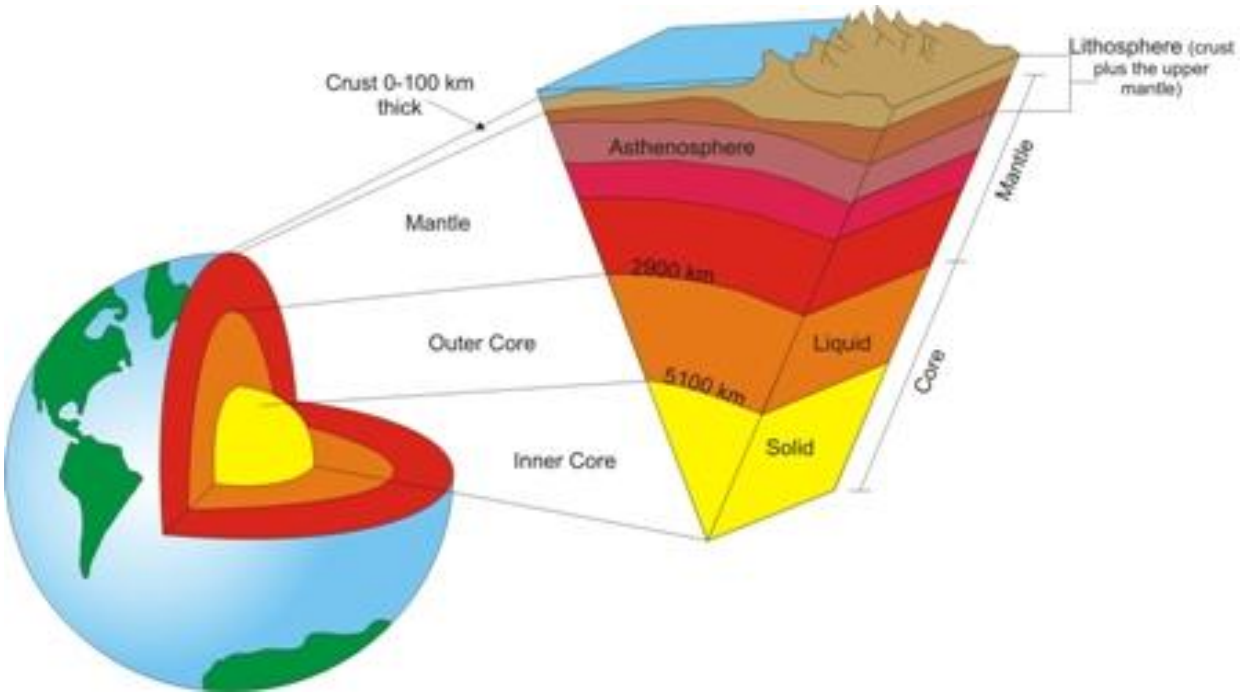
Frequently Asked Questions

Question 01:

Elaborate the Earth's Structure with sketch.

Answer:

- The interior structure of the Earth is layered in spherical shells. These layers can be defined by their chemical and their rheological properties.
- Earth has an outer silicate solid crust, a highly viscous mantle, a liquid outer core that is much less viscous than the mantle, and a solid inner core.



Crust

- The crust ranges from 5–70 in depth and is the outermost layer.
- The thin parts are the oceanic crust, which underlie the ocean basins and the thicker crust is continental crust, which is less dense.
- The uppermost mantle together with the crust constitutes the lithosphere.

Mantle

- Earth's mantle extends to a depth of 2,890 km, making it the thickest layer of Earth.
- The mantle is divided into upper and lower mantle.
- The upper and lower mantle are separated by the transition zone.
- The mantle is composed of silicate rocks that are rich in iron and magnesium relative to the overlying crust.
- Convection of the mantle is expressed at the surface through the motions of tectonic plates.

Core

- The denser materials exist within the Earth's core
- Seismic measurements show that the core is divided into two parts, a "solid" inner core and a liquid outer core.
- The inner core was discovered in 1936 by Inge Lehmann and is generally believed to be composed primarily of iron and some nickel.
- It is not necessarily a solid, but, because can deflect seismic waves, it must behave as a solid in some fashion.
- In early stages of Earth's formation about four and a half billion years ago, melting would have caused denser substances to sink toward the, while less-dense materials would have migrated to the crust.

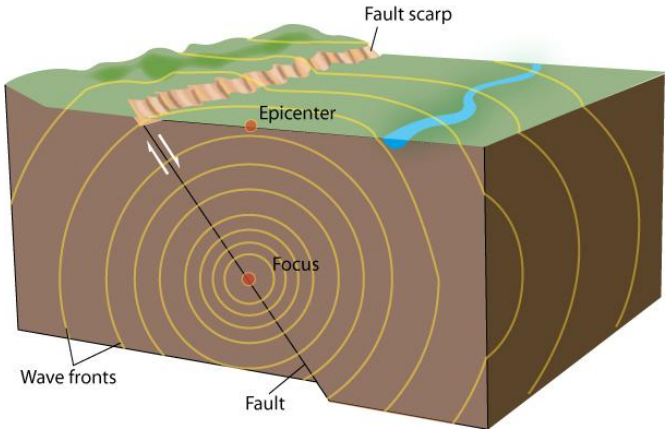
Question 02:

What are seismic waves. Elaborate its types.

Answer:

- Seismic waves are waves of energy that travel through the Earth's layers, and are a result of earthquakes, volcanic eruptions, magma movement,

large landslides and large man-made explosions that give out low-frequency acoustic energy.



- Four types of seismic waves are generated when faulting triggers an earthquake.
- All the seismic waves are generated at the same time, but travel at different speeds and in different ways.
- Body waves penetrate the earth and travel through it, while surface waves travel along the surface of the ground.
- Among the many types of seismic waves, one can make a broad distinction between body waves and surface waves.
- Body waves travel through the interior of the Earth.
- Surface waves travel across the surface. Surface waves decay more slowly with distance than do body waves, which travel in three dimensions.
- Particle motion of surface waves is larger than that of body waves, so surface waves tend to cause more damage.
- Primary and secondary waves are body waves.

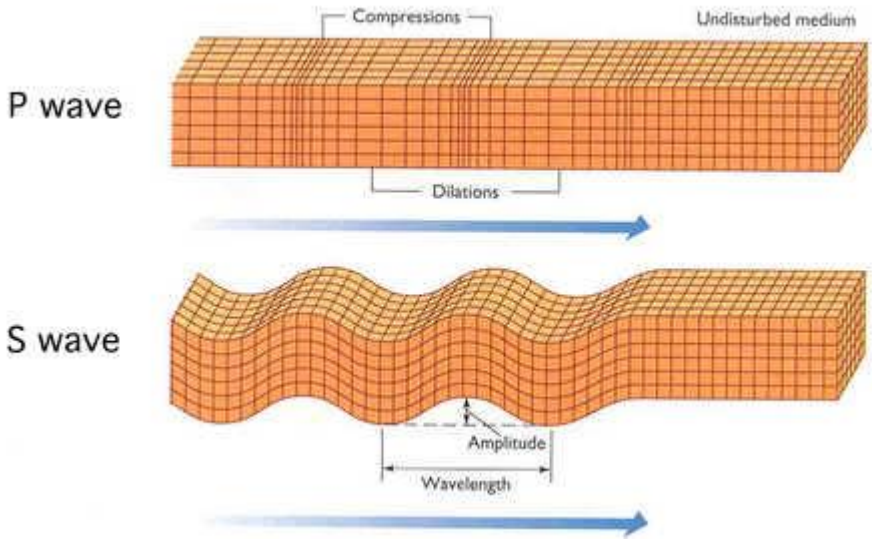
Primary Waves

- Primary waves (P-waves) travel the fastest and can move through solids and liquids.
- The P-wave energy causes the ground to move in a compression motion in the same direction that the wave is travelling.

Secondary Waves

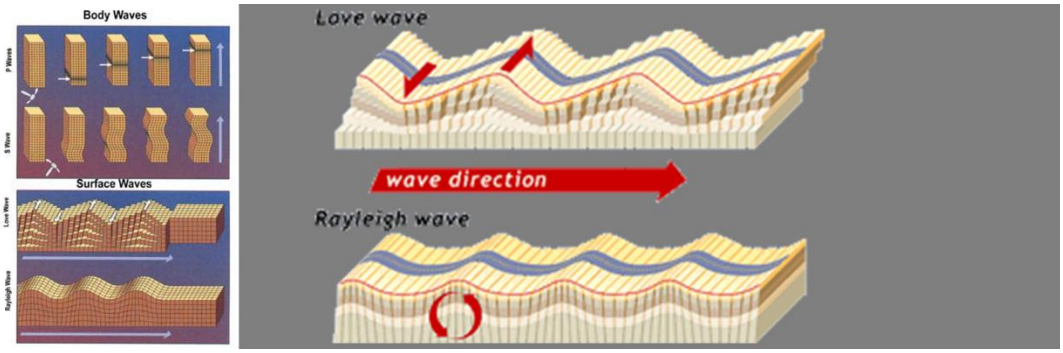
- ✓ Secondary waves (S-waves) are slower and travel only through solids.

- ✓ The S-wave energy causes the ground to move in a shearing motion perpendicular to the direction of wave movement.



Surface Waves

- ➢ Rayleigh and Love waves are the two types of surface waves.
- ➢ Rayleigh wave energy causes a complex heaving or rolling motion, while Love wave energy causes a sideways movement.
- ➢ The combination of Rayleigh and Love waves results in ground heave and swaying buildings. Surface waves cause the most devastating damage to buildings, bridges, and highways.



Question 03:

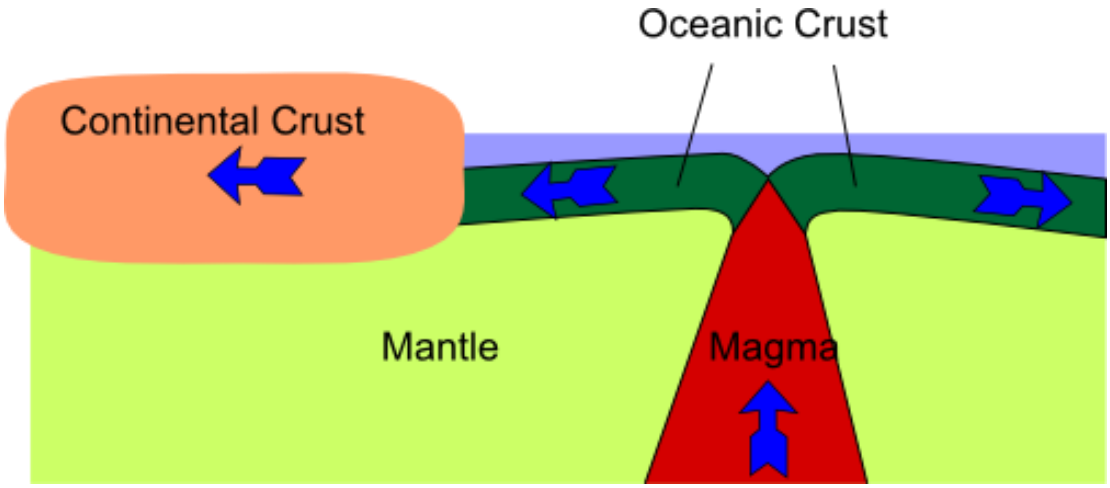
Explain Plate tectonic theory and continental drift.

Answer:

- Plate tectonics is the theory that the outer rigid layer of the earth (the lithosphere) is divided into a couple of dozen “tectonic plates" that move around across the earth's surface relative to each other, like slabs of ice on a lake.
- The Earth's lithosphere is composed of seven or eight major plates (depending on how they are defined) and many minor plates.
- Where the plates meet, their relative motion determines the type of boundary: convergent, divergent, or transform.
- Earthquakes, volcanic activity, mountain-building, and oceanic trench formation occur along these plate boundaries]
- The location where two plates meet is called a plate boundary. Plate boundaries are commonly associated with geological events such as earthquakes and the creation of topographic features such as mountains, volcanoes, mid-ocean ridges, and oceanic trenches.

Continental Drift:

- ✓ Continental drift is the movement of the Earth's continents relative to each other, thus appearing to "drift" across the ocean bed.
- ✓ The continents move around on Earth's surface and they were once joined together as a single supercontinent
- ✓ The amazing process of plate tectonics, in which the Earth’s land masses move slowly across the Earth’s crust, is continuing.



Question 04:

Define the following:

(i) Faults
(ii) Fore Shocks
(iii) After Shocks
(iv) Magnitude
(v) Intensity

Answer:

- Fault:

Earthquakes occur on faults. A fault is a thin zone of crushed rock separating blocks of the earth's crust. When an earthquake occurs on one of these faults, the rock on one side of the fault slips with respect to the other. Faults can be centimetre to thousands of kilometre long. The fault surface can be vertical, horizontal, or at some angle to the surface of the earth. Faults can extend deep into the earth and may or may not extend up to the earth's surface.

- Foreshocks:

A foreshock is an earthquake that occurs before a larger seismic event (the main shock) and is related to it in both time and space. They occur from a matter of minutes to days or even longer before the main shock.

- Aftershocks:

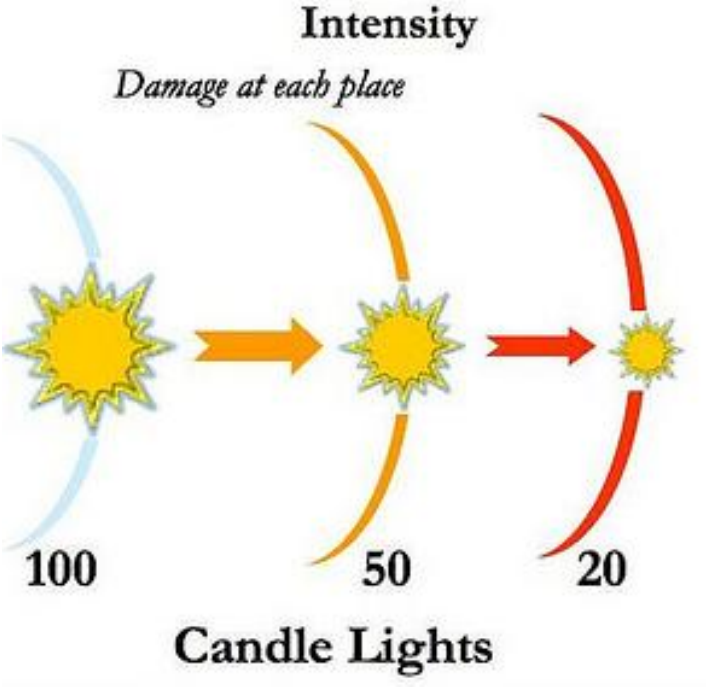
Part of living with earthquakes is living with aftershocks. Earthquakes come in clusters. In any earthquake cluster, the largest one is called the main shock; anything before it is a foreshock, and anything after it is an aftershock.An aftershock is a smaller earthquake that occurs after a previous large earthquake, in the same area of the main shock. If an aftershock is larger than the main shock, the aftershock is redesignated as the main shock and the original main shock is redesignated as a foreshock.

- Magnitude:

Earthquake size is a quantitative measure of the size of the earthquake at its source. The Richter MagnitudeScale measures the amount of seismic energy released by an earthquake.When an earthquake occurs, its magnitude can be given a single numerical value on the Richter Magnitude Scale.

- Intensity:

Intensity is variable over the area affected by the earthquake, with high intensities near the epicentre and lower values further away.


Intensity
Damage at each place
100
50
20
Candle Lights