Earth Science and the real world: What you need to know
1. GPS Data and Plate Motion

In this activity you will use GPS data to see how continents move over time. GPS stations are located throughout the world, and linked to satellites in fixed orbits around the earth. Data about the location of these stations has been collected for many years and using it, we can see that continents and plates have moved over time. The chart below gives GPS data for 12 locations around the world, with the average distance moved by each station in one year, and the direction it moved. Notice that the direction is given as either east or west of north.

1. For at least one location on each continent, draw an arrow indicating the direction of movement on the map provided. The length will represent the amount of movement (use the ruler) and the angle will represent the direction of movement from North (use the protractor). Try to complete this for as many locations as possible.

Location	Distance: mm per year	Direction: Degrees from North
Canberra, Australia	58	18E
Guam, Indonesia	11	77W
Hawaii, USA	72	60W
Ulaanbataar, Mongolia	25	100E
Buenos Aires, Argentina	12	10W
Oslo, Norway	21	50E
Denver, USA	17	103W
Capetown, South Africa	21	36E
St. Johns, Canada	19	51W
Yellowknife, Canada	21	125W
Bangalor, India	50	35E
Madrid, Spain	23	44E

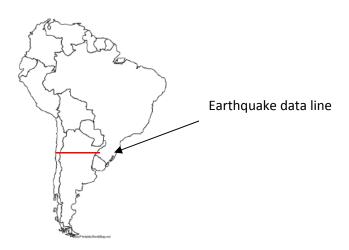2. Have a look at the map and note relative movements. What geographical features can be related to plate movement?

2. Earthquake Evidence and Plate Boundaries

The following data has been collected for 25 earthquakes that occurred between 2004 and 2006 in Chile and Argentina. They have been chosen along a line running west-east through the continent of South America.

Your task is to create a model showing the location of each earthquake along the line and the depth at which it occurred. Use a piece of string that most accurately represents the depth of the earthquake (shallow, mid-depth, deep). Then chose a pompom that most accurately represents the magnitude of the earthquake (4 would be small, 5 would be medium, 6 would be large). Hang the string in the correct position to show where along the east-west line they occurred.

Distance from the coast (km)	Depth (km)	Magnitude (Richter Scale)
-171	10	4
-20	28	4.2
4	27	4.3
55	56	4.5
102	82	4.5
236	86	4.8
392	138	4.9
484	155	5.1
613	462	6.1
844	569	6.7

Earthquake data line

What could be happening to create the pattern of earthquakes under the west coast of South America?