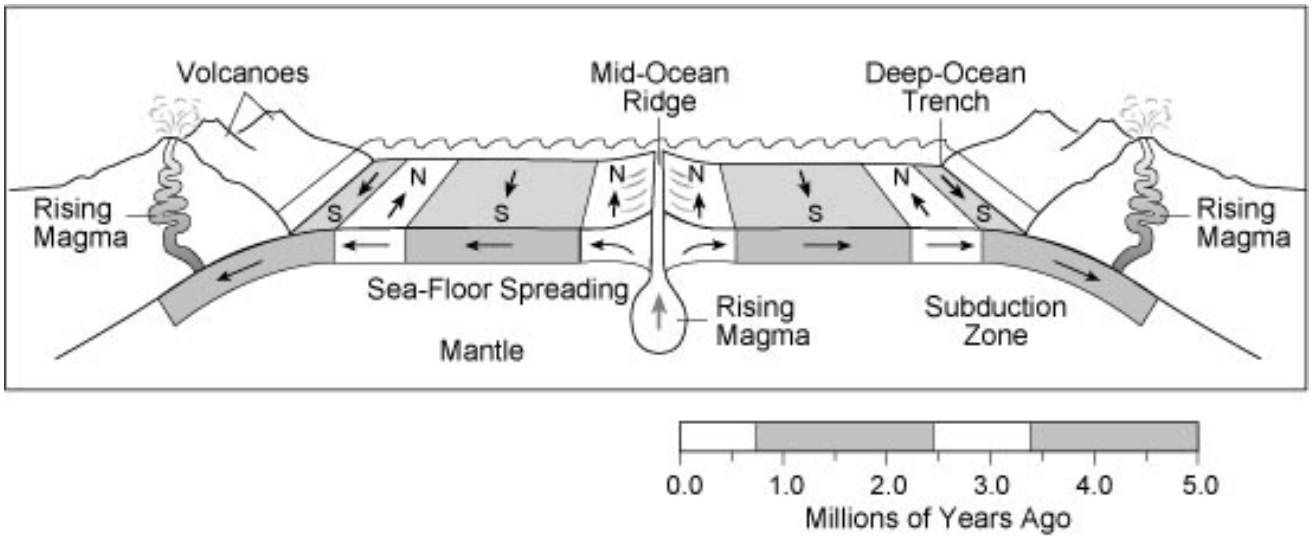
2.3 MODELING SEA FLOOR SPREADING

What geological evidence supports the Plate Tectonic Theory?

Scientists have suggested that the earth's magnetic field periodically reversed direction (north became south, south became north) over many millions of years. When the reversal occurred, it did so rapidly. Surveys of the oceans, and in particular, areas on either side of the mid-ocean ridges, showed patterns of magnetic anomalies that were repeated (mirrored) on either side of the spreading ridge.



As magma erupted along the mid ocean ridge, magnetic minerals within the cooling lava became aligned with the earth's magnetic field at the time of cooling. When the lava solidified, the pattern of magnetic alignment was locked into the rock. When the magnetic field changed direction again, the rock alignment remained as a record of the Earth's magnetism at the time of cooling. Careful measurements of the sea floor showed that the patterns of North and South alignment matched exactly on either side of the spreading ridge. Look at the these magnetic anomalies below.

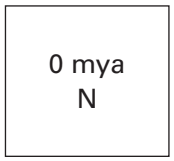
Age (millions of years)	170	160	140	120	100	80	60	40	20	TODAY 0	20	40	60	80	100	120	140	160	170
Magnetic polarity	N	N	S	N	S	S	N	S	N	N	N	S	N	S	S	N	S	N	N

MATERIALS

- 11 × 17 sheet of paper
- Colored pencils/crayons/markers
- Scissors
- Tape
- Modeling Sea Floor Spreading Data Sheet (printed on 11" × 17")
- Mid Ocean Ridge/Subduction Zone Student Worksheet (card stock)

DIRECTIONS

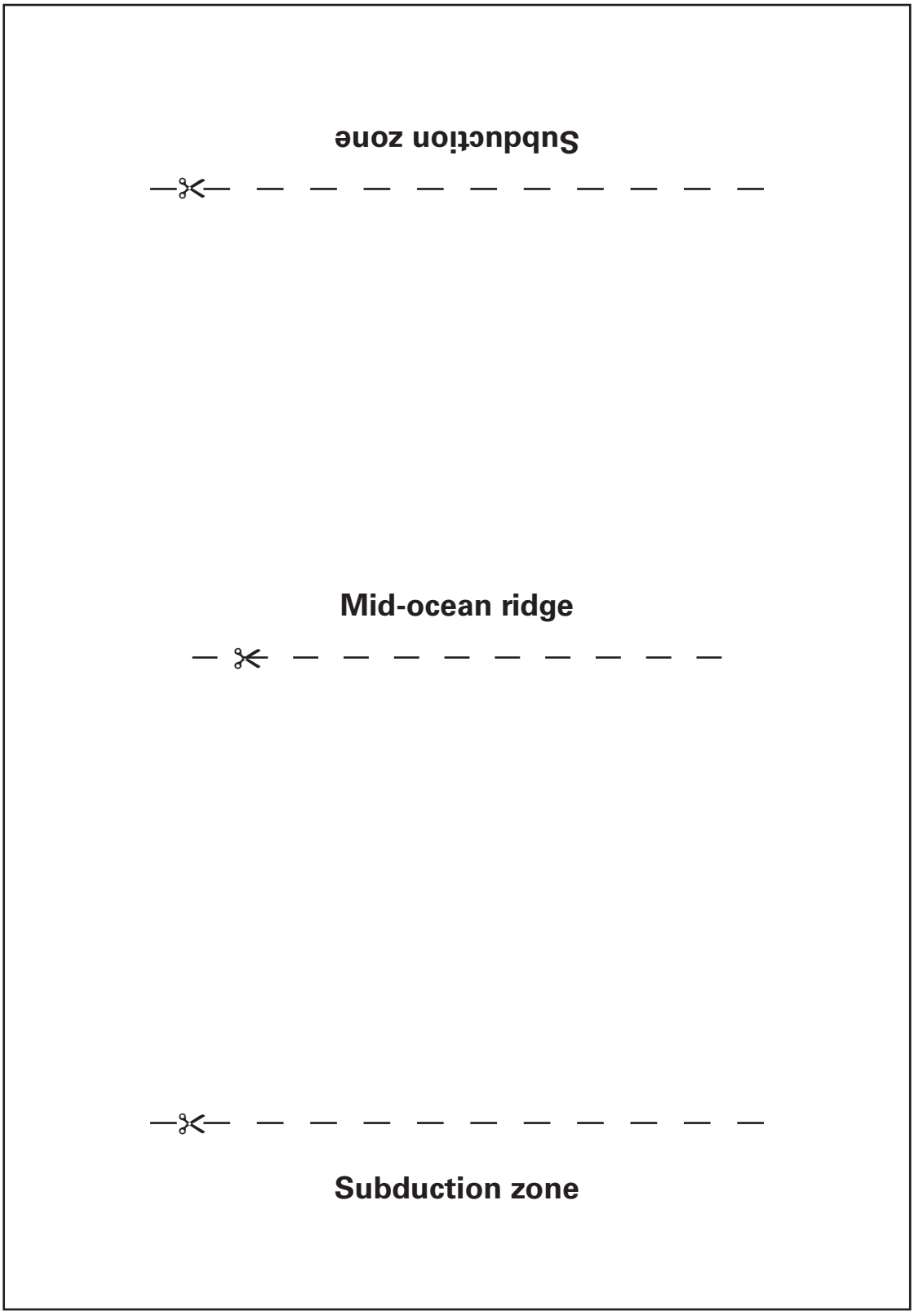
1. Cut the Modeling Sea Floor Spreading Student Sheet along the dashed lines to get 4 strips of paper
2. Tape these 4 strips together with today being at the center working outwards to 170 mya. The left side has been completed for you.
3. Label each box with the data found on your "Modeling sea floor spreading" sheet:
   - Age in millions of years (mya)
   - Direction of Polarity (N/S)



4. Color boxes labeled "N" red and "S" blue.
5. Cut the along the heavy lines labeled subduction zone and mid-ocean ridge on the student demonstration sheet.
6. Feed the two loose ends of your labeled strip into the mid-ocean ridge from below with the colored sides facing each other.
7. Fold the two loose ends outwards to the two subduction zones.
8. Have the a student hold the demonstration sheet as their partner pulls the two loose ends through the subduction zone at a very slow and steady pace.

REFLECTION

1. How does the age change as you get further from the mid-ocean ridge?
2. Do you notice any patterns on the ocean floor that extend on either side of the mid-ocean ridge?
3. Would one expect the thickness of the overlying sediments to be thicker or thinner near the mid-ocean ridges or nearer the subduction zones? Explain your reasoning.
4. How does sea floor spreading provide support for Wegener's theory of Continental Drift?


Subduction zone
Mid-ocean ridge
Subduction zone

2.3 MODELING SEA FLOOR SPREADING: DATA SHEET