

SECTION 5-1

SECTION SUMMARY

Earth's Crust in Motion

Guide for Reading

- ◆ How do stress forces affect rock?
- ◆ Why do faults form and where do they occur?
- ◆ How does movement along faults change Earth's surface?

An **earthquake** is the shaking and trembling that results from the movement of rock beneath Earth's surface. Powerful forces caused by the movement of Earth's plates squeeze rock and pull it in different directions. A force that acts on rock to change its shape or volume is called **stress**. Stress adds energy to the rock. The energy is stored in the rock until it changes shape or breaks. The change in the shape or volume of the crust is called **deformation**.

Three kinds of stress cause deformation: shearing, tension, and compression. **Shearing** pushes a mass of rock in two opposite directions. **Tension** pulls on the crust, stretching rock. **Compression** squeezes rock until it folds or breaks. **Shearing, tension, and compression work over millions of years to change the shape and volume of rock.**

When stress builds up in rock, it fractures along a fault. A **fault** is a break in Earth's crust where slabs of crust slip past each other. **Faults usually occur along plate boundaries, where the forces of plate motion compress, pull, or shear the crust so much that the crust breaks.**

There are three main types of faults. In a **strike-slip fault**, the rocks on either side of the fault slide past each other sideways with little up-or-down motion. Strike-slip faults are caused by shearing. In a **normal fault**, one block of rock lies above the fault while the other block lies below it. The block that lies above the fault is the **hanging wall**, and the block below the fault is the **footwall**. Normal faults are caused by tension. In a **reverse fault**, the hanging wall slides upward past the footwall. Reverse faults are caused by compression.

How blocks of rock move along a fault depends on how much friction there is between them. If friction is low, the blocks slide constantly without sticking. If friction is high, the blocks lock together. When the amount of stress is greater than the amount of friction, the blocks unlock suddenly, setting off an earthquake.

The forces of plate movement can change Earth's surface. **Over millions of years, fault movement can change a flat plain into a towering mountain range.** When normal faults uplift a block of rock, a **fault-block mountain** forms. Sometimes plate movement bends Earth's crust instead of breaking it along a fault. A **fold** is a bend in rock that forms when compression shortens and thickens part of the crust. A fold that bends upward in an arch is an **anticline**. A fold that bends downward in the middle to form a bowl is a **syncline**. When a fault pushes up a large, flat block of rock, a plateau can form. A **plateau** is a large area of flat land elevated high above sea level.

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REVIEW AND REINFORCE

Earth's Crust in Motion

◆ Understanding Main Ideas

Use the diagrams below to answer items 1–3.

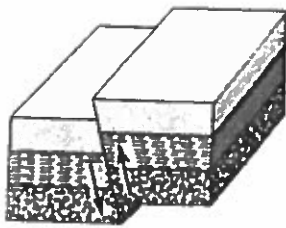


Diagram A

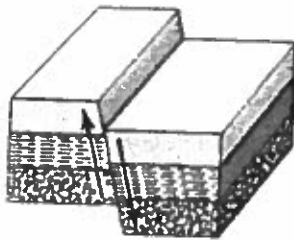


Diagram B

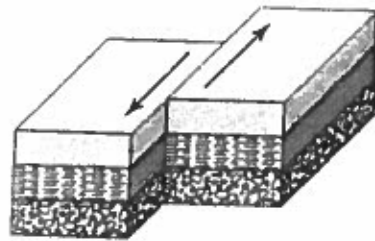


Diagram C

1. Diagram A

a. Type of Fault: _____ b. Stress Force: _____

c. Movement Along Fault: _____

2. Diagram B

a. Type of Fault: _____ b. Stress Force: _____

c. Movement Along Fault: _____

3. Diagram C

a. Type of Fault: _____ b. Stress Force: _____

c. Movement Along Fault: _____

◆ Building Vocabulary

Write a definition for each of these words. Use the back of this sheet if you need more space.

4. deformation _____

5. fault-block mountain _____

6. syncline _____

7. earthquake _____

8. stress _____

9. anticline _____

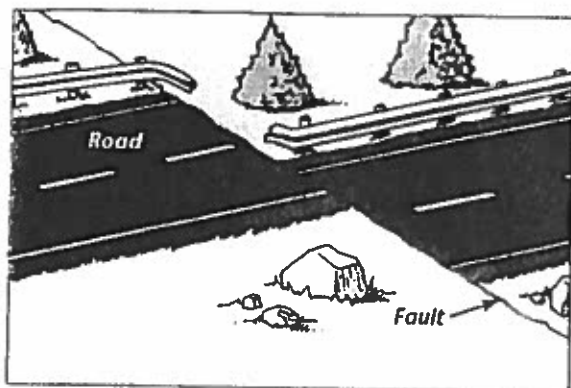
10. plateau _____

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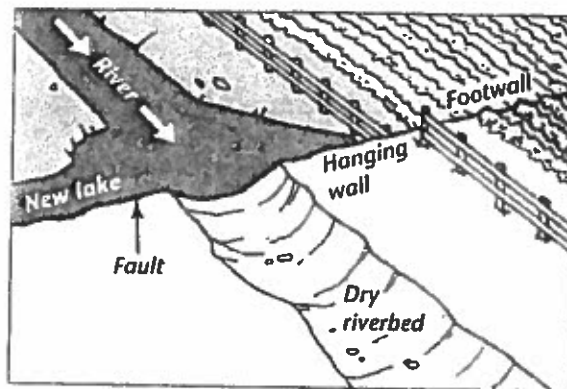
ENRICH

Evidence of Movement Along Faults

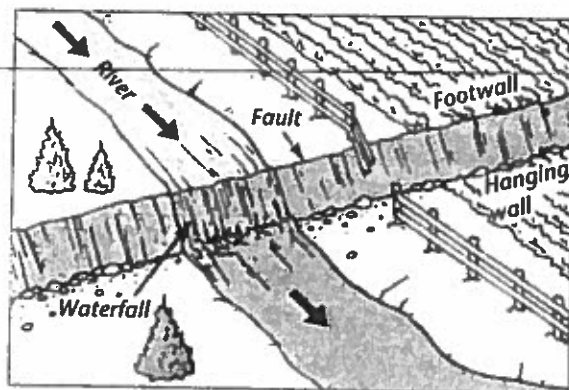
Each picture below shows how an earthquake changed the land surface at a fault. Examine the pictures carefully. Decide what kind of fault is shown in each. Then explain how movement along the fault caused the changes you see. Write your answers in the spaces provided.



Fault 1



Fault 2



Fault 3

Fault 1 _____

Fault 2 _____

Fault 3 _____

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