

Forces that Shape the Earth

Section I: Forces that Shape the Earth

Types of Stress

Definition	Example	Landform Created
Tension – when two plates move away from each other – pulls and stretches rock		Continental Rifts & Mid-Ocean Ridges
Compression – when two plates are pushing toward each other – squeezes rock causing it to fold or break		Ocean Trenches & Mountain Ranges
Shearing – when two blocks of rock are pushing in opposite directions – sliding motion causes rock to break or change shape		Faults & Fault Zones

The continental crust is constantly changing due to plate tectonics. Forces at plate boundaries are strong enough to break rocks or change their shape. **Stress** is the force that acts on rock to change its shape or volume; it adds potential, or stored, energy to rock until it changes shape or breaks. Three different kinds of stress can occur in the crust. **Tension** pulls on the crust, stretching rock so that it becomes thinner in the middle. **Compression** squeezes rock until it folds or breaks. **Shearing** pushes a mass of rock in two opposite directions. **Strain** is a change in the shape of rock that is caused by stress. **Elastic strain** is a change in rock

that is NOT permanent. When the stress is removed, the rock goes back to its original shape. **Plastic strain** creates a permanent change in the shape of a rock. It usually occurs when rocks are weak or hot.

Each type of stress can produce different types of landforms. Landforms created by compression include mountain ranges, ocean trenches, and volcanic arcs. **Mountain ranges** form when there is a collision of two continental plates. **Ocean trenches** form as one plate goes under another plate during the collision, forming a deep trench where the two plates meet. **Volcanic arcs** are a curved line of volcanoes that forms parallel to plate boundaries.

Landforms created by tension include mid-ocean ridges and continental rifts. A **mid-ocean ridge** forms when the tension causes the oceanic crust to spread, which allows hot rock from the mantle to rise, creating high ridges as a result. A **continental rift** forms when divergent boundaries cause an enormous split in the crust.

Landforms created by shearing include transform faults and fault zones. A transform fault occurs when plates slide horizontally past each other. They form a fault, or a break in the rock of the crust. Fault zones are areas of many fractured pieces of crust along a large fault.

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Review:

1. Identify the three different types of stress.
2. How do ocean trenches form?
3. What is a fault zone?