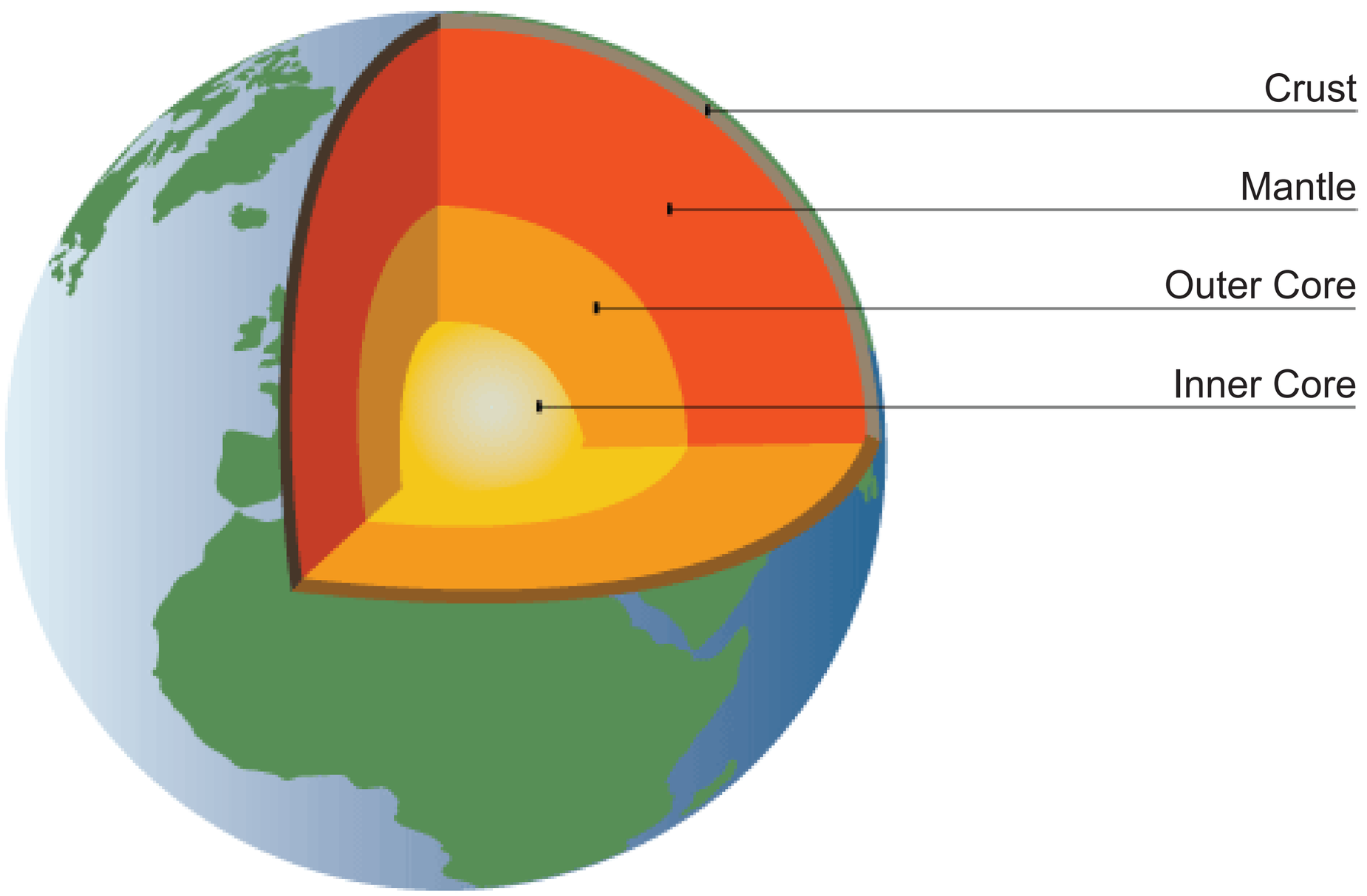
EARTH
STRUCTURE OF OUR PLANET

Crust
The crust, which is solid and rocky, varies from 5 to 90 km in thickness. The Continental crust, which forms the land, is 25 to 90 km thick and is thickest under the large mountain ranges, such as the Himalayas. It covers 29% of the surface of the planet. The Oceanic crust, found under the oceans, is much thinner at 5 to 10 km thick and covers about 71% of the planet's surface.

The crust is composed mainly of oxygen (47%), silicon (28%), aluminium (8%) and iron (5%). The rocks in the oceanic crust, such as basalt, are denser than the rocks forming the land, such as granite.

The crust is broken up into rigid tectonic plates comprising seven large plates and many smaller plates. They move very slowly relative to one another. The collision and separations which occur where plate edges meet and interact cause volcanic activity and earthquakes, such as occurs in the 'Ring of Fire' around the Pacific Ocean.



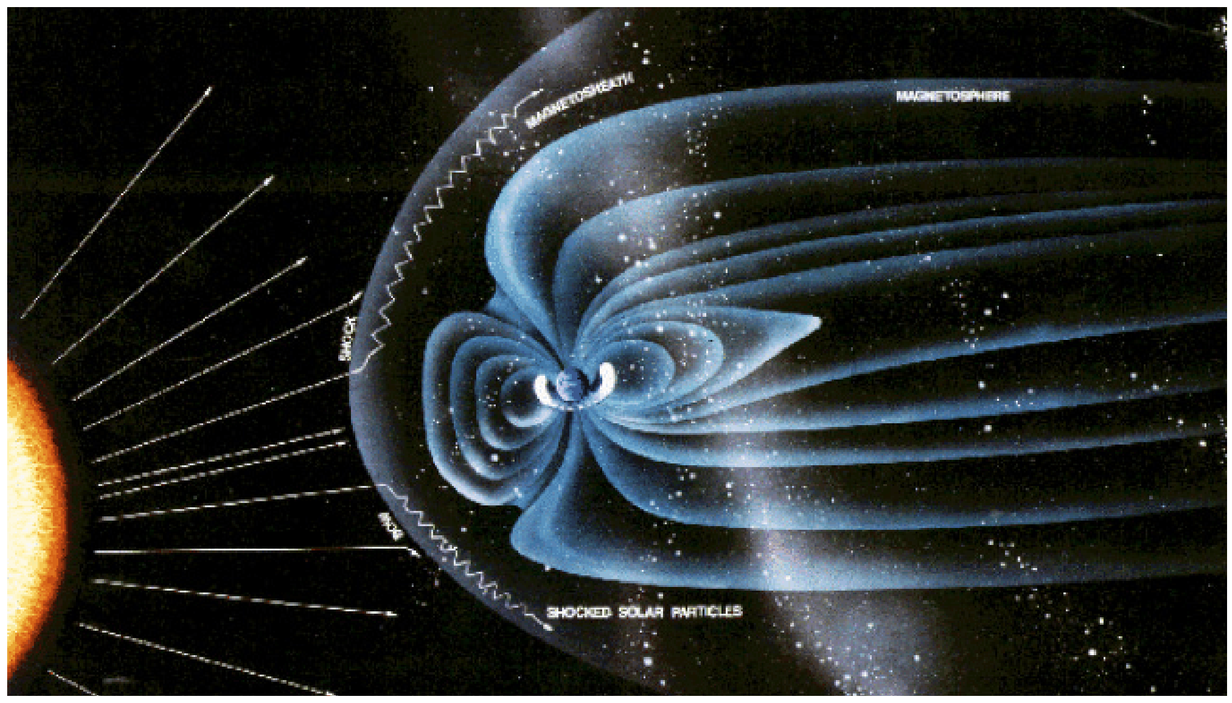
Mantle
The mantle is a thick, semi-liquid layer of solid and molten rock (magma). From an average of 35 km from the surface it extends about 2 900 km towards the centre of the Earth and is the thickest of the planet's layers. Convection currents within the mantle move the magma around. It is composed mostly of oxygen (49%), silicon (21%) and magnesium (23%).

Outer core
This liquid part of the core is made up of iron and nickel and is about 2 200 km thick. The motion of the outer core liquid metals forms the dynamo that creates and maintains the Earth's magnetic field.

Inner core
This sold structure, which is made of iron and nickel, has a diameter of about 2 440 km and reaches temperatures up to 5 500°C. The huge pressures that occur towards the centre of the planet are the reason why the metals are solid.

Atmosphere
The gaseous layer that surrounds the Earth is about 120 km thick and is made up of several layers. It comprises 78% nitrogen and 21% oxygen with traces of other gases. Half the total mass of the atmosphere is found in the 5.5 km closest to the Earth's surface. The atmosphere makes life possible on Earth as it blocks some of the dangerous energy from the sun, traps heat, keeps temperatures comfortable, and provides life-giving oxygen to plants, micro-organisms and animals.

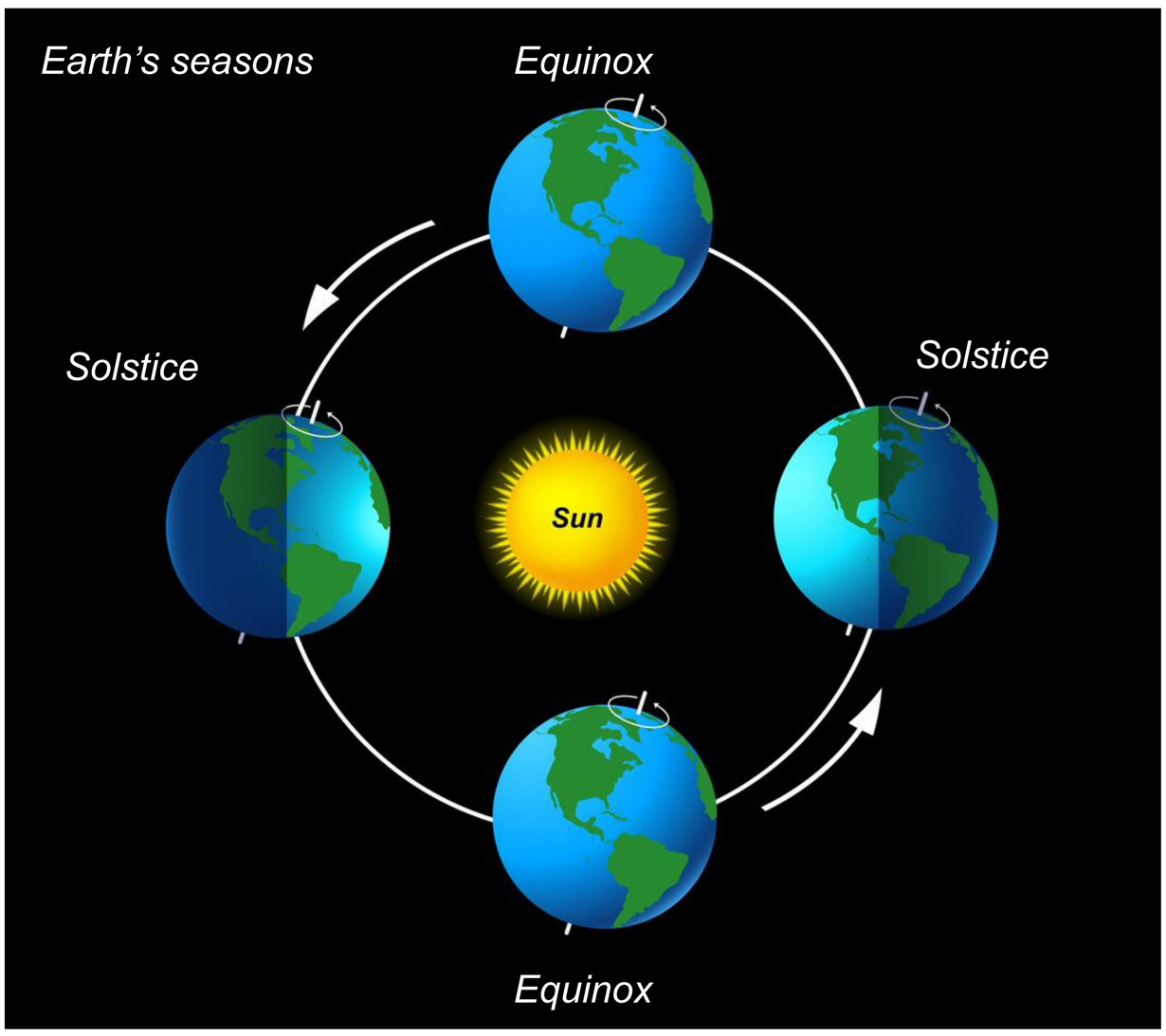
Magnetosphere
The magnetic field that surrounds the Earth extends many thousands of kilometres into space and protects the planet from the deadly cosmic rays found in space and from the charged particles carried from the Sun by the solar wind. The solar wind flattens the magnetosphere field on the Sun's side of the Earth and plumes it far outwards on the other side.

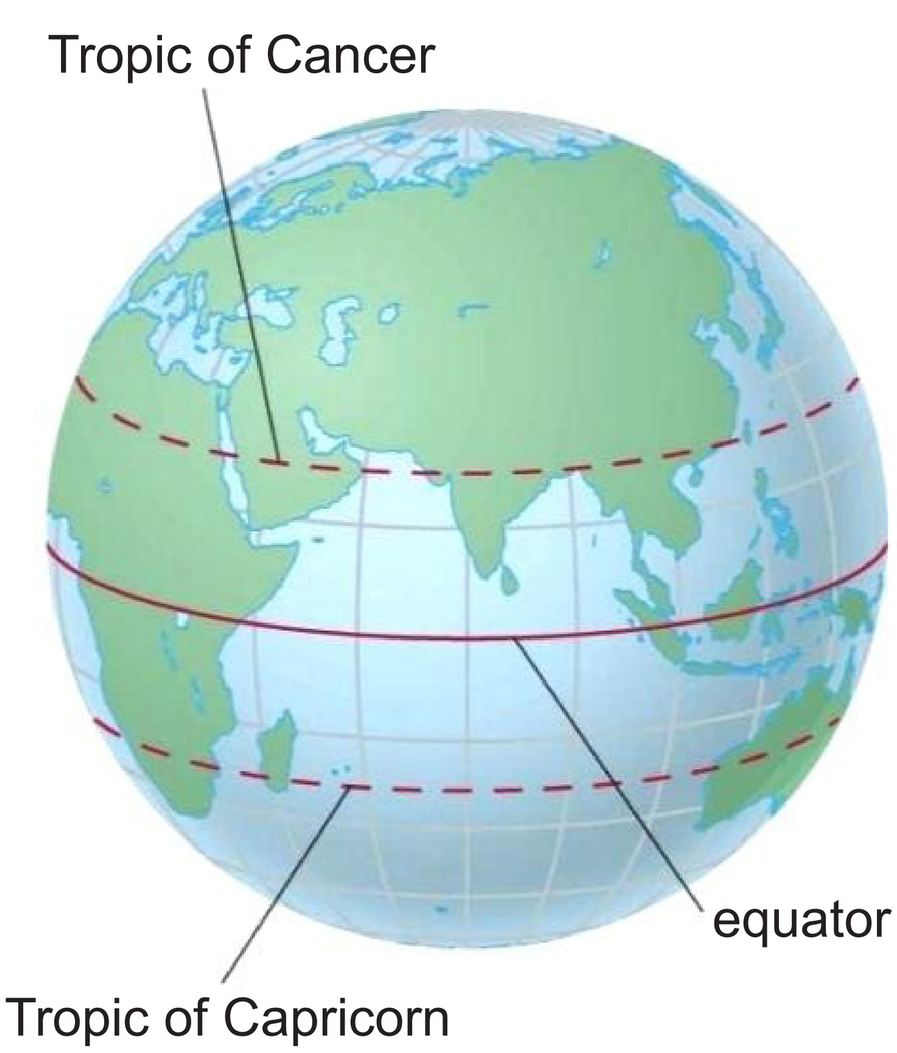


Magnetosphere

Seasons
The Earth's axis is 23.5° off vertical which means that, during its annual orbit around the Sun, different hemispheres point towards the Sun at different times of the year, which creates the seasons.

Our southern summer, when the days are long and the nights short, occurs when the southern hemisphere is pointing towards the Sun. At the same time the northern hemisphere is pointing away from the Sun and experiences winter, with its short days and long nights.





During our winter months the Earth is pointing the other way. The Sun shines more directly onto the northern hemisphere, creating their summer season, while we experience winter.

The Earth's tilt means that the Sun's seasonal movement ranges between 23.5°N and 23.5°S of the equator, these being marked by the latitudes of the Tropics of Cancer and Capricorn respectively.


Asteroid striking the Earth

Evolution of life on Earth
The earliest life on Earth has been dated to about 3.8 billion years ago. Single-cell life, mainly microbes, continued to live for billions of years. About 700 million years ago the first multi-cellular life appeared, with their diversity peaking in the Cambrian explosion about 540 million years ago.

Since then there have been five mass extinctions, which have led to the loss of many forms of life but also to the emergence of others. The causes of these extinction events are complex and include volcanic activity and the impact of asteroids from space.

The last great extinction was caused by the impact of a large asteroid in Mexico 65 million years ago. This led to the disappearance of the large dinosaurs on land and in the oceans and to the evolution of modern birds and mammals, including humans.