

Module 4

Earth dynamics and energy resources

Unit 1

Introducing the Earth and its resources

Unit 2

Plate tectonics

Unit 3

Energy resources

Language skills

- Listening to a text on the greenhouse effect and understanding its global meaning.
- Reading articles on the structure of the Earth and its systems, comprehending them both globally and in detail.
- Expressing one's opinion on the greenhouse effect.

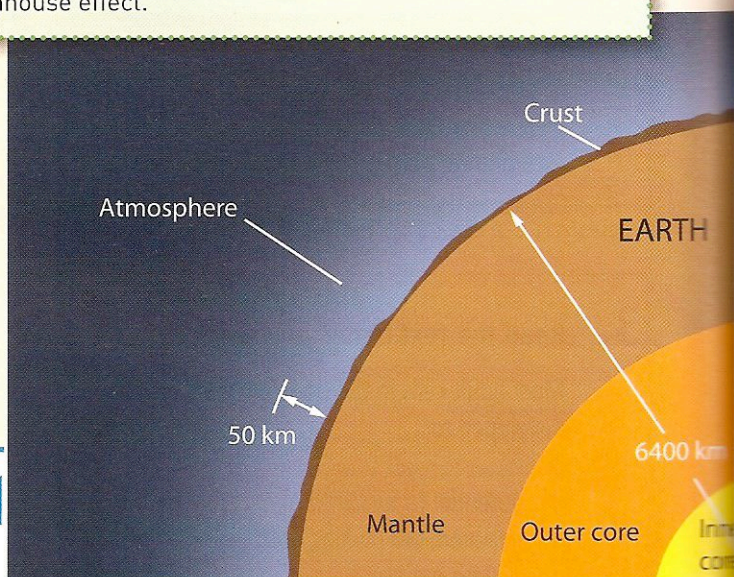
Unit 1

Introducing the Earth and its resources

Learning objectives

Revising previous knowledge on:

- The internal structure of the Earth and the Earth's four systems.
- The greenhouse effect.



WARMING UP

1. What does the picture show?
2. Do you know any of the terms indicated?

Match each term in the picture to its definition.

- | | |
|----------|--|
| 1. _____ | a. Layer of gases surrounding the Earth. |
| 2. _____ | b. The innermost part of the Earth's core. |
| 3. _____ | c. The fifth planet in the solar system in terms of size and mass. |
| 4. _____ | d. It surrounds the inner core. |
| 5. _____ | e. It is made up of different types of rocks. |
| 6. _____ | f. The largest fraction of the Earth's inner layers, immediately underneath the crust. |

1 The structure of the Earth

The Earth can be divided into layers: the crust, which represents the Earth's surface, the mantle and the core. The crust and the upper part of the mantle have a similar composition and behaviour, and form the lithosphere, that is the Earth's outer layer.

Accordingly, two types of **crust** can be described: the oceanic crust and the continental crust. The oceanic crust is mainly composed of basalt. It is thinner than the continental crust, being, on average, less than 10 kilometres thick. Nevertheless, it is denser, since it has an average density of about 2.9 g/cm^3 . The oceanic crust un-

derlies the ocean basin. It is relatively young compared to the continental crust, since it is continuously being created in the mid-ocean ridges and destroyed in the oceanic trenches.

The continental crust consists mostly of granitic and sedimentary rocks, which are less dense than basalt. Consequently, the density of this type of crust is 2.7 g/cm^3 , on average, although it is considerably thicker than the oceanic crust (from 25 to 70 km). The continental crust is older than the oceanic crust and makes up about 70% of the volume of the Earth's crust and about 40% of the Earth's surface. The Earth's **mantle** represents about 67% of the total mass of the Earth. It extends to a depth of approximately 2,900 km and is thought to be mainly

solid. According to the different rock characteristics, the mantle is divided into two different zones: the upper mantle and the lower mantle. The part of the upper mantle that overlies the crust, forming, with it, the lithosphere, consists of solid and brittle rocks. Below the lithosphere, the inner part of the upper mantle, called the asthenosphere, is plastic and partly molten flowing. Very little is known about the lower mantle. It is believed to be rigid and to consist of hotter and softer rocks.

The Earth's **core** is thought to be composed mainly of iron and nickel. It is divided into two different zones. The outer core is liquid, the inner core, due to its very high density, is solid.

EXERCISES

- 1 Make a chart to compare the different features of the continental and oceanic crust. Then discuss your choices in groups.

	Oceanic crust	Continental crust
Composition		
Density		
Average thickness		
Age		

- 2 Label the figure, using the following terms.

inner core • lithosphere •
upper mantle • oceanic crust
• lower mantle • outer core •
continental crust •
asthenosphere

