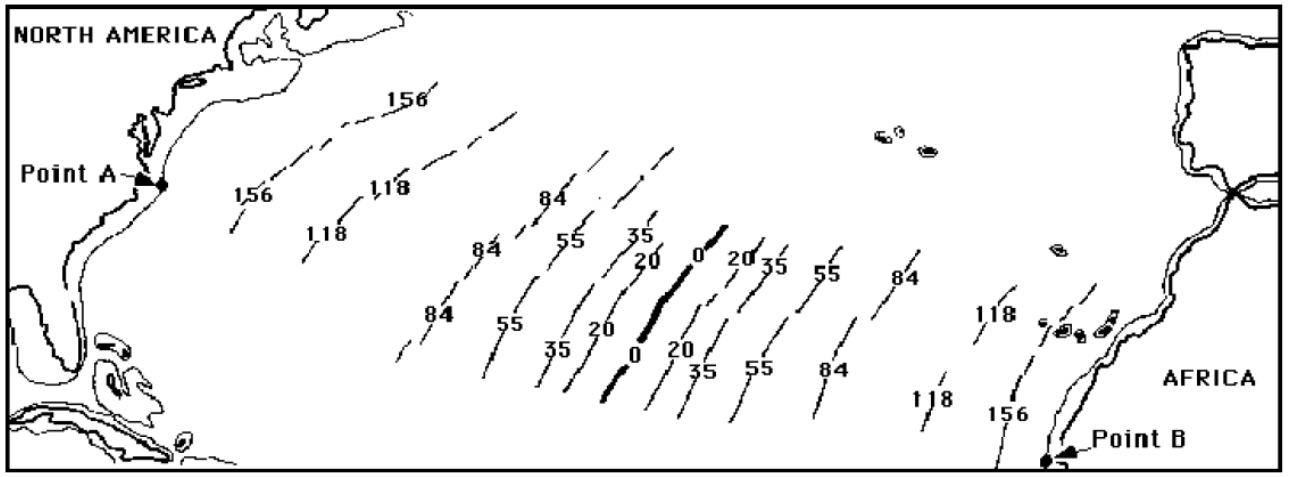
Sea Floor Spreading



The map above shows part of the North Atlantic Ocean with the coastlines and continental shelf edges of North America and Africa. The bold line labelled **0** is the Mid Atlantic Ridge.

Selected strips of the sea floor basalts on either side of the ridge are labelled with their ages in millions of years before present.

The distance between points A and B on the map is 4,550 kilometres.
The scale of this map is 1mm on the map represents 37 km on the sea bed.

1. Select one strip of sea floor basalt between points A and B. Record the age of the strip below and carefully measure the distance it has moved from the Mid Atlantic Ridge where it originally formed in millimetres.

   Sea floor basalt age at chosen location…….

   Distance from the Mid Atlantic Ridge on the map (mm)……..

   Actual distance in kilometres from the Mid Atlantic Ridge – use the scale to calculate this and show your working.

2. Calculate the average rate of sea floor spreading for this half of the Atlantic Ocean by using the formula:

   distance/time = velocity in cm per year

   How much spreading occurred over a million years?.....

3. Calculate the average rate of spreading for both sides of the Atlantic Ocean. You will need to double the answers you obtained for the half rates.

4. Repeat the calculation for two additional strips of sea floor basalts of different ages and at different distances from the Mid Atlantic Ridge.

5. Suggest why there is a variation between the three different calculations for the rate of sea floor spreading in the Atlantic. Calculate the average spreading rate for the entire ocean from your three spreading rates.

6. The current width of the Atlantic Ocean between points A and B is 4,550 km. Calculate the age of the Atlantic Ocean using the formula below:

   Total Distance/Average Spreading Rate = Age of Atlantic Ocean

7. The oldest rocks on the Atlantic Ocean floor, close to the continental slope are around 180 million years old. Calculate the average spreading rate for the entire width of the Atlantic Ocean

8. During which geological period did the North Atlantic begin to open?

Period	Age in Ma
Quaternary	**1.9**
Tertiary	**65**
Cretaceous	**144**
Jurassic	**208**
Triassic	**245**
Permian	**285**
Carboniferous	**360**
Devonian	**408**
Silurian	**438**
Ordovician	**505**
Cambrian	**542**
Precambrian	**4567**

9. How much has the distance (in centimetres) between North America and Africa increased since you were born?

10. How much closer (in metres) were these two continents when Christopher Columbus made his first voyage in 1492?

11. How much narrower was the Atlantic Ocean when the dinosaurs died out 65 million years ago?