

How do volcanoes and earthquakes happen?

As you have seen on pages 28 and 29, volcanoes and earthquakes often occur in the same places and are usually found in long narrow belts. This gives a clue about how they happen.

The earth was formed 4,600 million years ago. Since then it has been slowly cooling down and a thin **crust** has formed round the outside. The crust is not all one piece but is broken into several enormous sections called **plates**. Some of the plates are as large as continents while others are much smaller. Underneath the crust the rock is so hot that it remains molten and can flow like treacle. The plates float on this layer and move about very, very slowly – just a few millimetres a year. In some places they move towards each other and in others they move apart or scrape alongside each other. The place where two plates meet is called a **plate boundary** (diagram A). The movement at these plate boundaries can cause earthquakes and volcanic eruptions to occur.

Look at map B which shows the major plate boundaries. Compare it with the volcanoes map on page 28 and the earthquakes map on page 29. Look particularly at the ‘Ring of Fire’ around the Pacific Ocean. You should be able to see that most of the volcanoes and earthquakes happen along the plate boundaries.

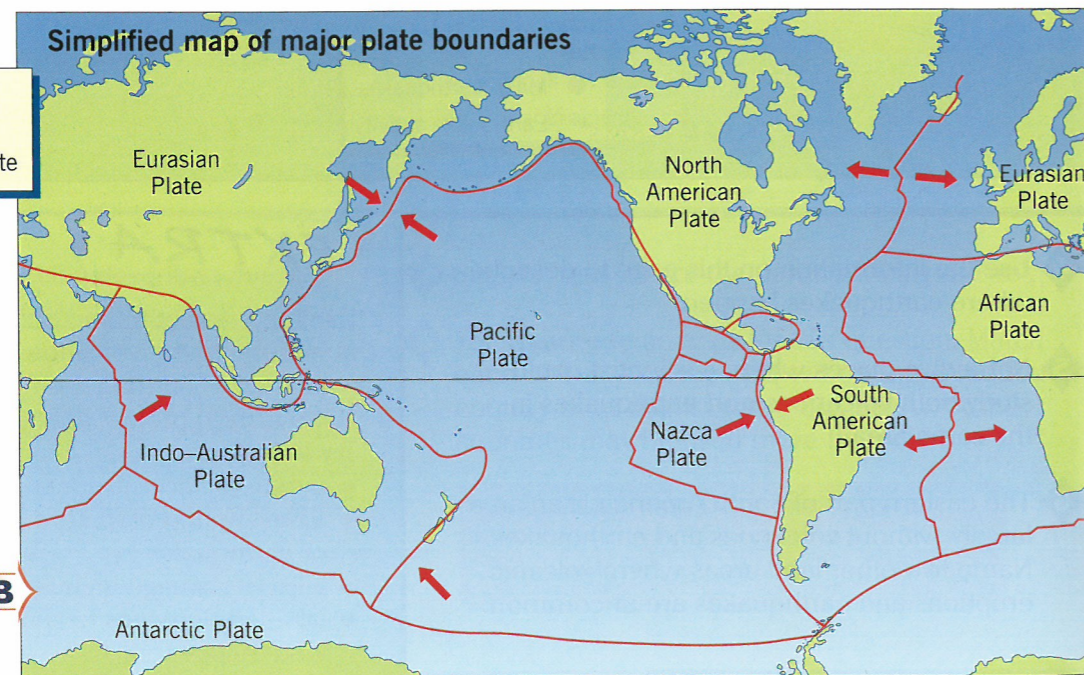
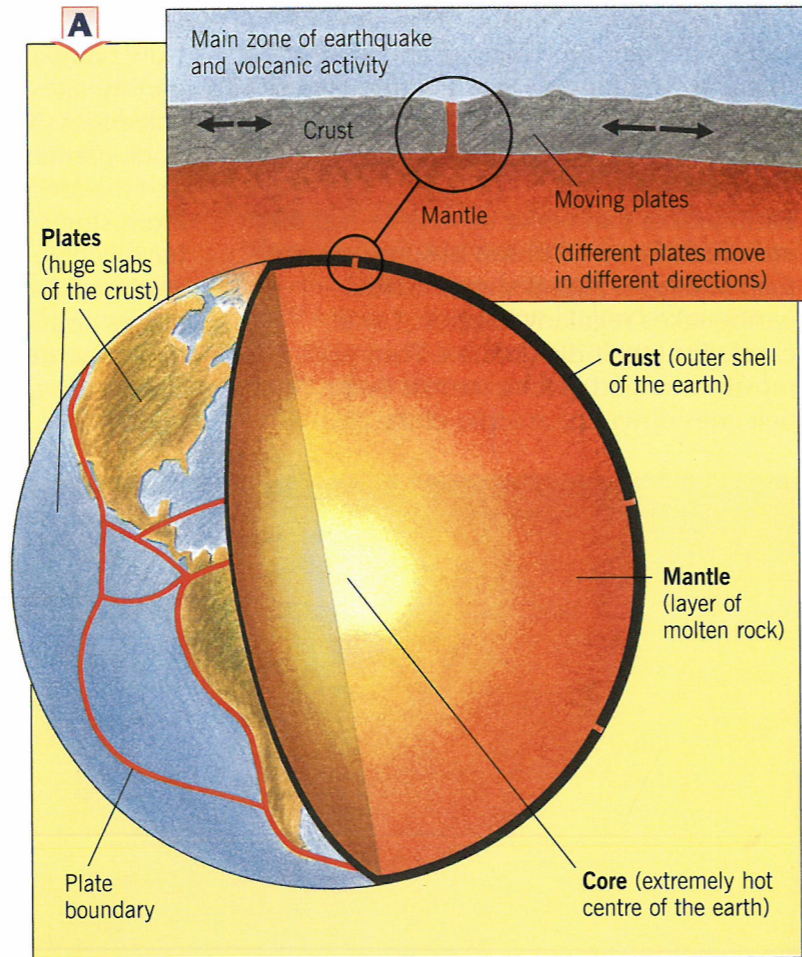
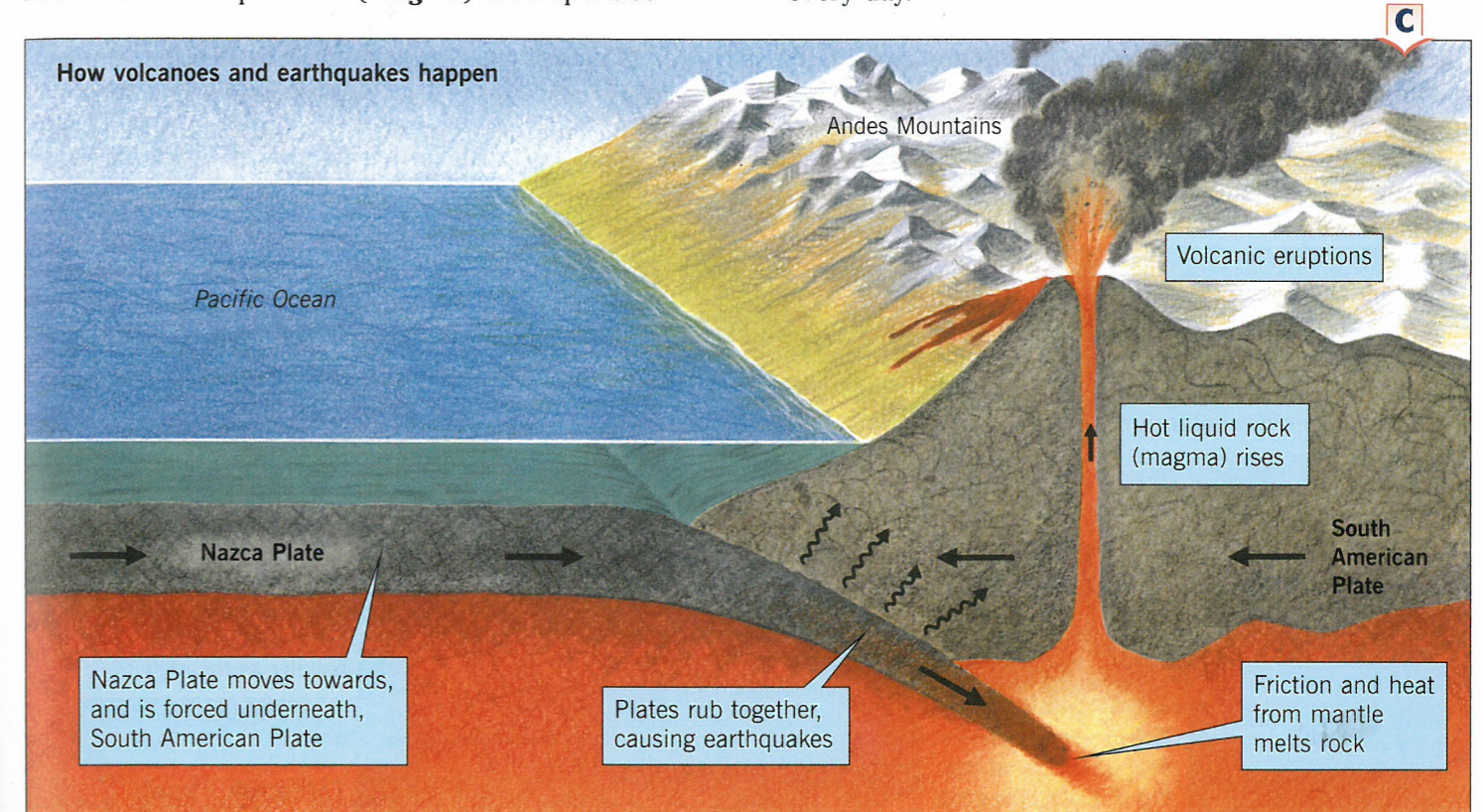


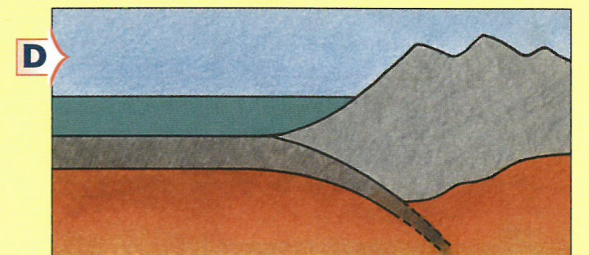
Diagram C shows what happens where plates move together. Here, on the west coast of South America, the Nazca Plate is being forced towards and underneath the South American Plate. As the plates move together the friction between them makes the rock melt. The liquid rock (**magma**) rises upwards

and erupts on the surface as a volcano. The movement of the plates scraping together also makes the ground shake and sets off earthquakes. South America has over a hundred volcanoes caused in this way and in some places earthquakes happen every day.



Activities

- 1 Look carefully at map B.
 - a On which plate does Britain lie?
 - b Why does Britain have no active volcanoes or major earthquakes?
 - c Which two plates meet along the west coast of the USA?
 - d Why do earthquakes happen in San Francisco?
- 2 Sort the statements below into the correct order to show how volcanoes can happen at plate boundaries.
 - Molten rock rises
 - Friction melts the rock
 - Plates rub together
 - Volcanoes erupt on the surface
 - Plates move towards each other
- 3 How does the movement of plates cause earthquakes?
- 4 a Make a larger copy of cross-section D.
 - b Name the two plates, the Andes mountains and the Pacific Ocean.
 - c Draw arrows to show plate movements.
 - d Put a circle around the zone of activity where there is friction, earthquakes and melting of rock.
 - e Add a title.



Summary

The earth's surface is made up of several plates that move about very slowly. Volcanoes and earthquakes are most likely to occur in areas where the plates meet.