Our cracked Earth

About this unit
This unit is about the Earth’s plates. It starts with a map of earthquake and volcano sites around the world, to show how these form a pattern. This pattern is then explained by plate theory. ‘Your turn’ helps to familiarise pupils with the idea of plate movements.

Key ideas
◆ Earthquakes are caused by sudden rock movements.
◆ Volcanoes are where liquid rock erupts from the Earth’s surface.
◆ The Earth’s hard surface (the lithosphere) is cracked into huge slabs called plates. These float around on the soft rock below, dragged by convection currents.
◆ Earthquakes occur at plate edges, where the plates push into or slide past or pull away from each other. Volcanoes also occur at or close to plate edges.
◆ So a map of the Earth’s main volcano and earthquake sites matches the plate map.

Key vocabulary
earthquake, volcano, plate, lithosphere, convection current, Ring of Fire (in Did you know? (see the glossary at the end of this book)

Skills practised in ‘Your turn’
◆ Geography skills: answering questions based on maps; drawing a diagram of a plate
◆ Numeracy skills: a calculation involving a change of units (km to cm)
◆ Thinking skills: coming up with reasons; predicting future changes

Unit outcomes
By the end of this unit, most pupils should be able to:
◆ define the terms given in ‘Key vocabulary’ above
◆ describe in general terms the pattern of earthquake and volcano sites around the world, and explain that this pattern is the result of plate movements
◆ explain what plates are, and name at least five of them
◆ explain what makes plates move
◆ draw a simple labelled cross-section of a moving plate (to show the structure of a plate, the soft rock below the plate, and a convection current in the soft rock)

Resources
For starter 2: a hard-boiled egg, and something to tap the shell with, to crack it
For starter 3 and plenaries 1 and 2: see geog.1 resources and planning OxBox CD-ROM
For plenary 3: a 3-D relief map of the ocean floor (chosen from google images)
For plenary 4: online access in the classroom, to show an animation for plate movements (type in animation plate movements in google; check in advance for level)

Ideas for a starter
1 Write the headings Earthquakes and Volcanoes, one on each half of the board. Then ask: What do you know about earthquakes? What do you know about volcanoes? Write down words or phrases to summarise pupils’ responses. Could these be grouped in any way? For example: causes consequences locations?
2 Hold up an egg (hard-boiled, but don’t say). Ask: What has this and the Earth got in common? Then tap on the shell and crack it. (Make sure the cracked pieces are not too small.) Ask: Now what else do it and the Earth have in common?
3 Use the interactive activity for Unit 9.2. Ask pupils to suggest answers. Reveal clues.
**Ideas for plenaries**

Plan plenaries for strategic points throughout the lesson, as well as at the end.

1. Turn to (or display) the map on page 110 of the students’ book. Ask pupils to describe the pattern of earthquake and volcano sites. Each gives one fact, which should not be a repeat of an earlier one. Prompt pupils to notice where most earthquakes and volcanoes are, and whether there are more on land, or in the ocean. Facts can include negatives such as: There are no volcanoes down the east coast of North America.

   Encourage pupils to look at the political map on pages 140 – 141 of *geog.1* students’ book, to give more detail. For example, to name countries in high-risk areas. This could also be a written exercise. See suggestion 6 on page 170 of this book.

2. Use the interactive activity for Unit 9.2, if you have not used it as a starter.

3. Display a 3-D relief map of the ocean floor from google images. Pupils see if they can identify plate edges, by comparing it with the map on page 111.

4. Display an animation of the Earth’s plates. Type in *Earth plates animation* in google. Check them in advance, to find one the right level for KS3.

5. Use questions 1 and 2 in ‘Your turn’ as plenaries.

6. Use questions 4 and 5 in ‘Your turn’ as plenaries. (See the note about question 4 in the answer section below.)

7. Tell me the three key facts you learned today. Pupils discuss and agree on them. (Eg There are plates. They are moving. The movement causes earthquakes and volcanoes.)

8. Give pupils, working in pairs, three minutes to discuss what they’ve learned. Warn that you’ll ask for feedback when the time is up. Then ask questions, some straight and some with a twist. For example:
   - What are plates?
   - What’s our plate called?
   - Why is London getting further from New York?
   - Why are Europe and Asia on the move together?
   - What’s the difference between the crust and the lithosphere?
   - Which do you think are the three most important things you learned today?

9. Choose a pupil to be in the hot seat. Another pupil asks him or her a question about what they’ve learned in today’s lesson. Then nominate two different pupils (4–6 pairs in total). There’s one golden rule: questions can not be repeated!

**Further class and homework activities**

Suggestions 6 – 10 on page 170 of this book

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**Answers to ‘Your turn’**

1. a A shaking of the Earth’s crust. It is caused by a sudden rock movement.  
   b A volcano is where lava (melted rock) erupts out through the Earth’s surface.

2. a Eurasian  
   b North American  
   c Indo-Australian  
   d Pacific, or Nazca  
   e Nazca  
   f Pacific

3. The drawing should be like the one in the middle of the strip on page 123, but with the crust, mantle and lithosphere labelled.

4. The Earth’s hard surface is cracked into big slabs called plates. These are continually moving. Their movement causes earthquakes and volcanoes along and near the plate edges. So earthquakes and volcanoes tend to lie along lines that match the plate edges.

5. It is not near a plate edge. But note that it used to be! Edinburgh sits on the remains of an extinct volcano, the mountains in North Wales are the remains of a volcanic plateau, and there are volcanic rocks throughout the UK.

6. 484 million years! (Some pupils will need to be reminded that 1km = 1000 m and 1 m = 100 cm)