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Seismic waves

Dr George Dransfield: Earthquakes cause terrible destruction because of seismic waves.

But what are seismic waves?

They're waves from volcanic activity and earthquakes that travel through the Earth's layers.

There are two main types of seismic waves: P-waves and S-waves.

After an earthquake, the primary waves arrive first and the secondary waves arrive second.

P-waves, or primary waves, are longitudinal waves that oscillate parallel to the direction of energy flow.

Meaning they compress and expand the material they move through, similar to a sound wave or pushing and pulling the end of a slinky.

(SLINKY RATTLES)

Here is a diagram of a P-wave.

P-waves can travel through solids, liquids and gases, so they can pass through all of Earth's layers.

Here is a diagram of P-waves emanating from the epicentre of an earthquake, represented by the star symbol.

Notice how the waves pass through all of Earth's layers: the crust, mantle, outer core and inner core.

S-waves, or secondary waves, are transverse waves, where the particles oscillate perpendicular to the direction of energy flow.

This means the particles move at right angles to the direction of wave travel, much like this wave on a slinky.

(SLINKY RATTLES)

Here is a diagram of an S-wave.

S-waves can only travel through solids.

Seismologists are scientists who study earthquakes and seismic waves.

They have observed that S-waves abruptly stop at around 2900 kilometres below the surface, creating a large S-wave shadow zone on the opposite side of Earth.

Because S-waves stop here, seismologists have concluded that they reached a liquid layer, the outer core.

S-waves can only travel through solids and don't destroy anything in the shadow zone.

And remember, that's how we know the Earth's outer core is liquid.

(MUSIC)