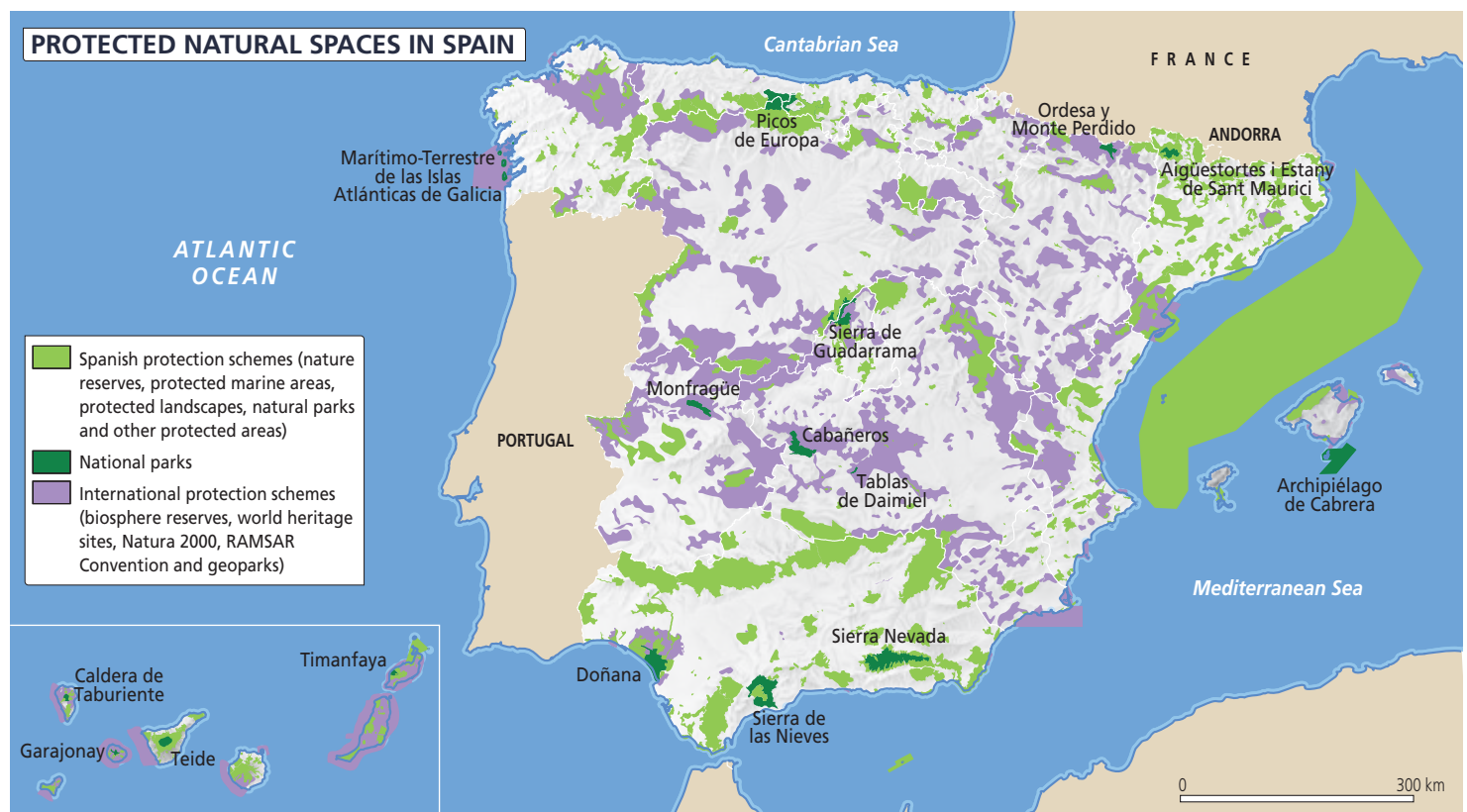
There are five types of protected natural spaces in Spain according to the network for *Espacios Naturales Protegidos* (ENP).

- **National parks** are large areas of very significant natural or cultural importance. They contain important examples of flora, fauna and/or geological formations. To qualify as a national park, the area in question must be extensive and have no urban development. Spain currently has 16 national parks.
- **Nature reserves** are established to protect ecosystems, communities or biological elements which are particularly rare, endangered or of significant value.
- **Protected marine areas** are protected marine spaces under the direct control of the national government. All or part of the natural resources in these spaces is protected.
- **National monuments** are areas that contain specially protected elements, such as rare or very large trees, geological formations, archaeological sites or mineral deposits.
- **Protected landscapes** are areas of aesthetic or cultural significance which need special protection.

Some of the protected areas in Spain belong to the EU's Natura 2000 scheme or are UNESCO biosphere reserves, world heritage sites or fall under the scope of Specially Protected Areas of Mediterranean Importance (SPAMI). Protected natural spaces account for more than 25% of Spain's total surface area.

### CLIL activities ➡➡➡➡➡➡➡➡➡➡

- 29 🗺️ Use the map to list the types of protected spaces in your province and autonomous community.
- 30 🔊 Listen and write what type of protected area is being discussed. Why's it protected?
- 31 💬 Answer the questions with a classmate.
- Do you think there are enough protected spaces in Spain? Why/Why not?
  - Should tourism be promoted in natural spaces?



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# Practical

## Participating in a debate

A debate is a form of communication in which two or more people give their opinion on a topic or on various topics. Each person puts forward their point of view and defends it. A series of key questions are decided and researched prior to the debate.

### Steps to follow to hold a debate

- 1 Decide on a topic or problem that you want to discuss. Then choose a moderator. The moderator prepares the questions to get the debate started. The moderator also controls the turns during the debate to make sure that everyone has an equal chance to speak.
- 2 The participants then do research to find out more about the topic. The more information they have, the better their arguments will be to defend or challenge an opinion.
- 3 People can participate in debates individually or in teams. In the first case, each participant puts forward their opinion freely, in the second case, the team decides what their opinions will be and everyone defends the same opinion.
- 4 During the debate, the moderator asks prepared questions. They can also ask spontaneous questions too, of course. Each individual or team has turns to speak and is invited to speak in order by the moderator. Everyone listens respectfully to whoever is speaking.
- 5 To conclude the debate, the moderator should summarise the ideas of the individuals or teams and come to a conclusion in which a final consensus is reached.
- 6 There can also be observers who take notes or record the session.



### Other debate topics

- Will we be able to achieve the Sustainable Development Goals by 2030? What do governments and citizens need to do to achieve this?
- Educational equality between genders in less-developed countries: could we be doing more?
- Are the policies currently in place to reduce the use of plastic in Spain sufficient?


### Example of a group discussion

DEBATE: Nuclear energy: a good idea or a bad idea?

Debate questions	Research
How does nuclear energy affect climate change?	Advantages and disadvantages of nuclear power
How does a nuclear power station affect the landscape and population nearby?	The effect of nuclear power on climate change
Would you be happy if the government announced it was opening a nuclear power station 30 km from your home?	How much energy does Spain import from abroad?
Does Spain need more nuclear power stations? Should we close the ones that are currently in operation?	Jobs in the nuclear power industry
What should we do with nuclear waste?	How many nuclear power stations are there in Spain? What about in Europe?
What's the future of nuclear energy?	How's nuclear waste stored in Spain? What options are there? What are the problems associated with nuclear waste?

- Hold one of the suggested debates in your class, following the steps described above. Choose a moderator and an observer (one for the whole debate, or one for each group). If your school and families agree, you could record your debate and then watch the recording to analyse it.

# Revision activities



- 1  Define these terms in your notebook.
- Earth Summit
  - national park
  - hole in the ozone layer
  - acid rain
  - desertification
  - overexploitation
  - biocapacity
  - environmental footprint

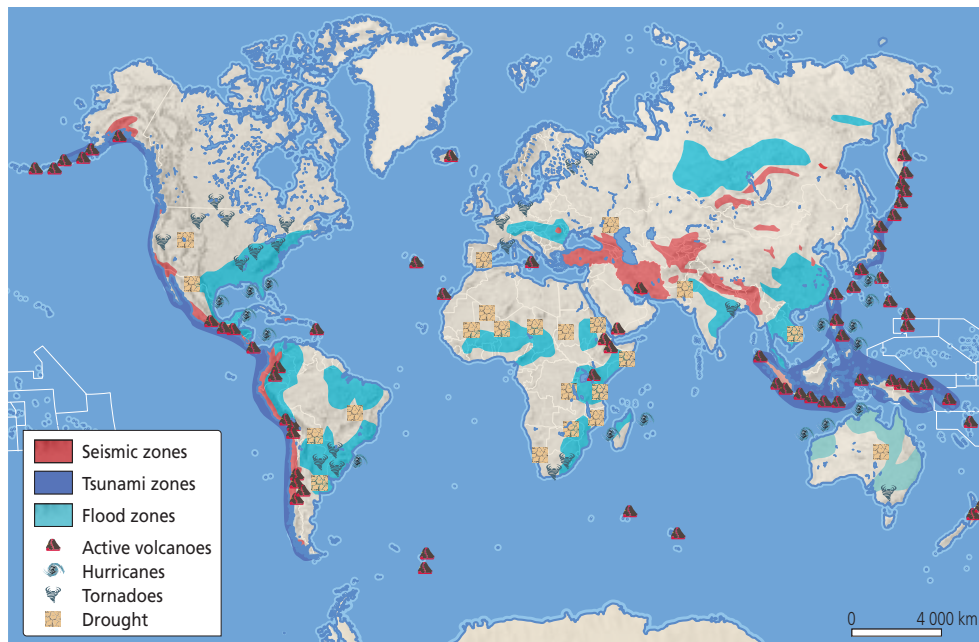
- 2 Answer the questions.
- a. What different types of waste are there?
  - b. What's desertification? What causes it?
  - c. What's the United Nations Convention on the Law of the Sea?
  - d. What are the main environmental problems with natural causes that Spain faces?
  - e. What do we call the UN directives that refer to sustainable development? Give some examples.


- 3  Read the text and explain what it's referring to.

*Development that satisfies the needs of the current generation, without compromising the ability of future generations to satisfy their own needs.*

Brundtland Report (1987)


- 4  Write a list of things you can do, as well as things your school can do, to stop climate change.
- 5  Look at the map and summarise the information it contains about natural disasters.



- 6  Visit the Global Footprint Network web page and find out more about the environmental footprint and biocapacity.
- a. List five countries with a negative ecological deficit and five with a positive ecological deficit.
  - b. Compare the US to China for: *biocapacity, per capita environmental footprint, population size and GDP per capita*. Each country has a negative ecological deficit. In which country is this the result of a larger population? In which country is it the result of higher consumption?
- 7 Look at the map showing nuclear power stations in Spain and answer the questions below.



- a. Where are the nuclear power stations located?
- b. Where's radioactive waste stored?
- c. What environmental risks can these produce?

- 8  Read the text and answer the questions below in your notebook.

### Urban pollution

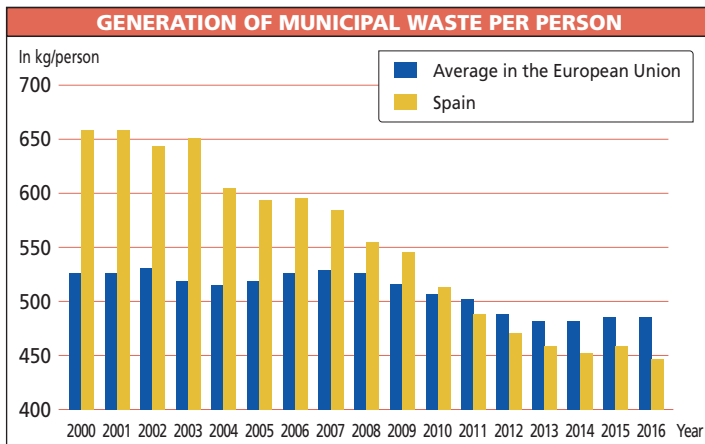
The city of Beijing, which according to a government report is almost 'uninhabitable for human life' today as a result of its extremely high levels of air pollution, has decided to close 300 polluting factories in order to improve air quality. In addition to these closures, no new industrial projects will be approved in sectors such as the steel industry and cement industry, which cause high levels of pollution.

*La Vanguardia* (Translated and adapted)

- What type of pollution does the text refer to?
- How does this type of pollution affect people living nearby?
- Bearing in mind that the population of Beijing is very high, what other types of pollution do you think there could be there?

- 9  Look at the bar chart and answer the questions.

- Which area was the first to reduce waste?
- How has Spain changed since 2000 in terms of waste generation?
- How does Spain compare in recent years to the EU average in terms of waste generation?




- 10 Why do you think national parks and other types of protection of natural spaces are important? What are the benefits of protecting natural areas?

- 11 Make a mind map in your notebook about environmental degradation. Include information about the:

- types of pollution.
- causes and consequences for the environment.
- causes and consequences for people.

- 12 Choose a Sustainable Development Goal and answer the questions.

- Why's it important to achieve this goal?
- How is it related to the economy, society and environment?
- What measures must we take to achieve it?

- 13  Read and summarise the text. Suggest how the problem can be resolved.

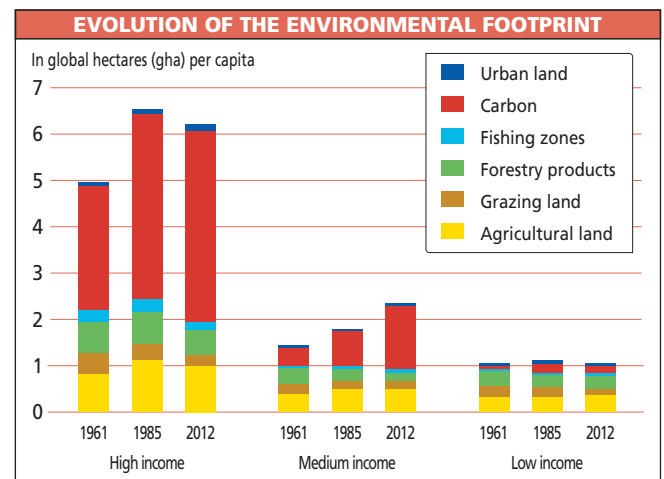
### The worrying growth of the Great Pacific Garbage Patch: three times the size of France

The gigantic Pacific Garbage Patch is growing at an alarming rate, according to new research published in *Nature* magazine. As this research shows, this area of waste now measures 1.6 million km<sup>2</sup> – almost three times the size of France – and contains almost 80 000 tonnes of plastic. This is 16 times more than was previously thought. In fact, one area within the garbage patch now contains the greatest concentration of plastic ever recorded.

'The concentration of plastic is increasing. I believe the situation is getting worse,' said Laurent Lebreton, the main author of *The Ocean Cleanup* Foundation study in Delft, Netherlands.

BBC (Translated and adapted)

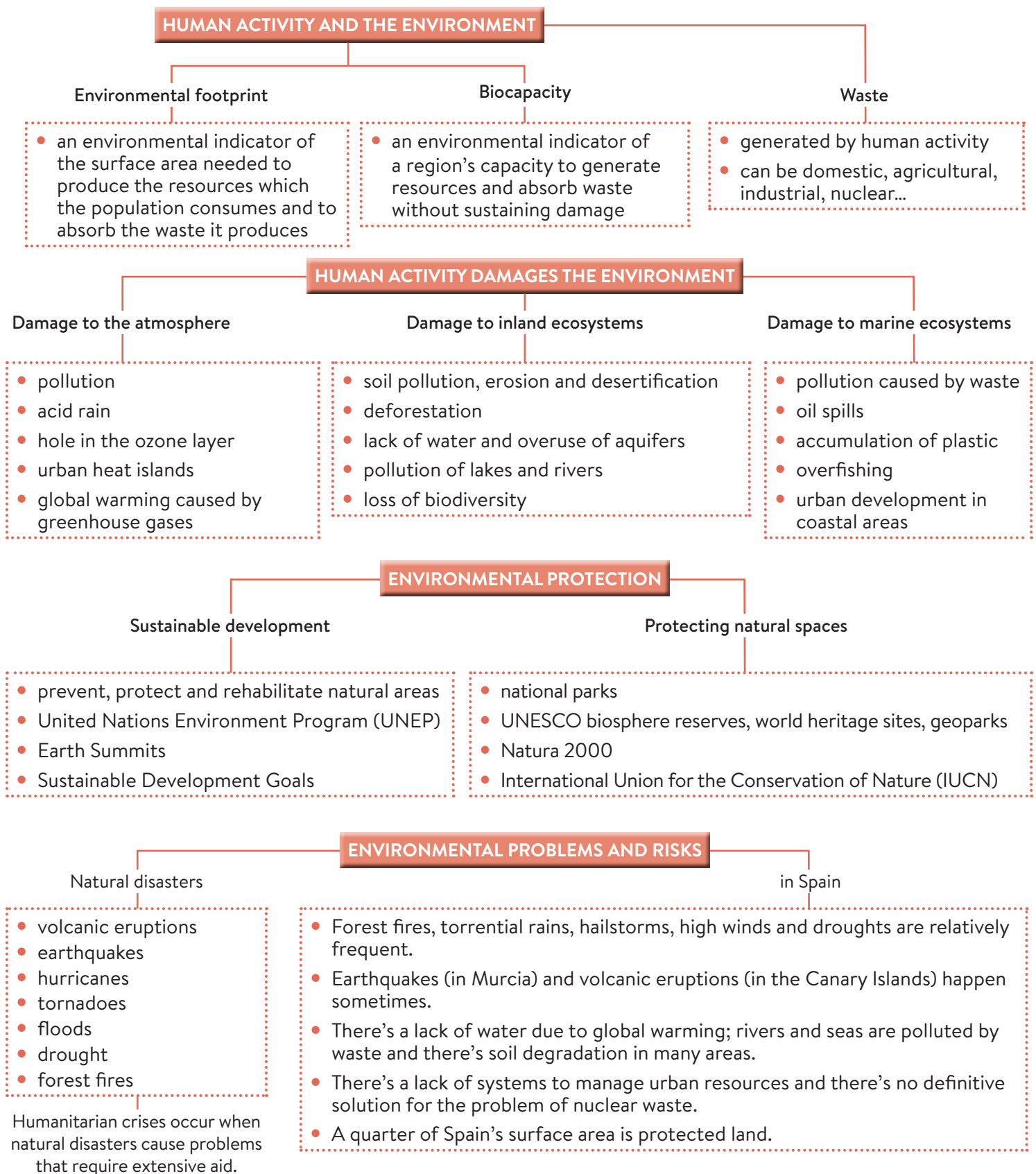
- 14  Look at the bar chart and answer the questions below.



- Which countries have the largest environmental footprints?
- What affects the footprint of each country? What types of human activity increase it?
- How has the environmental footprint of developed countries changed? What about in less-developed countries? Why?



## Sustainability and the environment



↓ Concept map

# Work on your key competences

**Will we be able to achieve the Sustainable Development Goals by 2030?**

## Achieving the Sustainable Development Goals

Fortunately, we know that nowadays many people are worried about the future of the planet and are trying to be more sustainable, both environmentally and socioeconomically. These concerns have grown in recent years and have led to the creation of the Sustainable Development Goals. However, it still isn't clear how we can achieve these goals. What's clear, however, is that we'll need to do more than just work together...

You're going to work on these goals to see if you can help solve some of these issues. You'll think about what needs to be done and what you personally can do to help achieve these goals.

### Preparation

- Classify the Sustainable Development Goals into four categories. To help you do this, use the information on the right.
  - ecological and environmental
  - economic and systems of production
  - social welfare
  - governmental and political action to improve the situation
- Form groups of four and choose a Sustainable Development Goal which you're all interested in.
- Do research to find out more about the goal you chose: what issue does it aim to resolve and what objectives are stated for 2030?

### Method

1. Once you've found information about the goal, create a presentation using PowerPoint, Prezi or another slideshow program to communicate what you found out.
2. Create a poster about the goal you researched. Include information about what category it falls under and a list of specific actions we can take to help achieve this goal.

### Presentation

Give your presentation to the class and pay close attention to the other groups' presentations.

Hold an informal debate. Discuss and evaluate the actions each group has suggested and suggest other actions that will help achieve the goal.

Add the new suggestions to your poster, or at least the most interesting ones.

Display the posters around the classroom or in the school corridor.

#### Group size:

groups of four for the presentation and poster.

large group for the debate.

#### Material:

computer with Internet access, reference books.

#### Classification of the Sustainable Development Goals

- **Ecological and environmental:** refer to climate change or protection of the environment.
- **Economic and systems of production:** refer to reducing the impact of economic activity to preserve the environment for future generations.
- **Social welfare:** refer to improving wellbeing and living standards around the world.
- **Governmental and political:** refer to promoting the SDGs and government policies to increase public awareness.

