



IQRA NATIONAL UNIVERSITY

ENGINEERING GEOLOGY

Lecture 06

Structural Geology (Faults , joints and folds , Their different types)



STRUCTURAL GEOLOGY

Structural Geology is that branch of geology which talks about geological structures. It is mainly concerned with shapes, arrangement, interrelationships of bedrock units & forces that cause them.

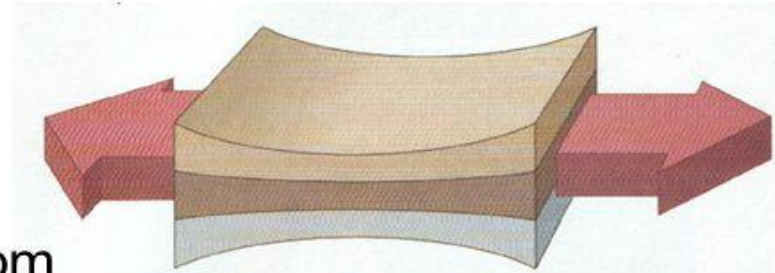
cause them

interrelationships of bedrock units & forces that

Types of Stress

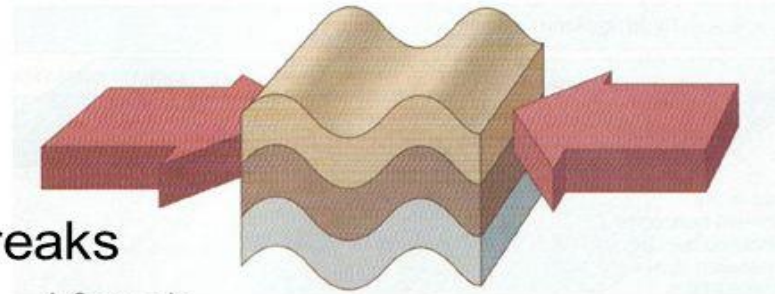
• Tension

- Pulls on the crust, stretching it thin
- Occurs when plates move away from one another



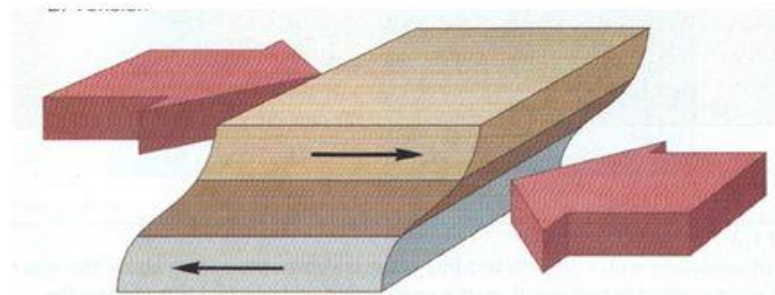
• Compression

- Rock is squeezed until it folds or breaks
- Occurs when plates push against one another



• Shearing

- Rock is pushed in two opposite directions
- Can cause rock to break and slip apart



What is a **Fault**?

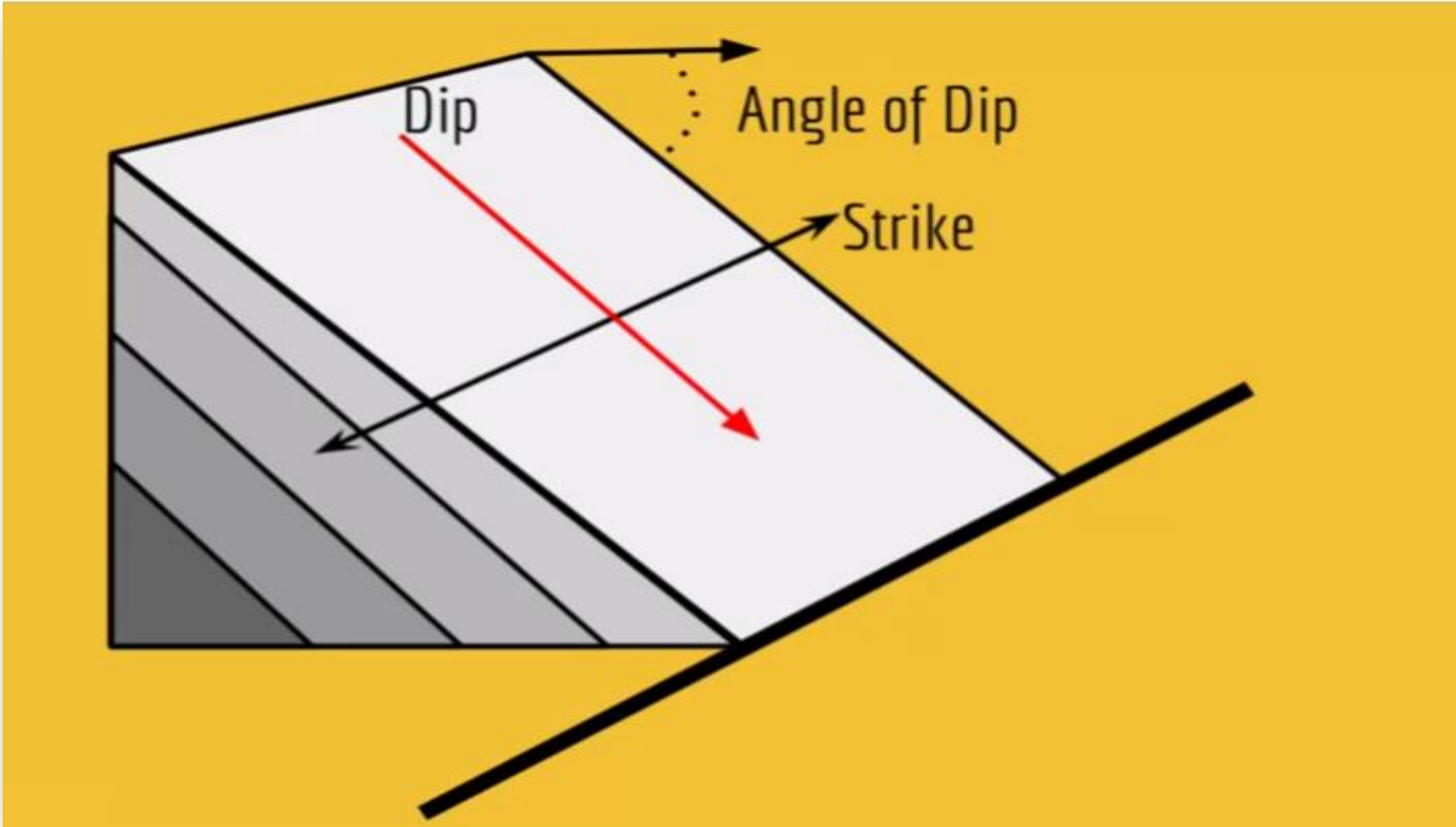
Fracturing and displacement of rock strata



Fracturing and
displacement of
rock strata

Types

- ❖ Dip-Slip Faults
 - Normal Faults
 - Reverse Faults
 - Thrust Faults
- ❖ Strike-Slip Faults
- ❖ Oblique-Slip Faults



Dip-slip-fault

Those faults in which movement is primarily parallel to the inclination.

Strike-slip-fault

Those faults that have the horizontal direction when they move.

Dip-Slip Faults

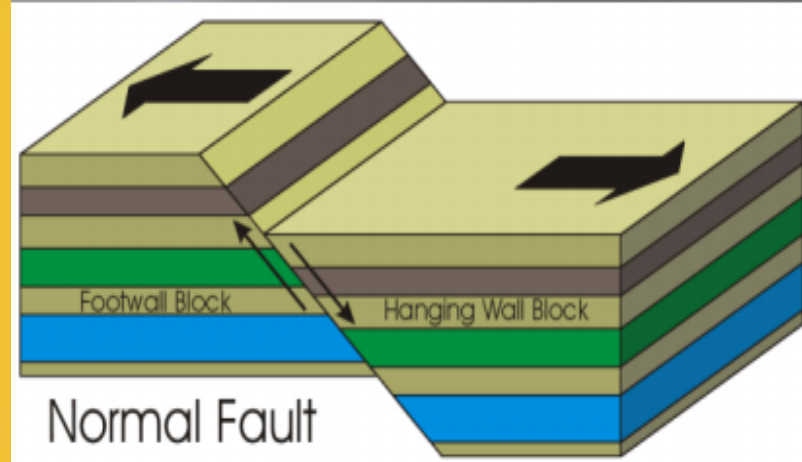
Hanging Wall



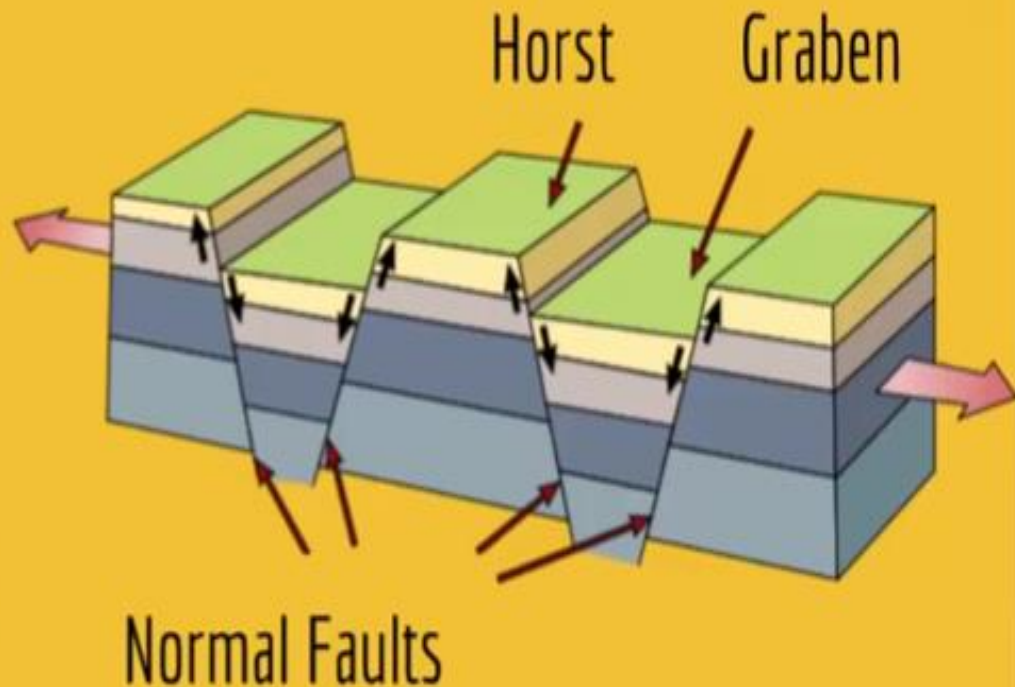
Foot Wall

What is a **Normal Fault** ?

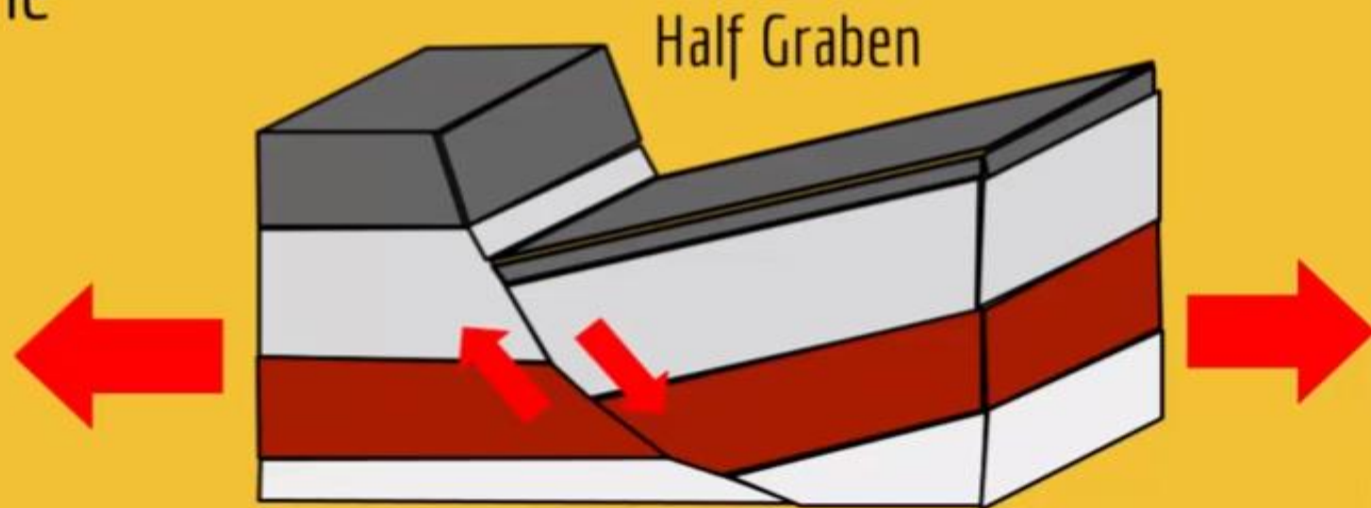
Fault where the hanging wall moves down relative to the footwall



Due to the tensional stress normal faults are created in a series. In such a case the down-dropped blocks form *grabens* and the uplifted blocks form *horsts*

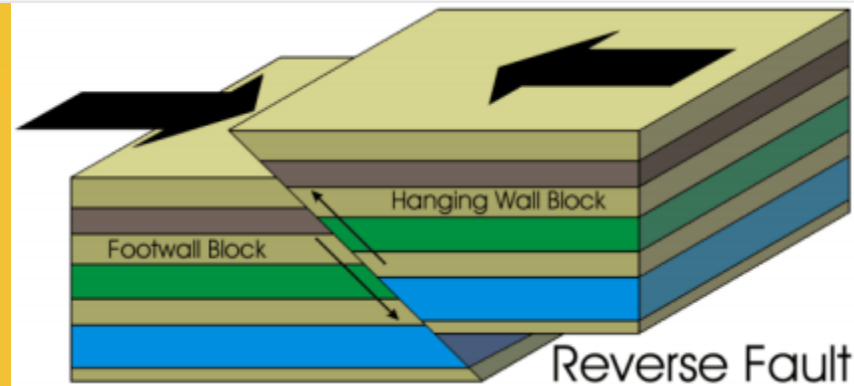


Half Grabens are a geological structure where it is bounded by fault from one side



What is a **Reverse Fault**?

Fault where the hanging wall moves up relative to the footwall



What is a **Thrust Fault** ?

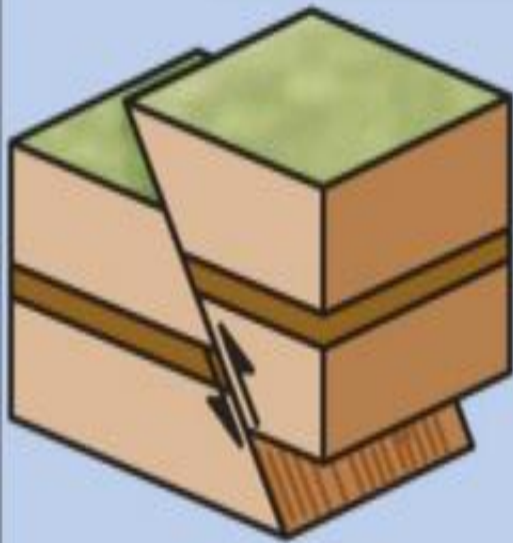
What is a **Thrust Fault** ?

A type of reverse faults having dips less than 45 degrees

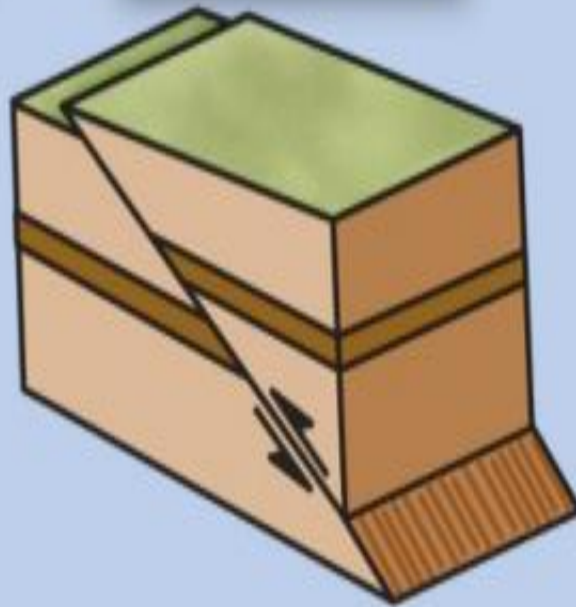


Dip-slip faults

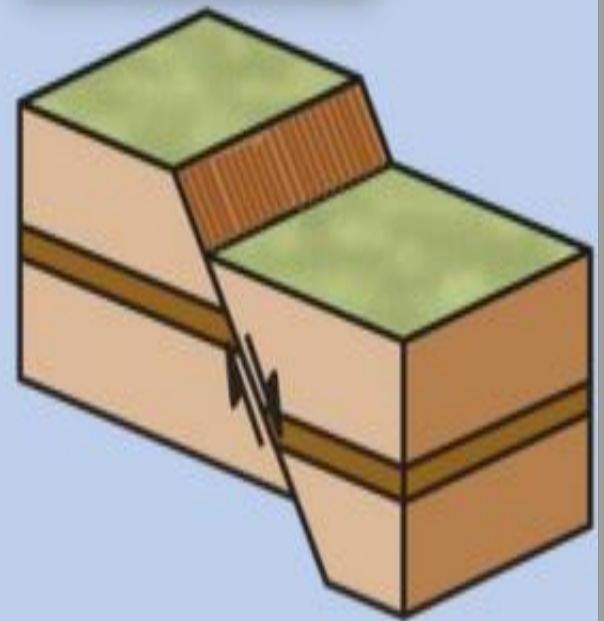
Reverse fault
(steep slope)



Thrust fault
(gentle slope)



Normal fault



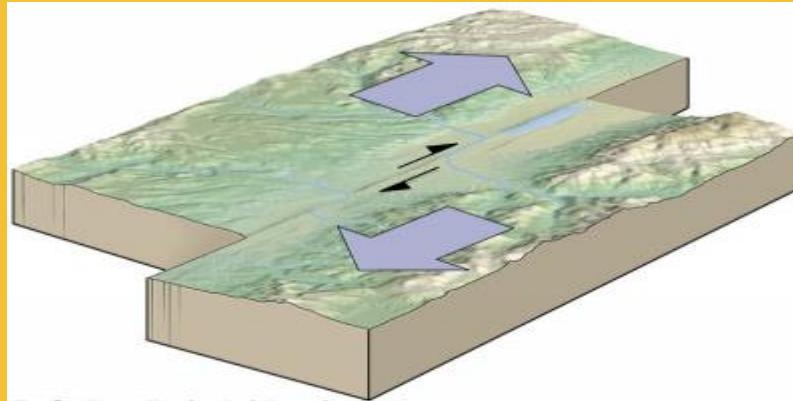
What is a **Strike
Slip Fault** ?

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A fault in which the dominant displacement is horizontal



Left lateral strike-slip faults
Right lateral strike-slip faults



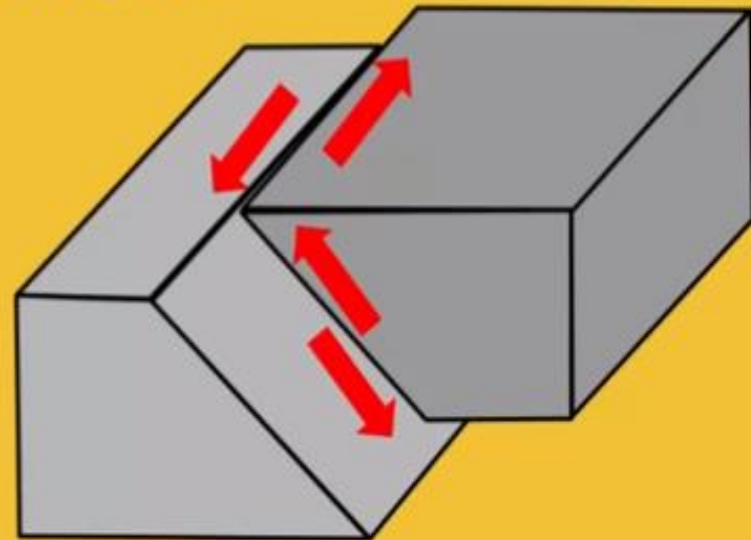
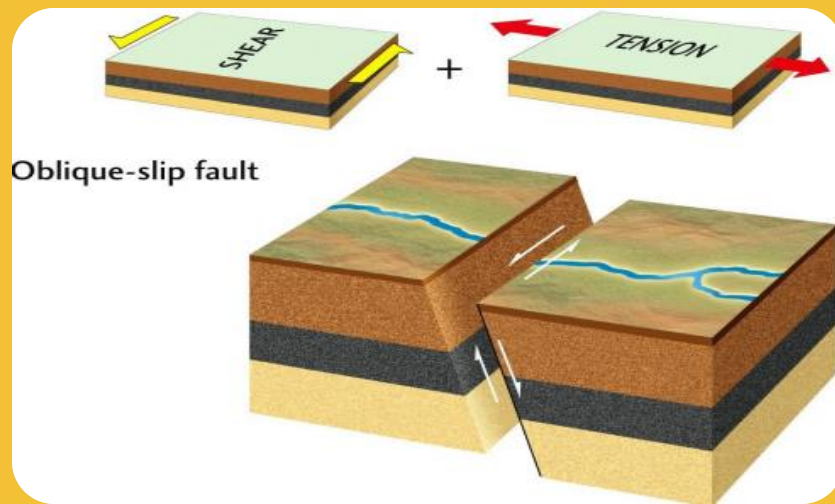
What is a **Oblique-Slip Fault**



What is a **Oblique-Slip Fault**



Faults that exhibit both dip-slip and strike-slip movement



What is a **Joint**?

What is a **Joint**?

Fractures along
which no displacement
has occurred



What is a **fold** ?

What is a **fold** ?

Folds

In response to compression force the strata may bend and buckle these are called folds.

Syncline (down)



Anticline (up)



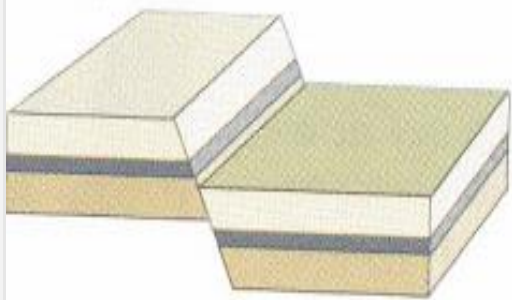
TENSIONAL
FORCES



Stretching and
thinning



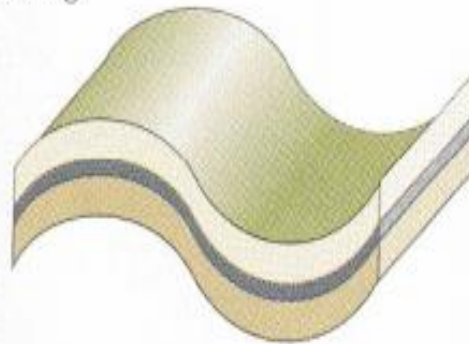
Faulting



COMPRESSIVE
FORCES



Folding



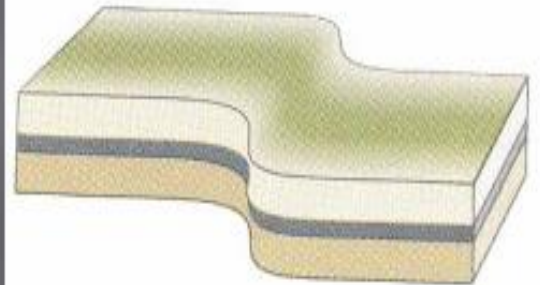
Faulting



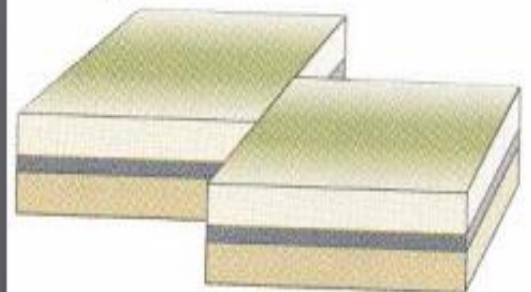
SHEARING
FORCES



Shearing



Faulting



END OF THE LECTURE

