

SUBSURFACE CHANGES TO EARTH

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OVERVIEW

- **Subsurface events: occurring inside the crust and mantle**
 - Moving the lithosphere due to the convection currents in the asthenosphere
- Main Theories:
 - **1912 Wegener, continental drift:** the continents once formed a single land mass (Pangea), which began breaking up into smaller continents.
 - **1960, Harry Hess, Seafloor Spreading:** Magma oozes up through breaks in the crust, then cools and forms new crust which pushes the pre-existing crust to the side.
 - **1960s, Theory of Plate Tectonics:** theory that explains what tectonics plates are, how they move, and the results of their movement



CONTINENTAL DRIFT OF PLATES



225 Million Years Ago



150 Million Years Ago

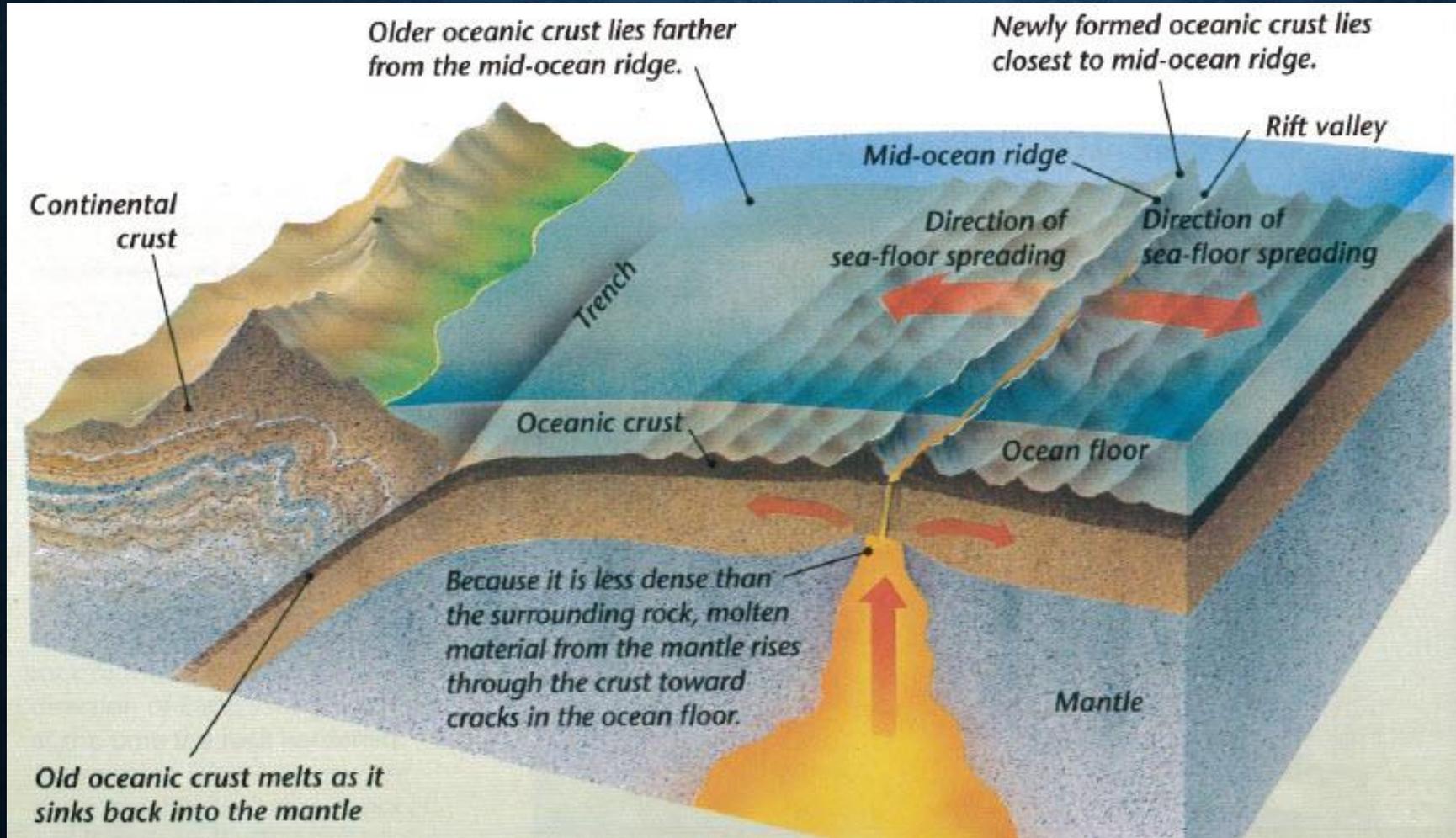


100 Million Years Ago



Earth Today

SEAFLOOR SPREADING



At the time, this was only a hypothesis until . . .

PLATE BOUNDARIES

- **Plate boundary: the region where two tectonic plates meet**
 - These may be in the middle of the ocean floor, around the edges of continents, or within continents

DIVERGENT BOUNDARIES

- **Divergent boundaries: two plates moving away from one another.**
 - Creates rift valley: molten rock rises and hardens between spreading plates, making new crust
 - **EXAMPLE:** mid-ocean ridges formed from new oceanic crust



CONVERGENT BOUNDARIES

- **Convergent boundaries: collision of one plate with another**
 - **Continental and oceanic plate:**
 - denser oceanic plate goes under the continental plate, melts, and becomes part of mantle(subduction zone). -> deep ocean trench, magma rises to form volcanic mountains.
 - **Two continental crusts collide:**
 - neither is subducted because they have the same density, edges crumble and uplift producing mountains.
 - **Two oceanic crusts collide:**
 - one is subducted, molten rock rises producing a chain of volcanic islands, called an island arc.

TRANSFORM BOUNDARIES

- rub against each other as they move in opposite directions

BOUNDARIES

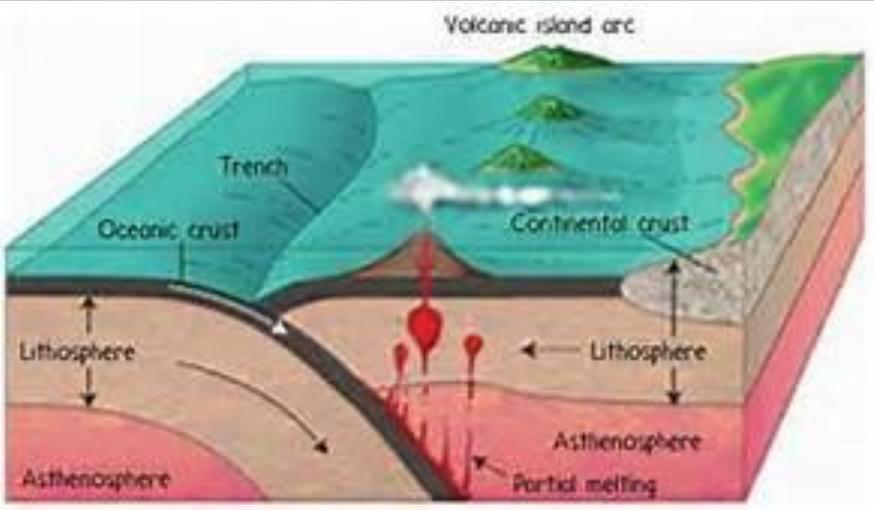
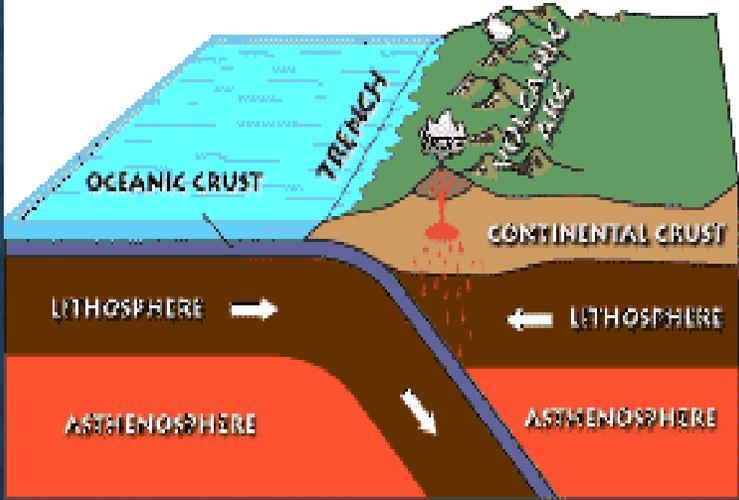
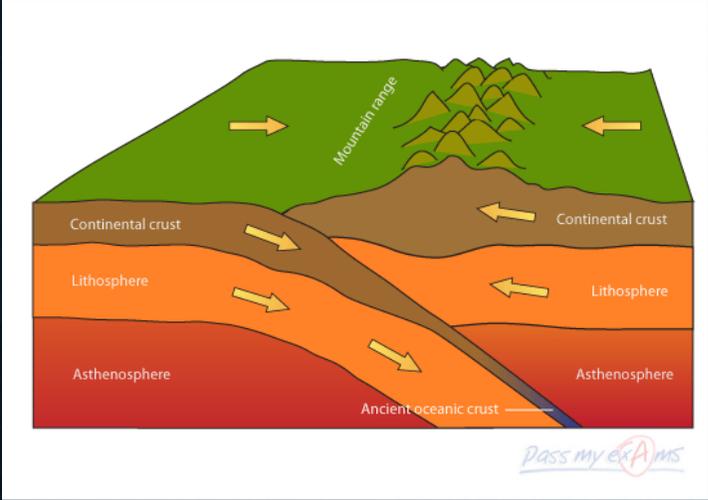
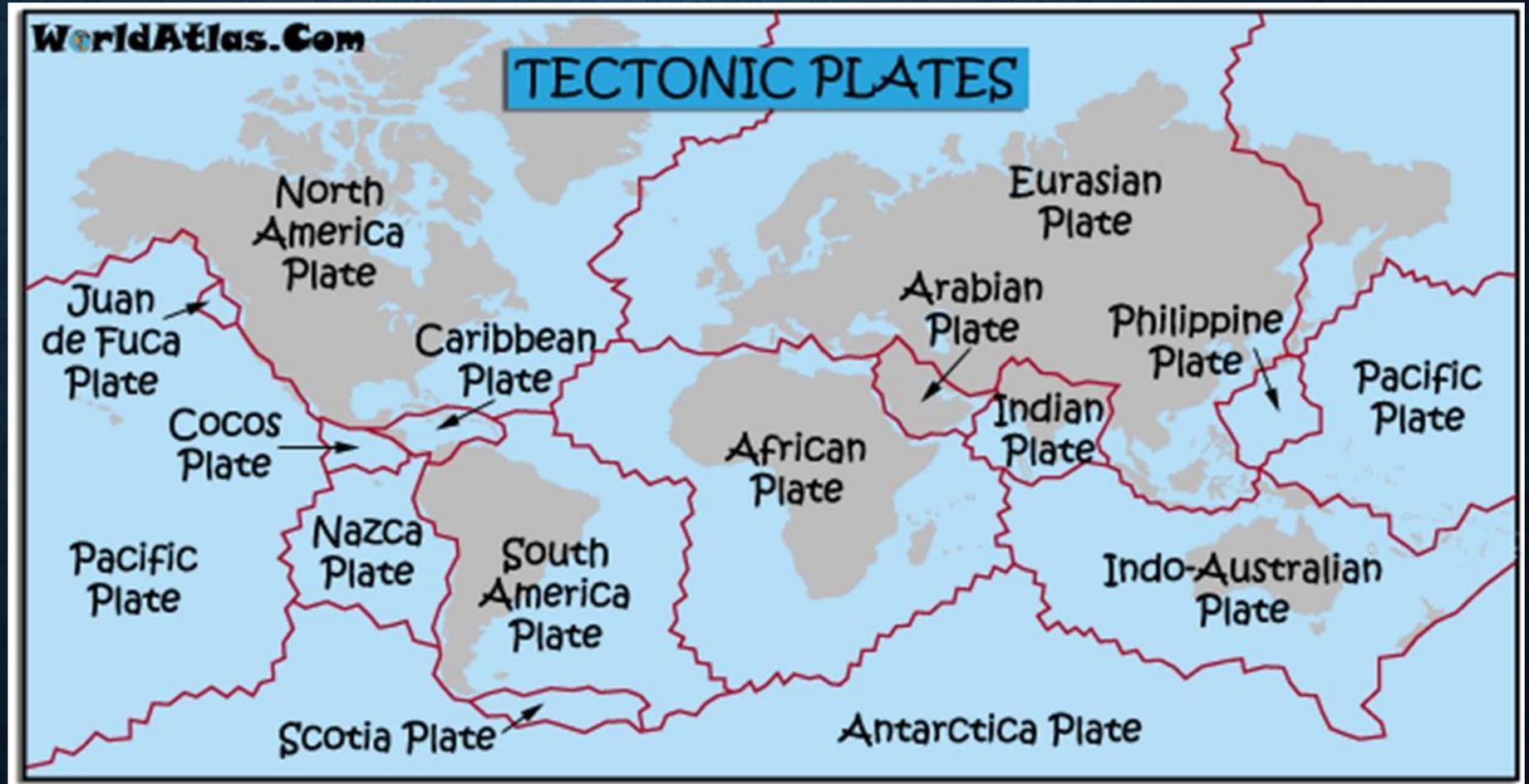


PLATE BOUNDARIES



1. What is the name of the supercontinent that had formed in Earth's past?

2. Describe what happens during a transform boundary.

3. Describe the direction of movement during a divergent boundary (towards, away, or sliding against each other).

4. What scientist was the leader in developing the theory of seafloor spreading?

5. What landform can be created at a divergent boundary?

6. Name three types of convergent boundaries.

7. What type of boundary produces earthquakes?

8. What is subduction?

9. Which crust is more dense, oceanic or continental?

10. How are mountains made?

11. What type of plate boundary creates mid-ocean ridges?

12. If the Earth makes new oceanic crust, why isn't the Earth getting bigger?

13. What scientist developed the Continental Drift Theory?

14. What landform is formed from two oceanic crusts colliding?

15. If the Nazca tectonic plate (made of oceanic crust) collides with the South American tectonic plate (made of continental crust), which one will subduct?

16. In what part of Earth do convection currents occur?

17. What is the name for the huge landmass that Wegener believed covered much of the Earth 200 million years ago?

18. True or False: The similar ages and types of rocks from western Africa and eastern Brazil support the theory of continental drift.

19. True or False: The Mid-Atlantic Ridge is an example of a convergent plate boundary.

20. What type of boundary forms island arcs?

21. True or false: density is what determines which lithospheric plate will subduct during a convergent collision.

22. What are convection currents?

23. Why is California prone to earthquakes, but Florida is not?