Crustal Boundaries

How do plates interact at their boundaries?
Crustal Boundaries

- Tectonic plates are constantly moving and interacting
- As they move across the asthenosphere and form plate boundaries they interact in various ways
Crustal Boundaries

- The types of plate boundaries are:
  - Divergent
  - Transform
  - Convergent
Crustal Boundaries

- **Convergent Boundary** - boundary where two lithospheric plates are coming together

  - **Example**: the India Plate pushing upward into Eurasian Plate and creating the Himalayan Mountains
Convergent Plate Boundary - Himalayan Mountains
**Crustal Boundaries**

- **Subduction** - the process where one plate is pushed below another and consumed in the mantle
  - Example: the Nazca Plate being consumed under the South American Plate
Subduction Boundary
Three Types of Convergent Boundaries:

- Ocean - Ocean Boundary
- Ocean - Continental Boundary
- Continental - Continental Boundary
Ocean - Continent Boundary
Continent - Continent Boundary
Crustal Boundaries

- **Divergent Boundary** - boundary where two lithospheric plates are moving apart

  - **Example**: part of the Mid-Atlantic Ridge emerges from the ocean and splits Iceland in half
Divergent Plate Boundary
Divergent Plate Boundary Iceland
Crustal Boundaries

- **Sea-Floor Spreading** - the process where ocean floor is extended when two plates move apart

- **Mid-Ocean Ridge** - underwater mountain range created from a divergent plate boundary
Mid-Ocean Ridge
Crustal Boundaries

- **Mid-Atlantic Ridge** - a mid-ocean ridge that runs the length of the Atlantic Ocean
  - Separates the North and South American Plates from the Eurasian and African Plates
Mid-Atlantic Ridge
Crustal Boundaries

- **Rift Valley** - long narrow valley that runs the entire length of a mid-ocean ridge system
Scientists dragged a magnetometer across the ocean floor and discovered a unique magnetic pattern where stripes of normal and reversed polarity parallel the mid-ocean ridge flipping every 200,000 to 300,000 years (the last one was 781,000 years ago).
“Flip-flopping” Polarity
“Flip-flopping” Polarity
Crustal Boundaries

Evidence

- Rock samples of the deep ocean floor show that basaltic oceanic crust becomes progressively younger as you approach the mid-ocean ridge
Age of the Seafloor
Crustal Boundaries

- **Transform Boundary** - boundary where two lithospheric plates are sliding past one another
  - **Example**: the San Andreas Fault is 800 km long and runs throughout California
Transform Plate Boundary
San Andreas Fault
Transform Plate Boundary