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Exploration Student Worksheet: Causes of Earthquakes

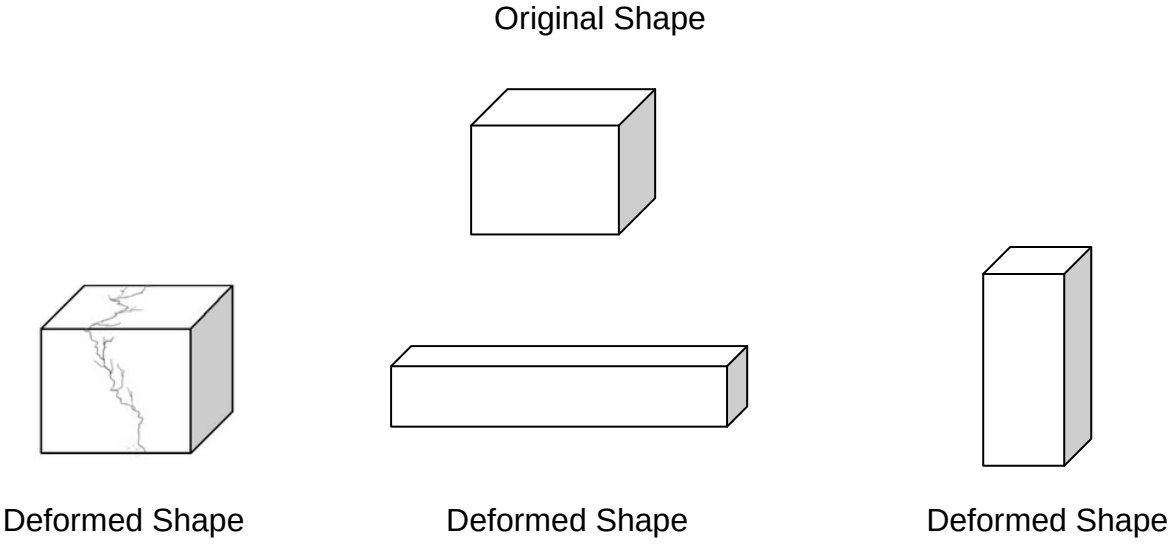
Overview

Strain, caused by stress, is the deformation, or change in an object's size or shape. In this Exploration, you will examine how stress and strain are related. You will observe the types of faults formed due to stress and then relate faulting and earthquakes to plate tectonics. You will also examine the world map that shows the earthquakes along plate boundaries associated with types of stress.

Questions

1. Define the terms stress and strain. Explain how they are related.

2. Infer the type of stress that has caused changes in the original shape of the object given below.



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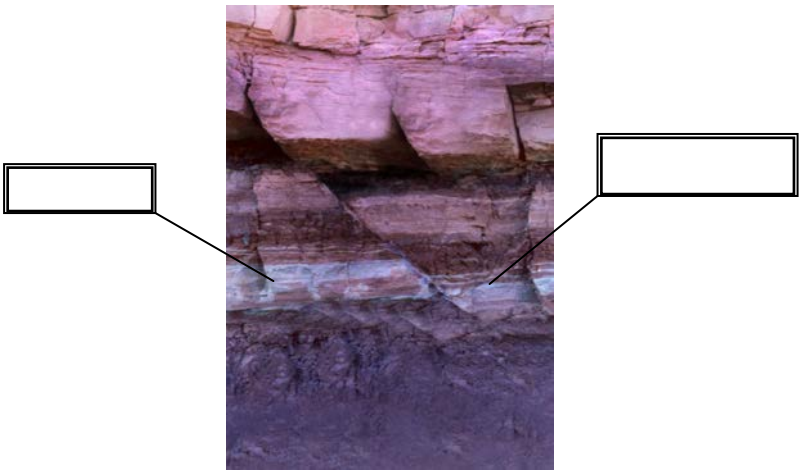
3. Compare and contrast normal and reverse faults.

4. In the Exploration, select the *Shear* radio button option in the *Apply Stress* section and then click *Trigger* button. Observe and explain what happens.

5. Identify the type of fault and the type of stress that has caused the offset of strata in the image below. Label the hanging wall, foot wall, and the direction of movement. What could have caused the stress that formed the fault?



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6. Define the terms focus and epicenter.

7. Describe the types of stress associated with each of the three types of plate boundaries. What types of earthquake movements and faults do you expect at these boundaries?

8. Which type of plate boundary is associated with very strong and deep earthquakes? What type of stress is associated with these earthquakes? What types of faults?

9. Earthquakes are caused by plate movement and displacement along faults. What are some other causes of earthquakes?

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10. What type of stress is associated with the San Andreas Fault System? Describe how rocks move relative to each other during earthquakes along the San Andreas. What type of fault is the San Andreas?

11. While mapping an area, a geologist finds that there are a significant number of normal faults. The geologist uses relative dating methods to figure out that the faults are about 180 million years old. What do these faults tell the geologist about what was happening in the area 180 million years ago? What might the geologist infer about the tectonic environment of the region at that time?