

## The continental jigsaw puzzle

### Can you reassemble a super-continent from a 'jigsaw puzzle'?

Introduce the idea that the continents have not always been in their present positions by asking pupils to look for the apparent match in the coastlines of Africa and South America. (If a globe is available, this will reduce any distortion from the representation of the continents on a flat Atlas page).

Ask what evidence pupils would look for which might demonstrate that the continents once really had been together, rather than the match being a mere coincidence. (*Pupils might suggest: fossils of comparable land animals that could not have swum across an ocean; rocks of the same type and age that match; fold belts which seem to stop at the coast, only to appear again on the other side of the intervening ocean; evidence of ancient*

*climates, such as red desert beds or rocks formed in tropical forest environments, etc.*).

Seat the pupils in small groups and then issue the 'jigsaw puzzles', copied onto card and cut out from the sheets supplied below. Ask them to reconstruct the supercontinent from their own jigsaw and then to compare notes with their colleagues nearby.

Ask them if they can think of any alternative explanation for the various lines of evidence, which would not imply that the continents had moved. (*A widely accepted explanation before the 1960s was that the continents had not moved, but they were formerly linked by lost continental masses or by land bridges that had later sunk without trace*).

### The back up

**Title:** The continental jigsaw puzzle

**Subtitle:** Can you reassemble a super-continent from a 'jigsaw puzzle'?

**Topic:** Using a series of prepared maps of the modern day continents to reconstruct the supercontinents of the past.

**Age range of pupils:** 14 – 18 years

**Time needed to complete activity:** 20 - 30 minutes for each group to assemble all its jigsaws and to compare notes.

**Pupil learning outcomes:** Pupils can:

- search for matching patterns in their jigsaws;
- reassemble the former supercontinents from their jigsaws;
- evaluate the different lines of evidence for 'continental drift';
- discuss the relative merits of continental drift theory against the older land bridge hypothesis.

**Context:** This activity allows discussion of 'continental drift' theory, which is now regarded as part of the overarching theory of plate tectonics. It provides a useful introduction to more technical aspects of the theory and can be used at all levels of pupils' attainment.

### Following up the activity:

Carry out the activities in the related titles on the plate tectonics theme in the Earthlearningidea series, e.g. *Magnetic Earth – modelling the magnetic field of the Earth*; *Geobattleships – do earthquakes and volcanoes coincide?*; *Continents in collision – Modelling the processes at a destructive plate margin*. Carry out a web-based search for the work of Alfred Wegener, who laid the foundations of continental drift theory in the early years of the 20th Century.

### Underlying principles:

- The continents form parts of larger units called plates.
- Continents move, together with adjacent parts of their plate, over the surface of the globe, at rates of a few centimetres per year.
- Plate movement involves the lithosphere (and not the crust alone) moving over a weak zone in the upper mantle of the Earth.
- Links between the continents were once explained by proposed land bridges, which later sank: however, the geophysical evidence shows there are no sunken masses of continental lithosphere.

### Thinking skill development:

Pupils construct a pattern from the jigsaws, and explain their thinking in small groups. Bridging is involved in relating the cardboard jigsaw to the real world.

### Resource list:

- sets of 'jigsaws', prepared by copying from the templates provided onto cardboard and then cutting them out. (Diagrams may need enlarging first). Different coloured card can help sort out any muddles, once the jigsaws are being used!

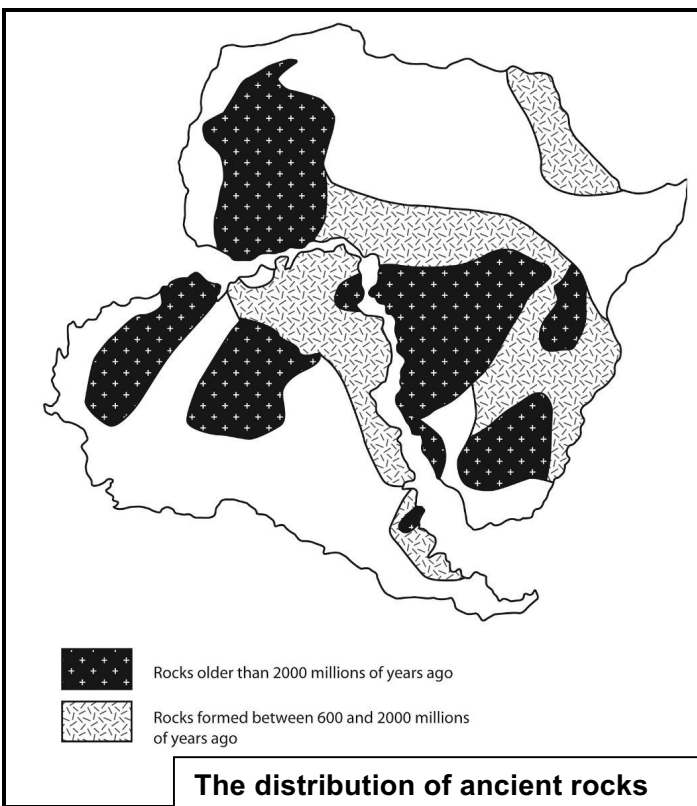
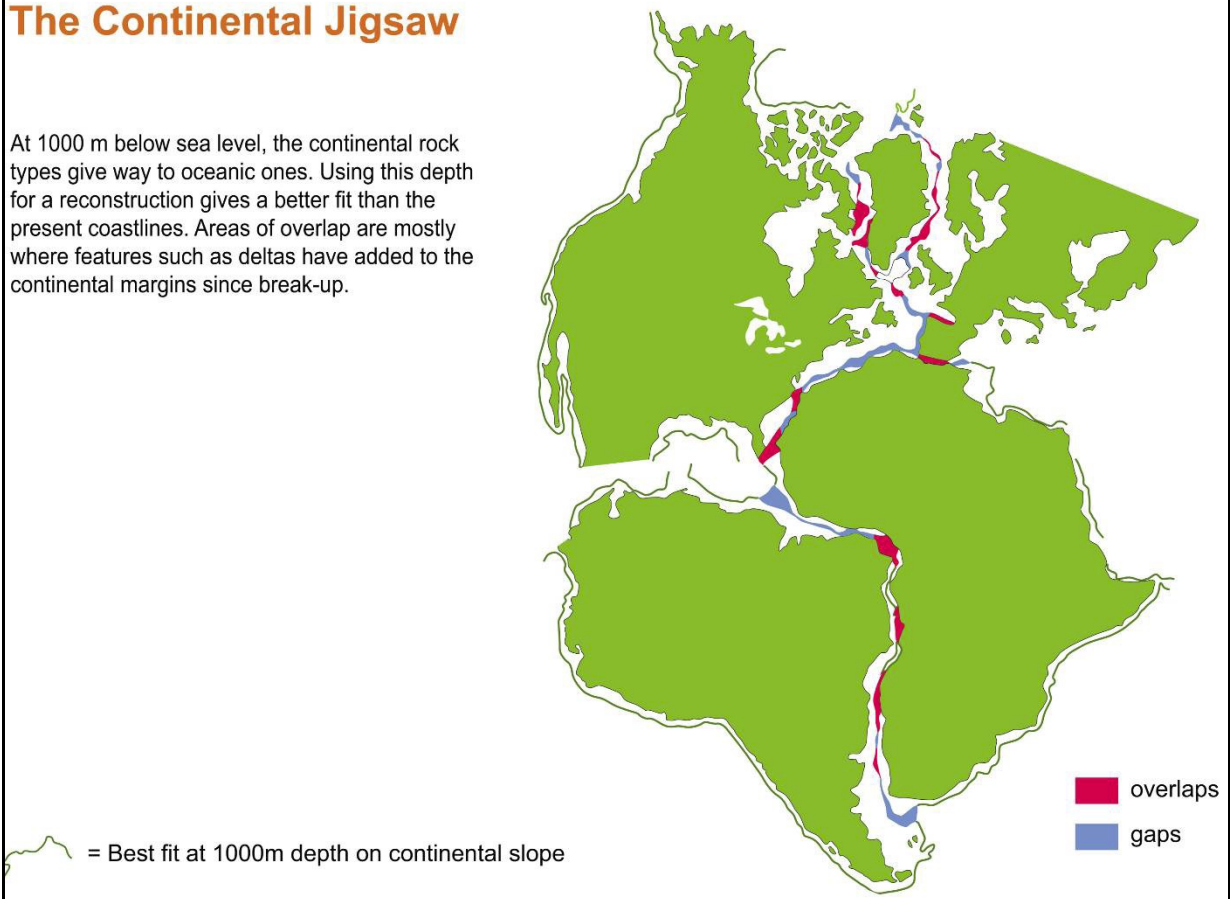
### Useful links:

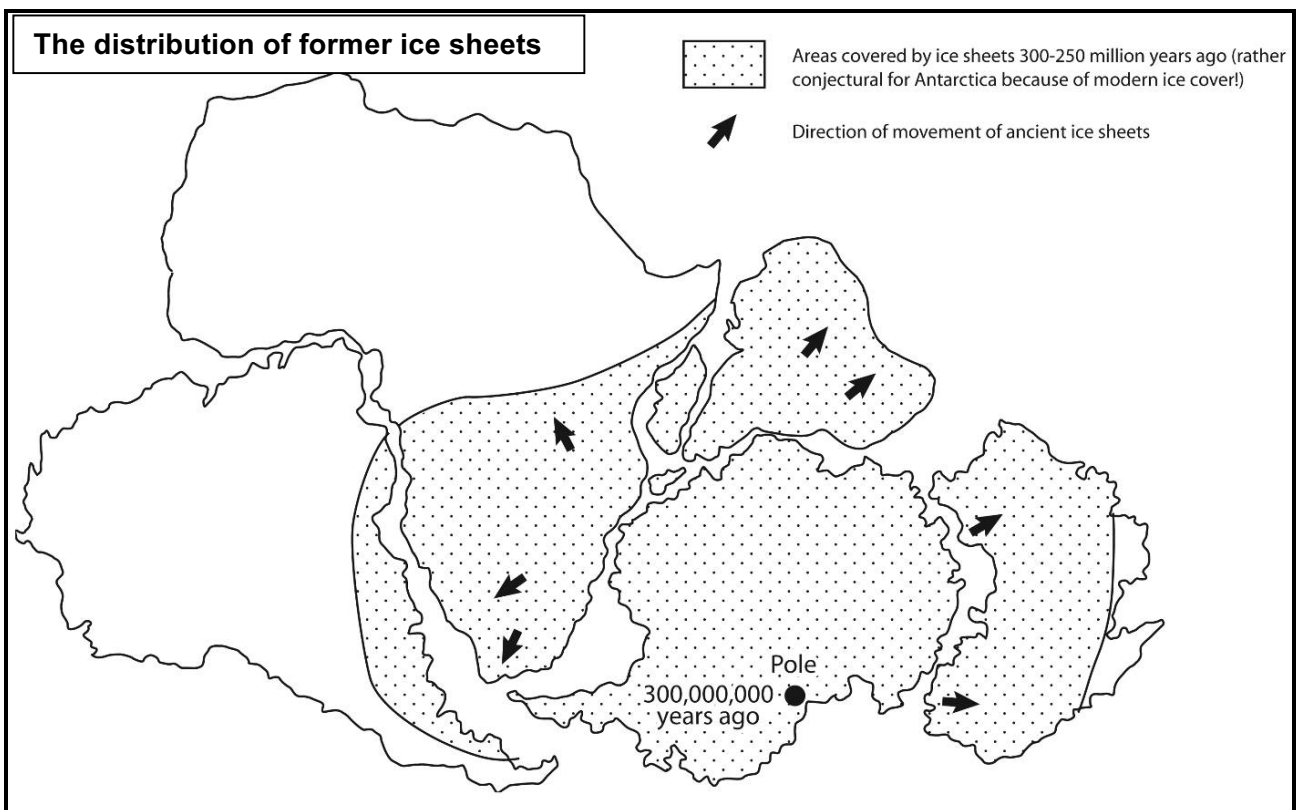
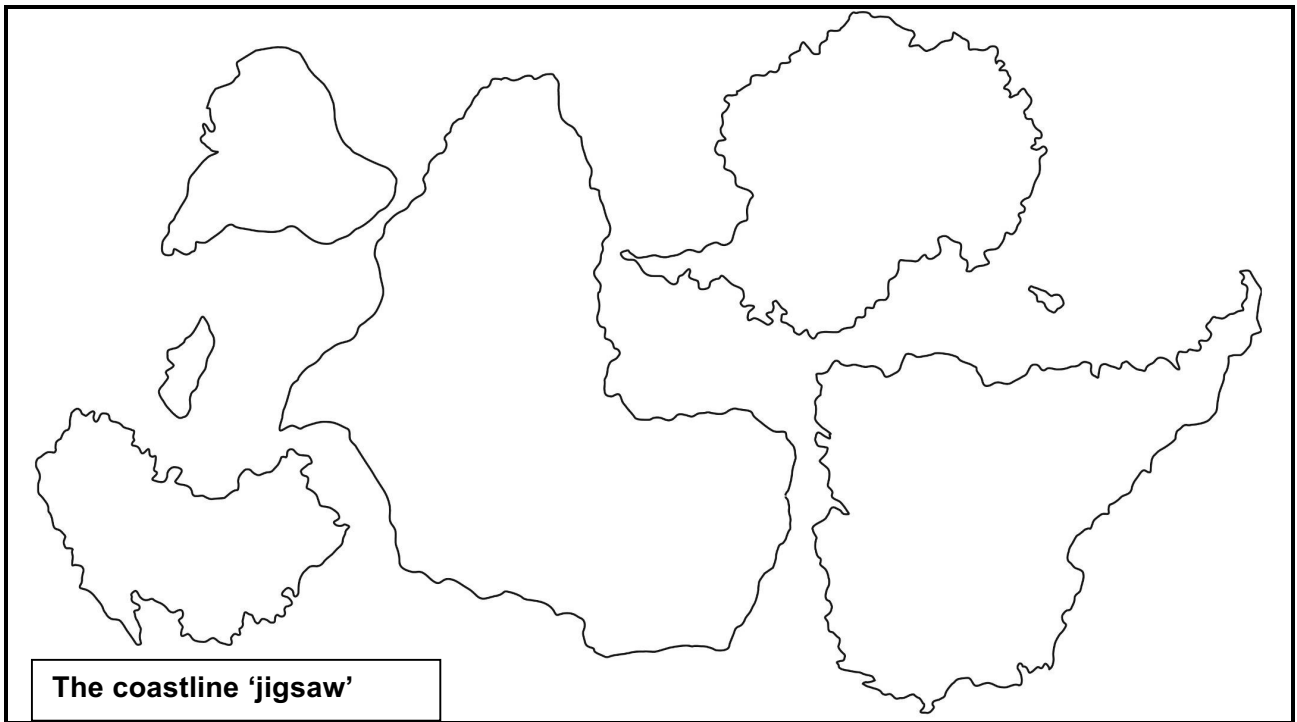
Dudman, C. 2003. Wegener's Jigsaw (a carefully researched "novel" on the life of Alfred Wegener)

**Source:** Based on the workshop titled "The Earth and plate tectonics", Earth Science Education Unit (ESEU), © The Earth Science Education Unit: <http://www.earthscienceeducation.com/> licensed under an Attribution-Noncommercial-Share Alike 3.0 Unported Creative Commons licence <http://creativecommons.org/licenses/by-nc-sa/3.0/>. The activity is based on diagrams originally published by the Open University. The diagrams were redrawn by ESEU and are used with permission.

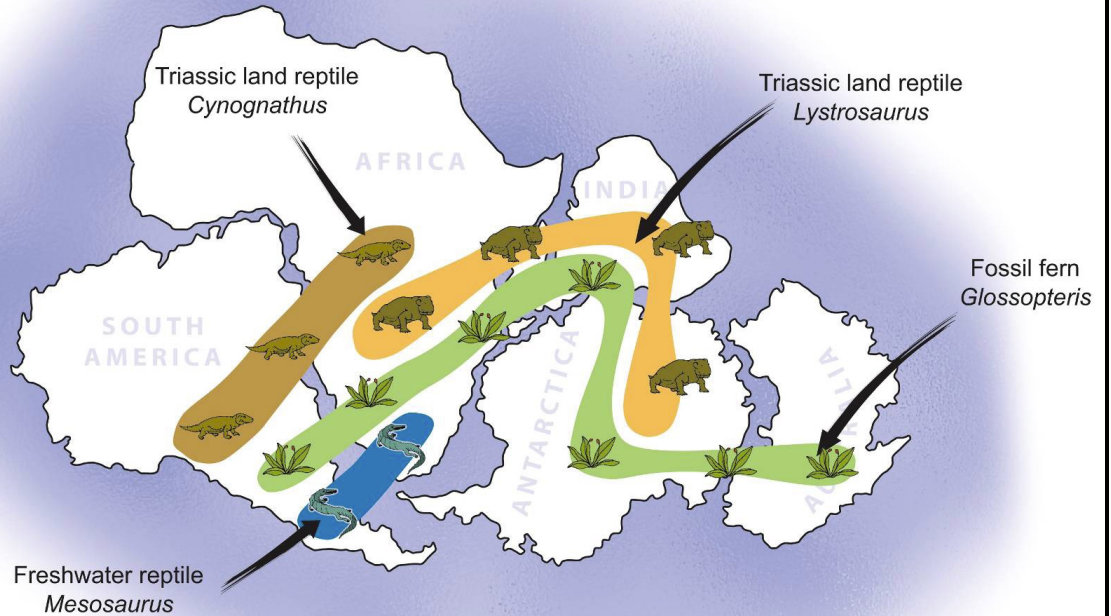
## The Continental Jigsaw

At 1000 m below sea level, the continental rock types give way to oceanic ones. Using this depth for a reconstruction gives a better fit than the present coastlines. Areas of overlap are mostly where features such as deltas have added to the continental margins since break-up.





## Distribution of land/freshwater animals and plants in the continents of 'Gondwanaland'



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