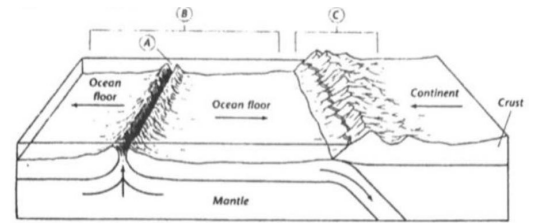


Seafloor Spreading

Our Learning Objective – Analyze and interpret data on the distribution of fossils and rocks, continental shapes, and seafloor structures to provide evidence of the past plate motion.



Background:

About 40 years ago, scientists discovered that there are both *age* and *magnetic patterns* in the seafloor. This discovery allowed another piece of the puzzle about plate tectonics to fall into place.

Scientists found that new seafloor has continually been forming over millions of years at the mid-ocean ridges throughout all of Earth's oceans. Molten rock from the Earth's mantle, called magma, rises to the seafloor where it cools & solidifies into new rock. In some places on the seafloor, this new rock is pulled apart by the plates' movements, forming two rock masses that move away from each other in opposite directions. Here, the seafloor spreads very slowly away from the ridge. Geologists call this process seafloor spreading.

Elsewhere, trenches are formed where one plate goes beneath the other. Because the older seafloor crust eventually descends into deep ocean trenches and is removed, the oldest seafloor rocks are only about 180 million years old. On the other hand, the oldest continental rocks (which don't descend into trenches) are as old as 4,000 million years.

In this Activity, you will construct a paper model to investigate the patterns that scientists have discovered in their studies of the seafloor.

I can...

- construct a paper model that will illustrate how the seafloor spreads (crust is created) at mid-ocean ridges, but is consumed (crust is destroyed) where it subducts into deep ocean trenches.

Materials:

- Seafloor spreading model pattern
- Scissors
- Colored pencils (orange, yellow, green, blue)
- Tape

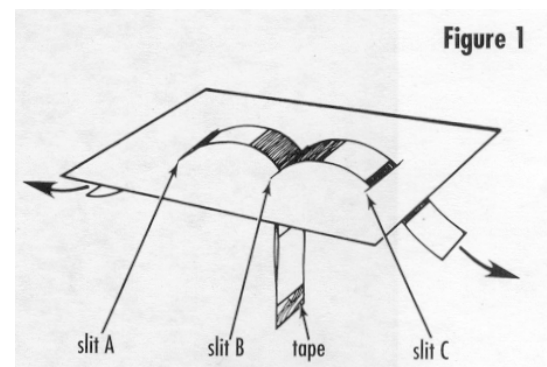
Vocabulary:

- Magma: Molten rock, before it reaches Earth's surface.

- Seafloor spreading: The process by which molten rock rises, cools, solidifies, and is pulled apart by tectonic plates.

Directions:

1. Cut along the dotted lines of the seafloor-spreading model pattern.
2. Color the areas indicated on the two strips with colored pencils.
3. Tape together the orange ends of the strips *with the colored sides facing each other*.
4. Thread the two strips through Slit B of the larger sheet. Pull one side down through Slit A and the other through Slit C (Figure 1).
5. Pull the strips through the slits so that the same colors on both strips emerge from Slit B and disappear into Slits A and C at the same time.



Explain

1. What is happening at Slit B? What feature occurs at the corresponding location on the seafloor?
2. What is happening at Slits A and C? What features occur at corresponding locations on the seafloor?
3. If you were to sample and date the rocks along the colored strip starting at Slit B and moving toward Slit A, what change if any would you see in the age of the rocks?
4. If you were to sample and date the rocks along the colored strip starting at Slit B and moving toward Slit C, what change if any would you see in the age of the rocks?
5. In this model, what do the strips represent? What do the colors represent?
6. New seafloor rock is continually being formed at mid-ocean ridges and old seafloor rock is continually removed at ocean trenches. If the rock on the continents is continually formed but not removed, how would the age of the oldest rocks on the continents compare with the age of the oldest rocks on the seafloor?
7. What causes the plates to be pulled apart?
8. Look at the map on the right showing some of Earth's plates and the direction of their motion. What is happening at the Atlantic and Pacific Oceans? Explain your answers.

