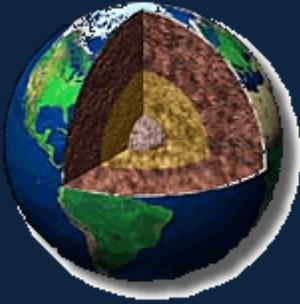


# The structure of the Earth

Imagine a Scotch egg.....



1. The outer shell of the Earth is called the **CRUST** (breadcrumbs)
2. The next layer is called the **MANTLE** (sausage meat)
3. The next layer is the liquid **OUTER CORE** (egg white)
4. The middle bit is called the solid **INNER CORE** (egg yolk)

DEAD EASY!

The deepest anyone has drilled into the earth is around 12 kilometers; we've only scratched the surface. How do we know what's going on **deep** underground?

## EARTH STRUCTURE Test

HERE IS SOME EXTRA STUFF (IN A LOT MORE DETAIL THAN WE NEED FOR GCSE):

**This diagram shows a detailed picture of the Earth's interior.** Crust is being created at the mid ocean ridges and being eaten at the seduction zones. The movement processes are driven by the convection created by the heat produced by natural radioactive processes deep within the Earth.

### Inner core: depth of 5,150-6,370 kilometers

The inner core is made of solid iron and nickel and is unattached to the mantle, suspended in the molten outer core. It is believed to have solidified as a result of pressure-freezing which occurs to most liquids under extreme pressure.

### Outer core: depth of 2,890-5,150 kilometers

The outer core is a hot, electrically conducting liquid (mainly Iron and Nickel). This conductive layer combines with Earth's rotation to create a dynamo effect that maintains a system of electrical currents creating the Earth's magnetic field. It is also responsible for the subtle jerking of Earth's rotation. This layer is not as dense as pure molten iron, which indicates the presence of lighter elements. Scientists suspect that about 10% of the layer is composed of sculpture and oxygen because these elements are abundant in the cosmos and dissolve readily in molten iron.

### D" layer: depth of 2,700-2,890 kilometers

This layer is 200 to 300 kilometers thick. Although it is often identified as part of the lower mantle, seismic evidence suggests the D" layer might differ chemically from the lower mantle lying above it. Scientists think that the material either dissolved in the core, or was able to sink through the mantle but not into the core because of its density.

### Lower mantle: depth of 650-2,890 kilometres

The lower mantle is probably composed mainly of silicon, magnesium, and oxygen. It probably also contains some iron, calcium, and aluminum. Scientists make these deductions by assuming the Earth has a similar abundance and proportion of cosmic elements as found in the Sun and primitive meteorites.

**Transition region: depth of 400-650 kilometers**

The transition region or mesosphere (for middle mantle), sometimes called the fertile layer and is the source of basaltic magmas. It also contains calcium, aluminum, and garnet, which is a complex aluminum-bearing silicate mineral. This layer is dense when cold because of the garnet. It is buoyant when hot because these minerals melt easily to form basalt which can then rise through the upper layers as magma.

**Upper mantle: depth of 10-400 kilometers**

Solid fragments of the upper mantle have been found in eroded mountain belts and volcanic eruptions. Olivine (Mg, Fe)<sub>2</sub>SiO<sub>4</sub> and pyroxene (Mg, Fe) SiO<sub>3</sub> have been found. These and other minerals are crystalline at high temperatures. Part of the upper mantle called the asthenosphere might be partially molten.

**Oceanic crust: depth of 0-10 kilometers**

The majority of the Earth's crust was made through volcanic activity. The oceanic ridge system, a 40,000 kilometer network of volcanoes, generates new oceanic crust at the rate of 17 km<sup>3</sup> per year, covering the ocean floor with an igneous rock called basalt. Hawaii and Iceland are two examples of the accumulation of basalt islands.

**Continental crust: depth of 0-75 kilometers**

This is the outer part of the Earth composed essentially of crystalline rocks. These are low-density buoyant minerals dominated mostly by quartz (SiO<sub>2</sub>) and feldspars (metal-poor silicates). The crust is the surface of the Earth. Because cold rocks deform slowly, we refer to this rigid outer shell as the lithosphere (the rocky or strong layer).

**Structure of Earth**

