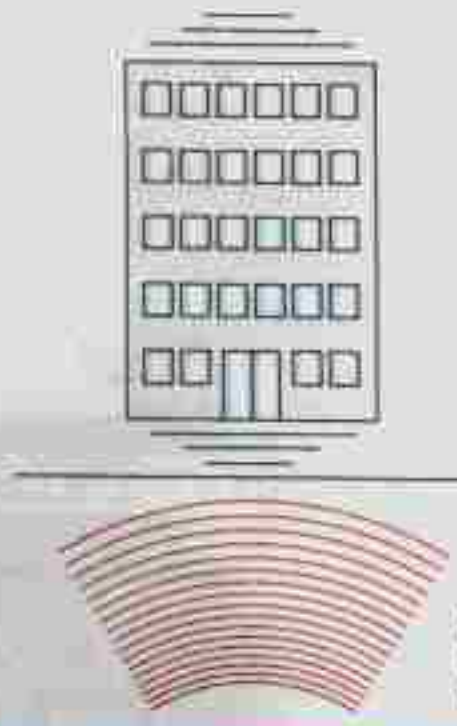
SEISMIC WAVES

Seismic waves are shock waves caused by earthquakes. They travel through the Earth starting from the epicentre. Seismic waves can cause tremendous damage to buildings and structures on the Earth's surface. There are two types of seismic waves. They are called P-waves and S-waves.

P-WAVES

- These are longitudinal waves that can travel through solids and liquids.
- They cause the surface of the Earth and buildings to vibrate up and down.
- They travel slightly faster than S-waves.
- They travel faster the more dense the material through which they are travelling.



p-waves push buildings up and down

S-WAVES

- These are transverse waves that can only travel through solids not through liquids.
- They cause side to side vibrations on the surface.
- They travel slightly slower than P-waves.
- They travel faster the more dense the material through which they are travelling.

s-waves shake buildings

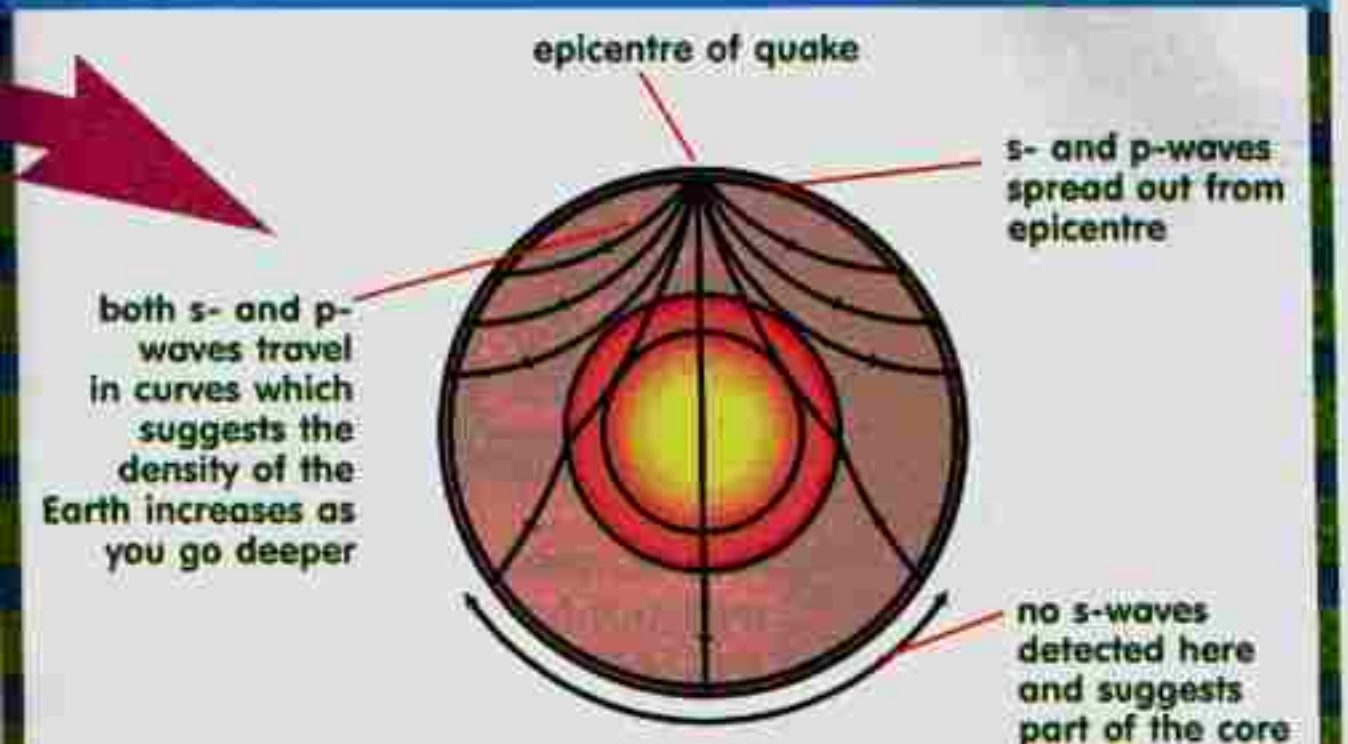
Examiner's Top Tip

Make sure you can link properties of the S-waves and P-waves with the structure of the Earth.

MAKING GOOD USE OF SEISMIC WAVES

Knowing the properties of P-waves and S-waves allows scientists to use them to learn about the internal structure of the Earth. The paths taken by seismic waves as they travel through the Earth, can be monitored using seismographs.

OBSERVATIONS AND CONCLUSIONS



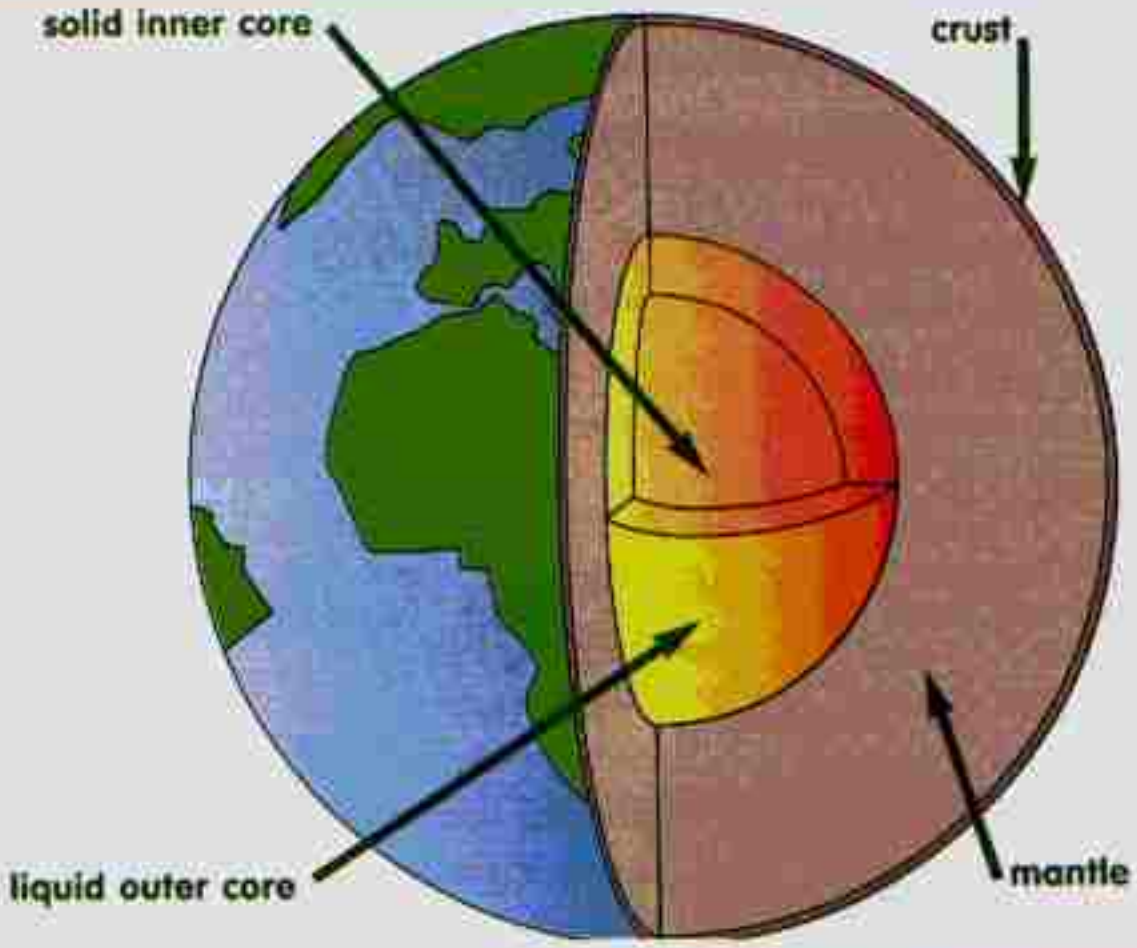
Key facts

- If the density of the rocks changes, the speeds of the S-waves and P-waves change.
- If their speeds change their direction usually changes too.
- If the change in rock density is gradual, the paths followed by the waves are gently curved.
- If the change in density is abrupt, e.g. crossing a boundary between different types of rock, there will be an abrupt change in direction.
- If there are no S-waves it suggests there is molten, liquid rock.

SUMMARY

The Earth is not a solid ball of rock, it has a layered structure.

- The crust: a thin outer layer.
- The mantle: a hot solid which has some liquid properties, i.e. it can flow but extremely slowly like thick tar.
- The outer core: a very hot liquid made of molten iron and nickel.
- The inner core: a very hot solid.



QUICK TEST

1. What is an epicentre?
2. What are the names of the two different types of waves produced by an earthquake?
3. Name three differences between these waves.
4. Why do we think that part of the core is liquid?
5. Why are the paths followed by some seismic waves gently curved?