

Daily Routine

- Sit in your appropriate seat quietly
- Make sure you are wearing your ID's
- Have all necessary materials out
- All back packs on the floor
- All cell phones on silent and away in backpacks
- All iPods off and headphones out of your ears
- Hats off
- No food or drink except for water

Bellwork/Quick-write

- What is the continental drift hypothesis
- What were the four lines of evidence Wegener used to support his hypothesis?

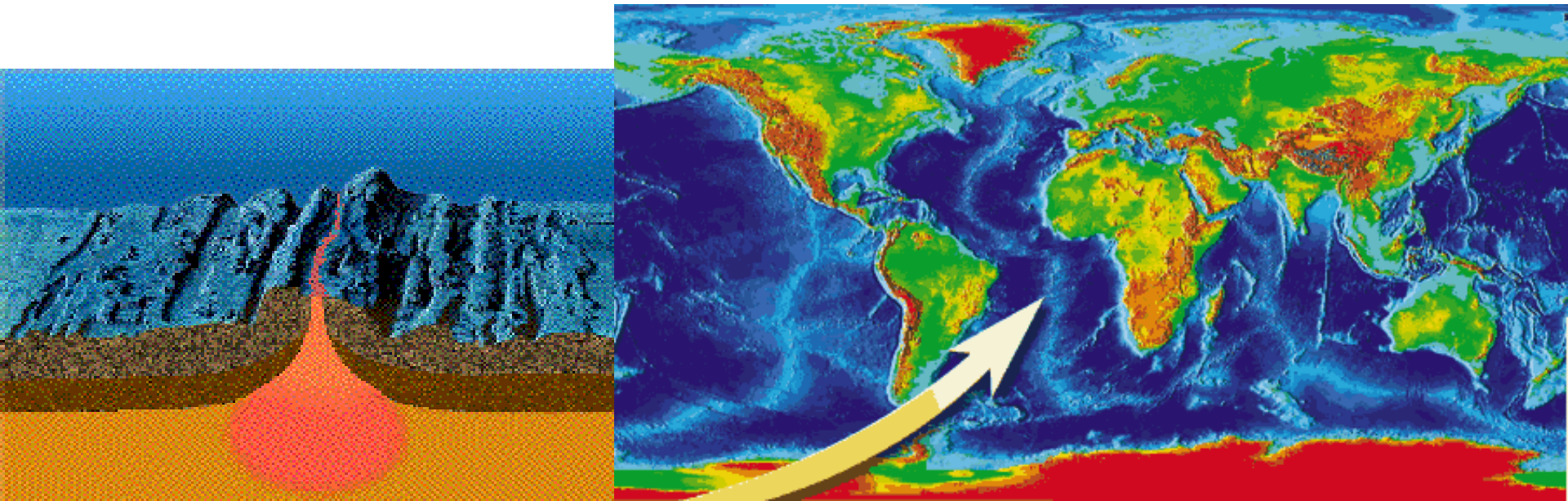
Plate Tectonics: Sea Floor Spreading

Where is Lystrosaurus?

- You will have 30 minutes to work on Friday's paper lab.
- If you do not complete it, it will become homework.

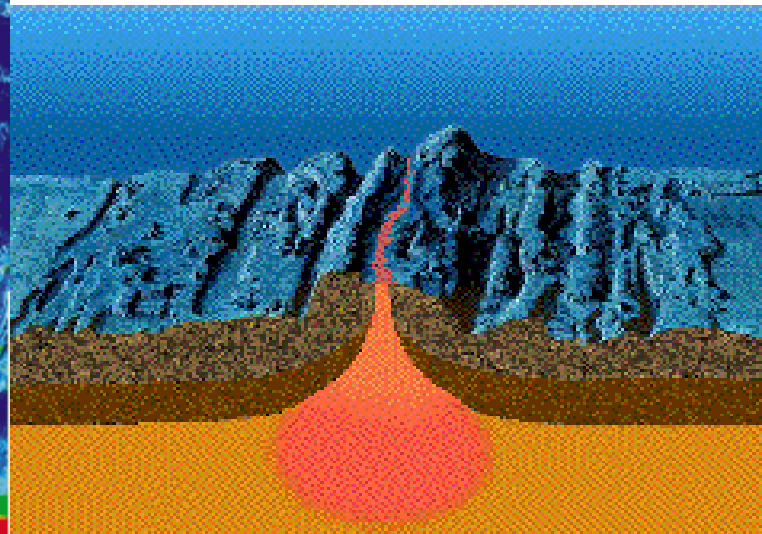
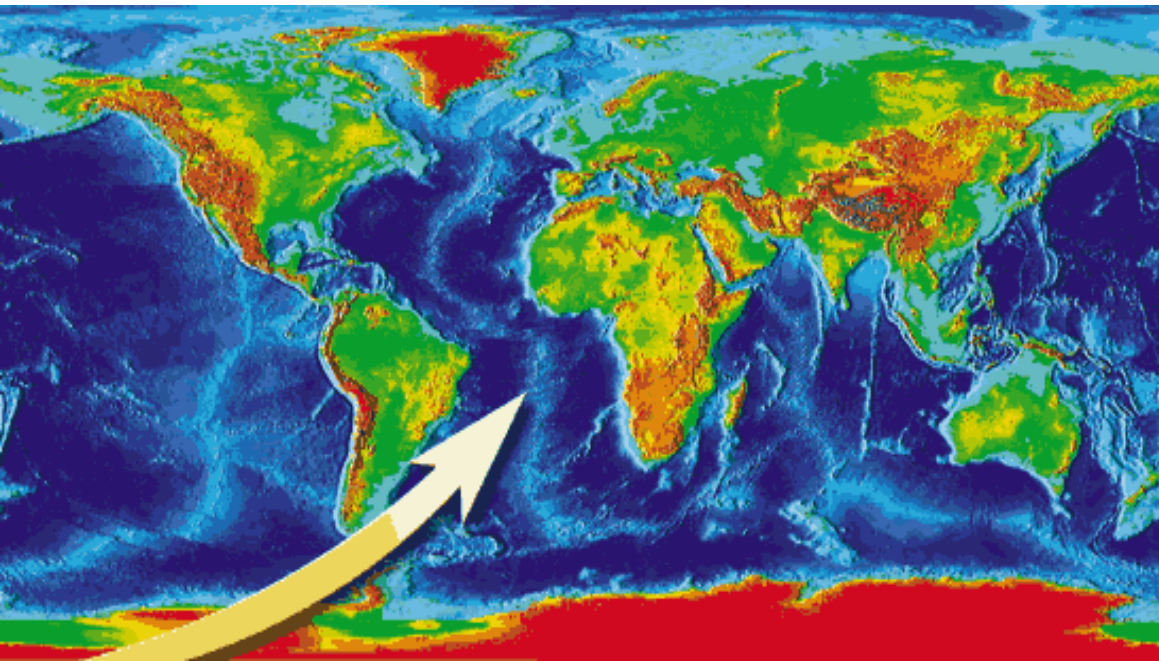
Seafloor Spreading

- It was believed that the bottom of the ocean was flat and featureless
- New technology after World War Two allowed us to map the bottom of the Ocean
- They found underwater volcanic mountain ranges extend through earth's oceans



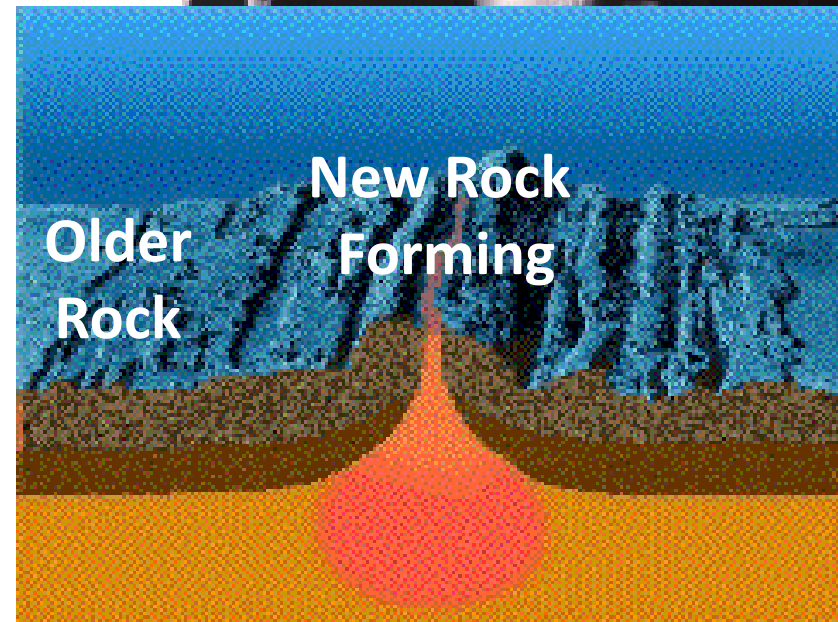
Seafloor Spreading

- Deep beneath the ocean, lies a system of ridges
- Mid-ocean ridges form an underwater **volcanic** mountain range that extends through many of the earth's oceans
- Basaltic Rock is forming new seafloor!



The Seafloor Moves?

- In the 1960's, a famous scientist by the name of Harry Hess discovered the theory of **seafloor spreading**
- Center of the ocean, Harry noticed that the rock was very young
- While the rock closer to the continents was much older

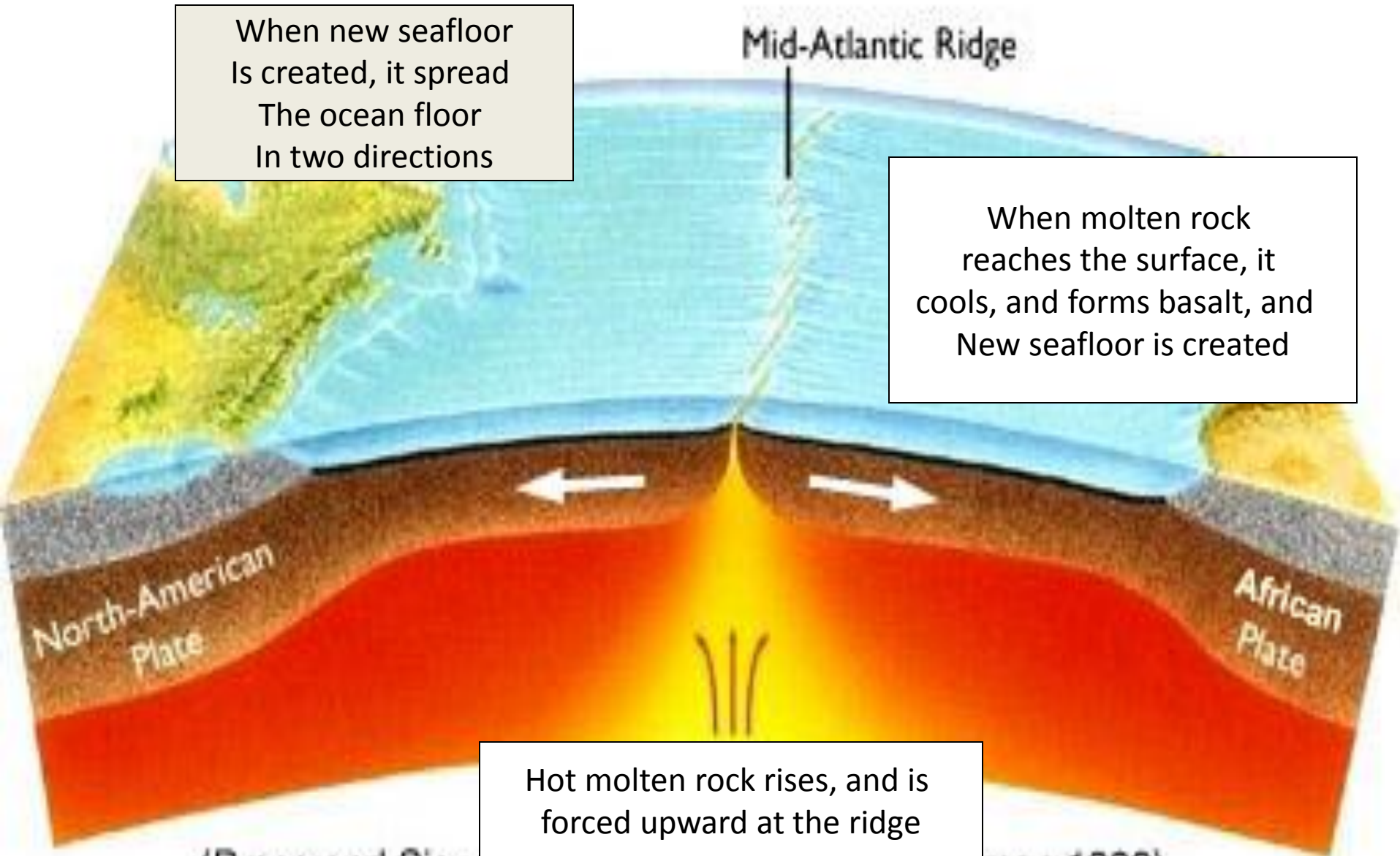


Seafloor spreading

When new seafloor is created, it spreads the ocean floor in two directions

Mid-Atlantic Ridge

When molten rock reaches the surface, it cools, and forms basalt, and new seafloor is created



Hot molten rock rises, and is forced upward at the ridge

(Press and Siever, Understanding Earth, Freeman 1998)

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Bell Work

- Explain the process of sea floor spreading.
- What is a mid-ocean ridge?

Today's Activity Directions

1. You will be working in groups of two.
2. Get five different colored pencils preferably violet, blue, green, yellow, orange, and/or red
3. Obtain two pieces of line paper, and line the tops together.
4. Line the papers up to match and tape them together.

Today's Activity Directions

5. Put the desks together and leave a little space in between the desks.
6. Place the lined paper in the slit between the desks
7. Make sure only one line of the lined paper is showing from the crack.
8. Slowly pull out the paper on both sides of the desk crack.

Today's Activity Directions

9. Color each 30 million year period with a different color.
10. Each line represents 5 million years of Earth's history.
11. Start with purple/blue, and move on to green, yellow, orange, and red at the very end

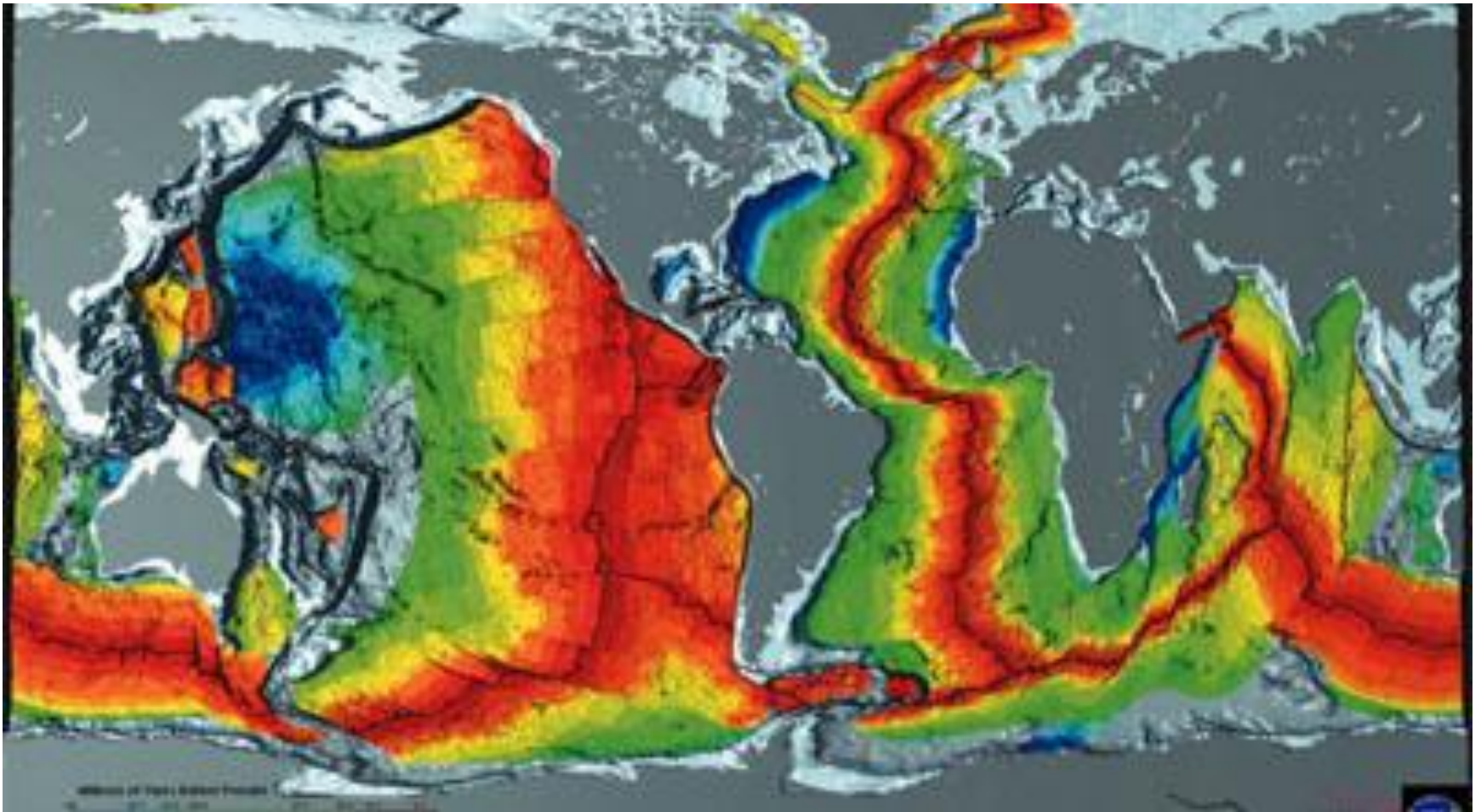
Activity Questions

- In the activity, what underwater feature does the desk crack model?
- What real life material does the pieces of paper model in this demonstration?
- What do the different colors represent?
- What colors represent the oldest samples? What colors represent the youngest? Why? Explain your reasoning?
- What colors represent the densest samples? What sample represents the least dense material? Explain your reasoning.

Activity Questions

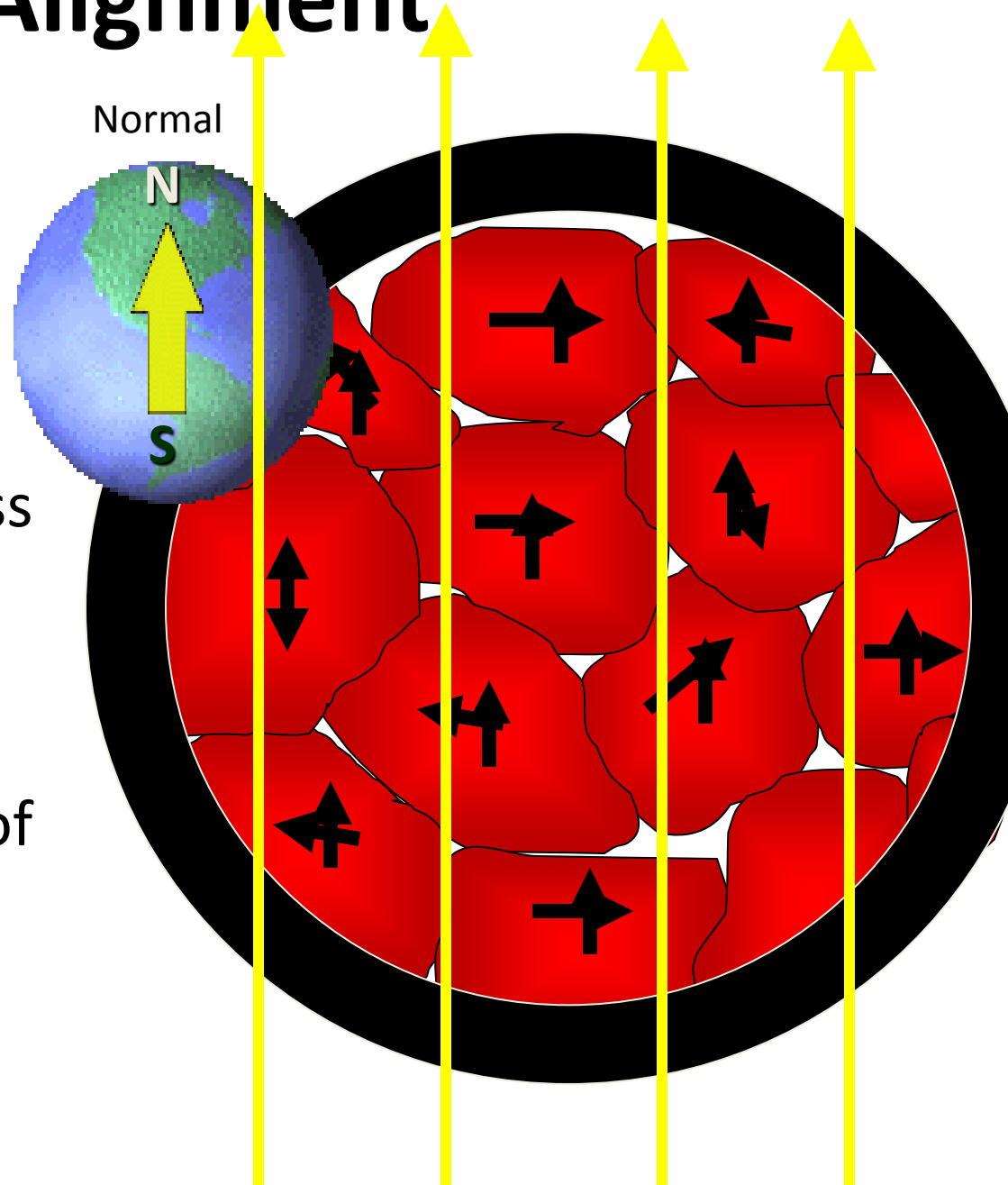
- Imagine that your hands as your pulled the paper out from the desk represent two continents that were once together, but must move away from each other as the sea floor grows. You have heard about the Continental Drift Hypothesis and why it was not accepted. Why does this model provide very strong evidence for why the continents moved apart?
- The Earth is about 4.6 billion years old. Based on observations of the sea floor spreading model, why do you think that the oldest ocean floor is only about 200 million years old?

Rock Ages through radiometric dating



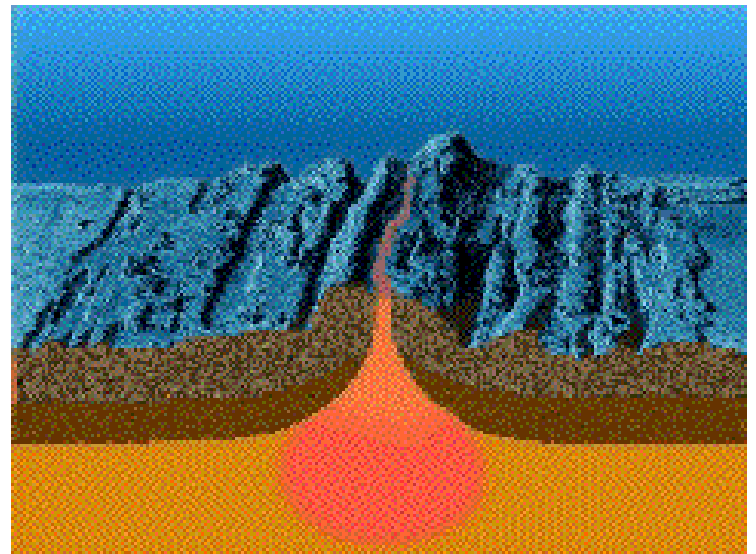
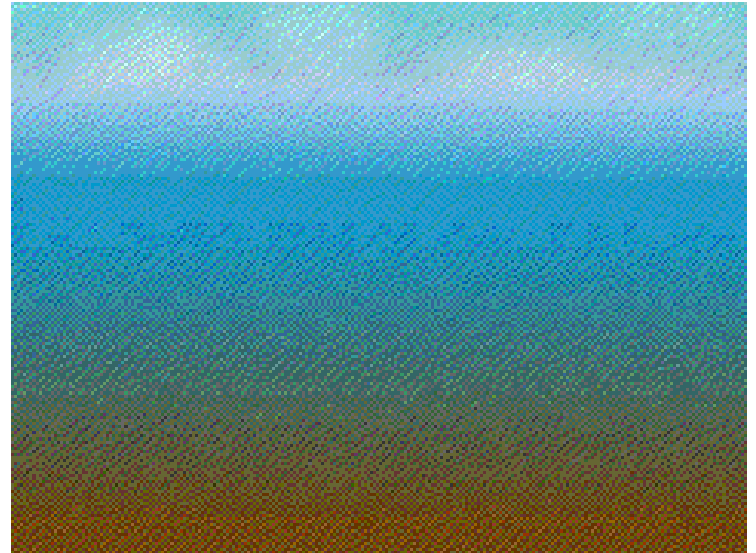
Mineral Alignment

- Iron minerals (magnetite) in basaltic lava rock **Align** themselves with the earth's magnetic field like a miniature compass needle
- As lava cools, these magnetic minerals **Record** the direction of the earth's magnetic field like a compass needle



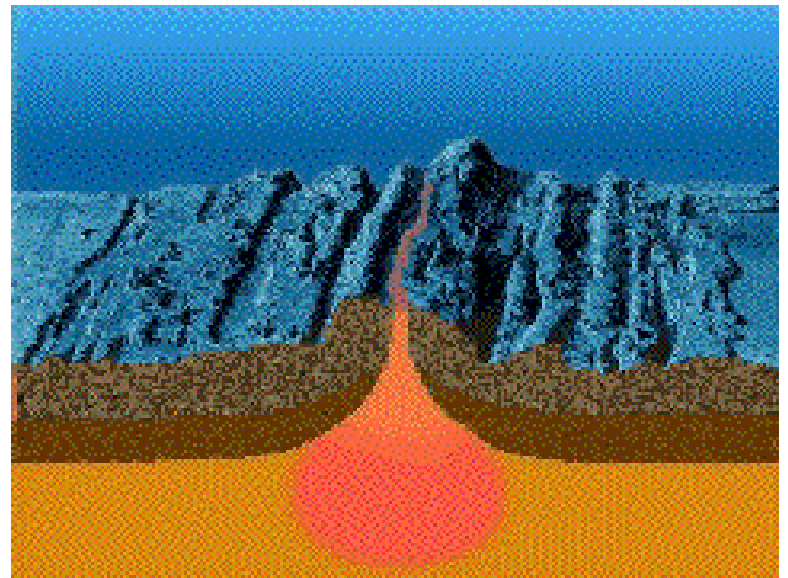
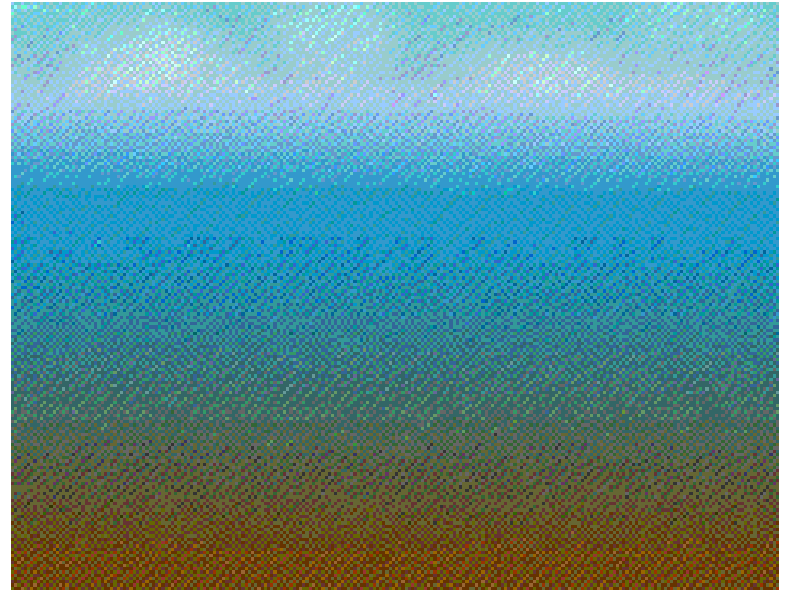
Magnetic Clues

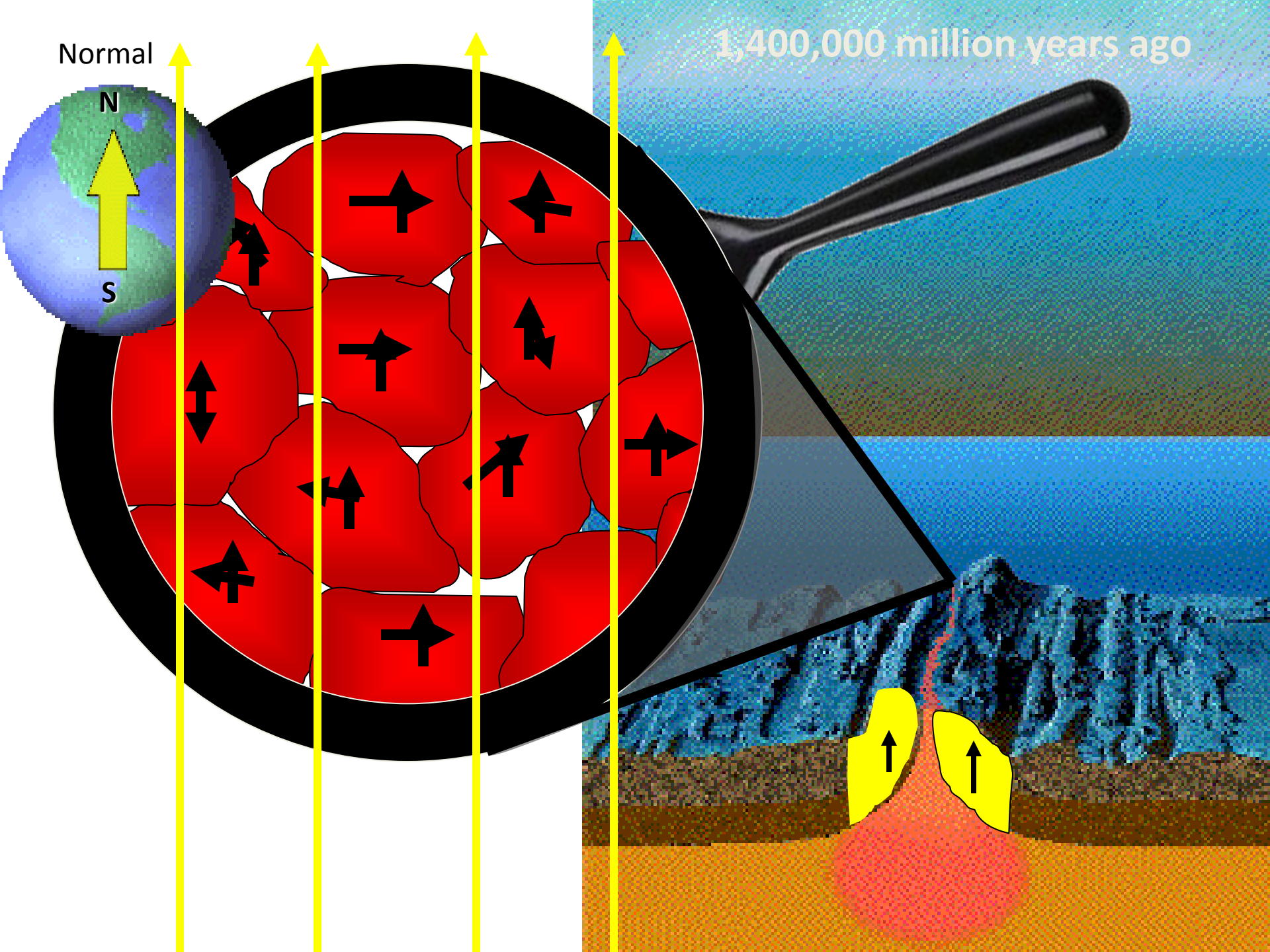
- As Harry Hess mapped the ocean bottom, he dragged a magnetometer behind his boat
- He discovered stripes or anomalies on the seafloor bottom
- Paleomagnetism: magnetic direction acquired by the minerals in a rock at the time the rock was deposited or hardened



Magnetic Clues

- What Harry Hess realized was that each stripe was a reversal in the magnetic field
- Each stripe was a record of earth's magnetic history
- Pattern remain consistent on both sides of the ridge
- This discovery provided strong evidence for Seafloor Spreading





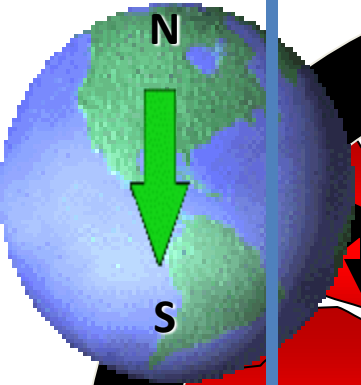
Normal

N

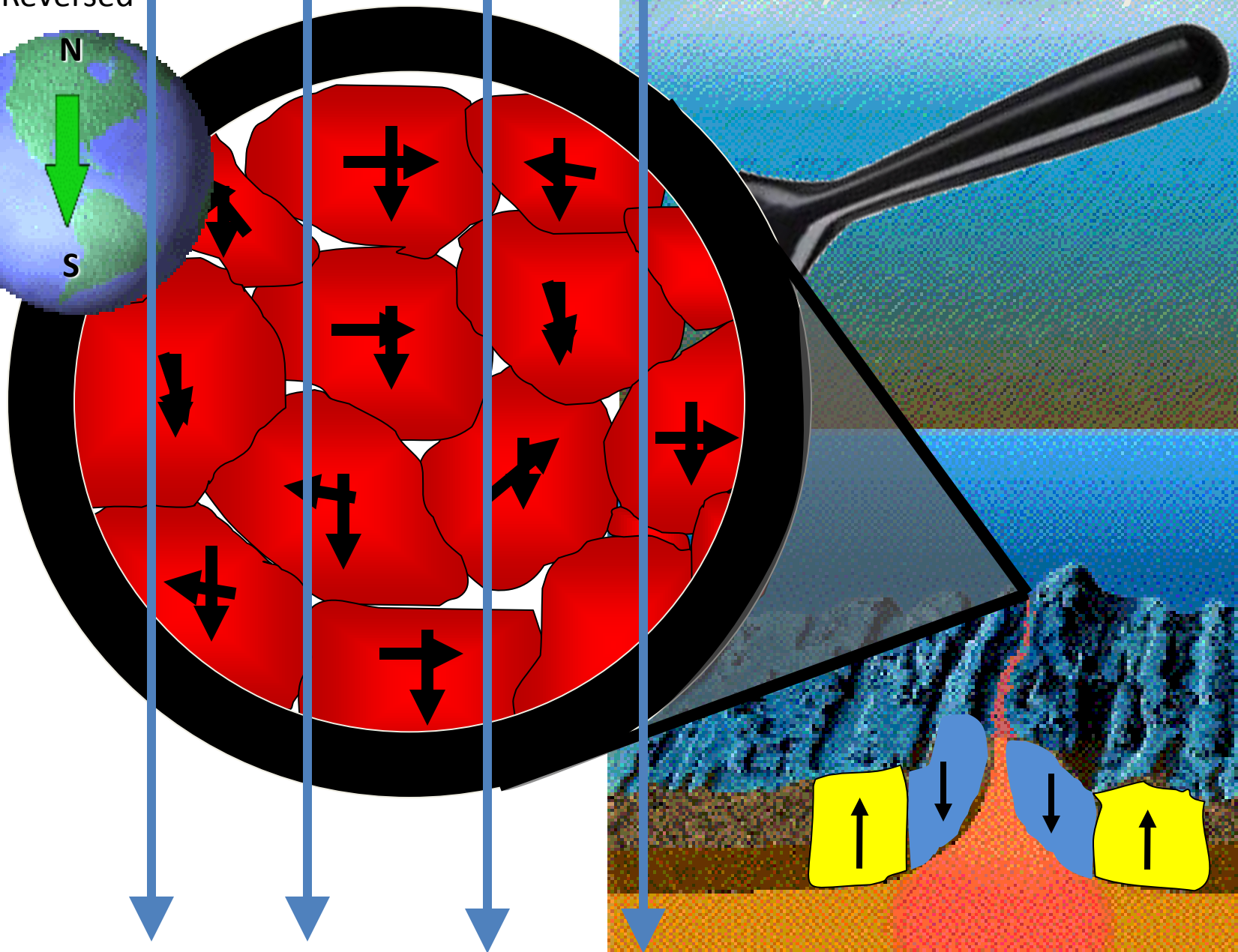
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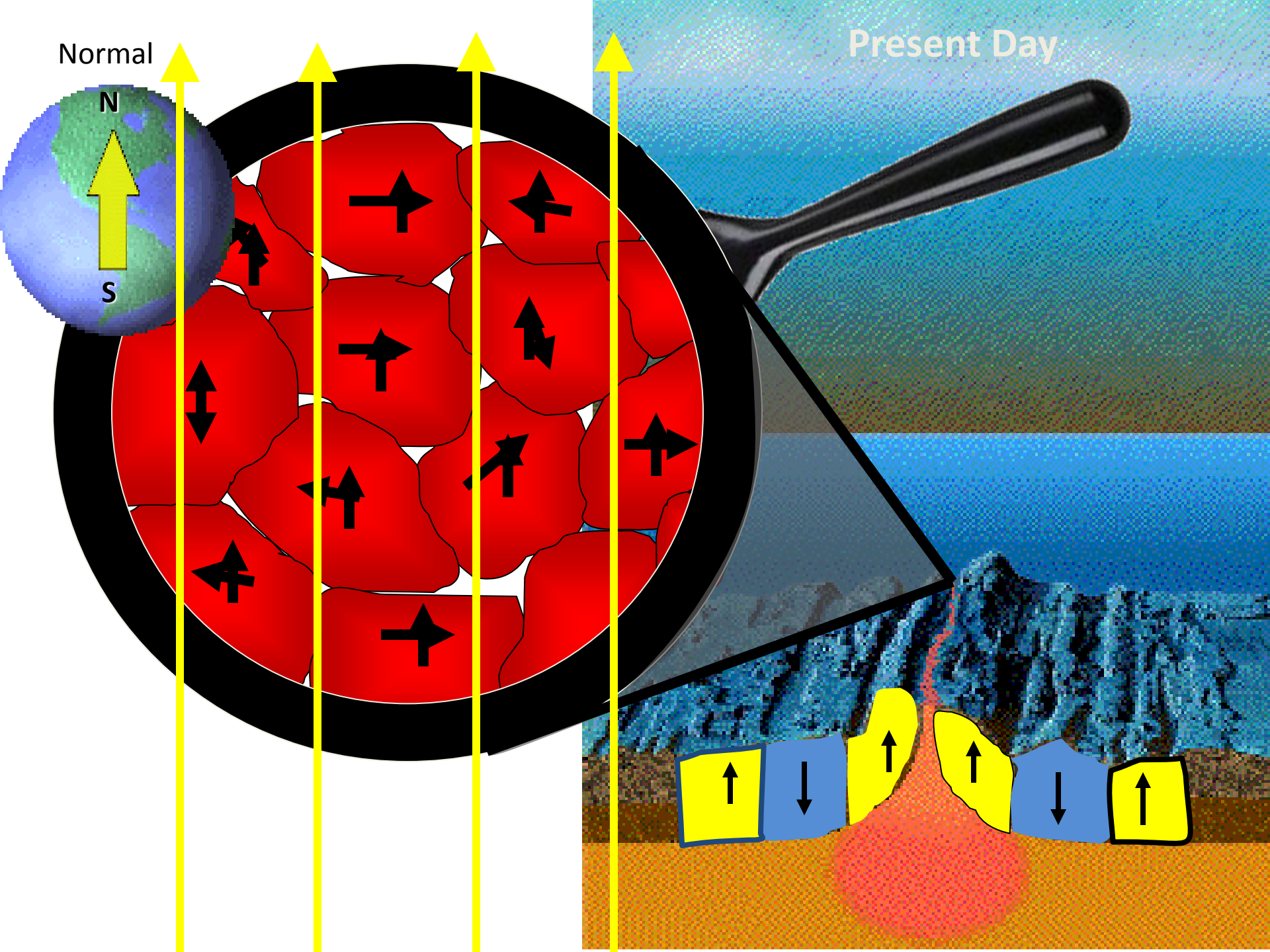
1,400,000 million years ago

Reversed



700,000 thousand years ago





Paleomagnetism Simulation

- <http://oit.williams.edu/itech/learning-objects/>