The structure of the earth

The structure of the Earth resembles the layers of an orange. The Moho is the boundary that separates the crust from the mantle

Earth is made up of four distinct layers:
- A solid outer crust
- A solid mantle
- A liquid outer core
- A solid inner core

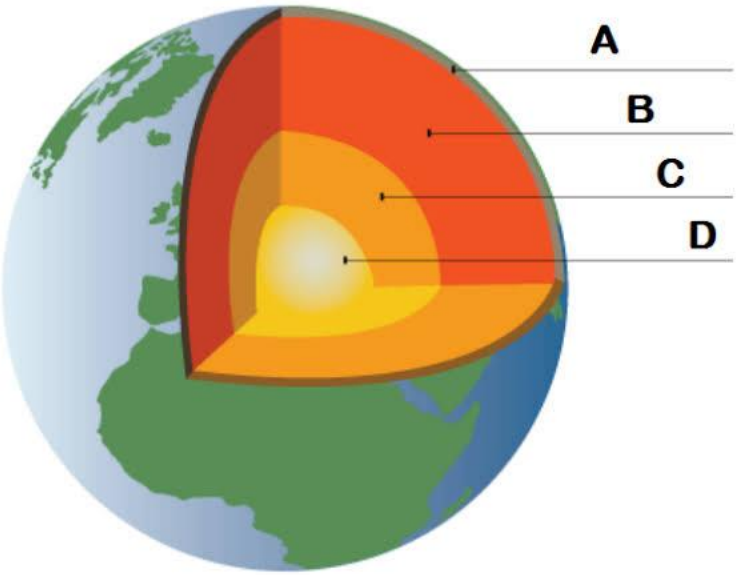
THE CONTINENTAL CRUST:
- The outermost layer of solid rock, on which we live.
- Thicker under the continents and thinner under the oceans.
- Broken into smaller segments, called plates, which float on the mantle.
- It is 6-90 km thick (solid rock)

THE MANTLE:
- Beneath the crust.
- 2 900 km thick, consisting of hot, plastic rock.
- Temperatures may reach up to 5 000˚C.

THE OUTER CORE:
- Very dense but liquid due to extremely high temperatures.
- 2 250 km thick and consists of nickel (Ni) and iron (Fe) known as NiFe.

THE INNER CORE:
- Is extremely hot.
- Solid because of extreme pressure.
- 1 200 km thick.

Activity
Study the diagram and answer the questions that follow:



1. State the layers A, B and D on FIGURE 1.2. (3 x 1)

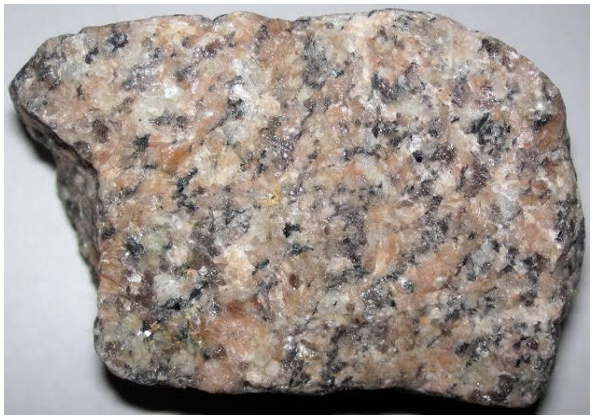
2. Name TWO layers of the Earth which are in solid form? (2 x 1)
3. Which layer of the Earth experiences the highest temperature? Motivate your answer. (1 + 2)

4. Discuss in a paragraph of approximately EIGHT lines the characteristics of layer A that are important to sustain life on earth.

(4 x 2)

CLASSIFICATION OF ROCKS

IGNEOUS ROCKS
What do they look like ?



How do they form ?

- From molten minerals
- Magma wells up from the mantle
- Magma cools below or on top of the Earth's surface
- Deep cooling results in the formation of crystals

What are the characteristics?

- Fine to coarse crystalline rock
- Made up of different minerals
- Jointed when exposed
- Colorful

Examples

- Basalt layer in the Drakensberg
- Dolerite sills and dykes in the Karoo
- Granite domes

What are they used for ?

- Monuments / Tombstones
- Counter tops
- Floor covering
- Valuable minerals and ores
- Weathered rock produces fertile soil

SEDIMENTARY ROCKS

What do they look like ?

How do they form ?

- From pre-existing rocks and sediments
- Contains organic material
- Weathered sediments are deposited by wind, ice and water
- Material deposited in horizontal layers
- Sediments are compressed over time and form sedimentary rocks

What are the characteristics?

- Layered in appearance
- Coarse- or fine-grained texture
- Can contain fossils
- Each layer is called a stratum
- Bedding plane separates different types of rock

Examples

- Sandstone made from sediments
- Shale made from finer sediments
- Coal made from plant material
- Conglomerate made from larger pebbles cemented together

What are they used for ?

- Dolomite for cement
- Building blocks
- Source of crude oil and coal

METAMORPHIC ROCKS

What do they look like ?

How do they form ?

- Sedimentary and Igneous rocks that are subjected to high temperatures and/or pressure
- Physical and chemical changes take place
- Folding and faulting exerts extreme pressure
- Molten magma intrusions cause extreme heat and pressure

What are the characteristics ?

- Brittle
- Streaky in appearance

Examples

- Sandstone becomes Quartzite
- Granite becomes Gneiss
- Shale becomes Hornfel
- Limestone turns to Marble

What are they used for ?

- Flooring
- Slate for roof tiles
- Marble for statues

Match the following statements in Column A with the terms or examples in Column B. Write down only the question number and correct letter. e.g. 2.1.8 P.

2.1.1	Rocks formed when magma solidifies	A. Quartzite
2.1.2	This rock type occurs as layers or strata	B. Fossils
2.1.3	Rocks formed when heat or pressure is added	C. Marble
2.1.4	Recognizable remains of plants and animals preserved in rocks.	D. Metamorphic
2.1.5	Processes that cause rocks to form, break down, change, and reform over time.	E. Gneiss
2.1.6	Sandstone change under heat and pressure to …	F. Igneous
2.1.7	Limestone turns to … under heat and pressure	G. Sedimentary
		M. Shale

7x1=7