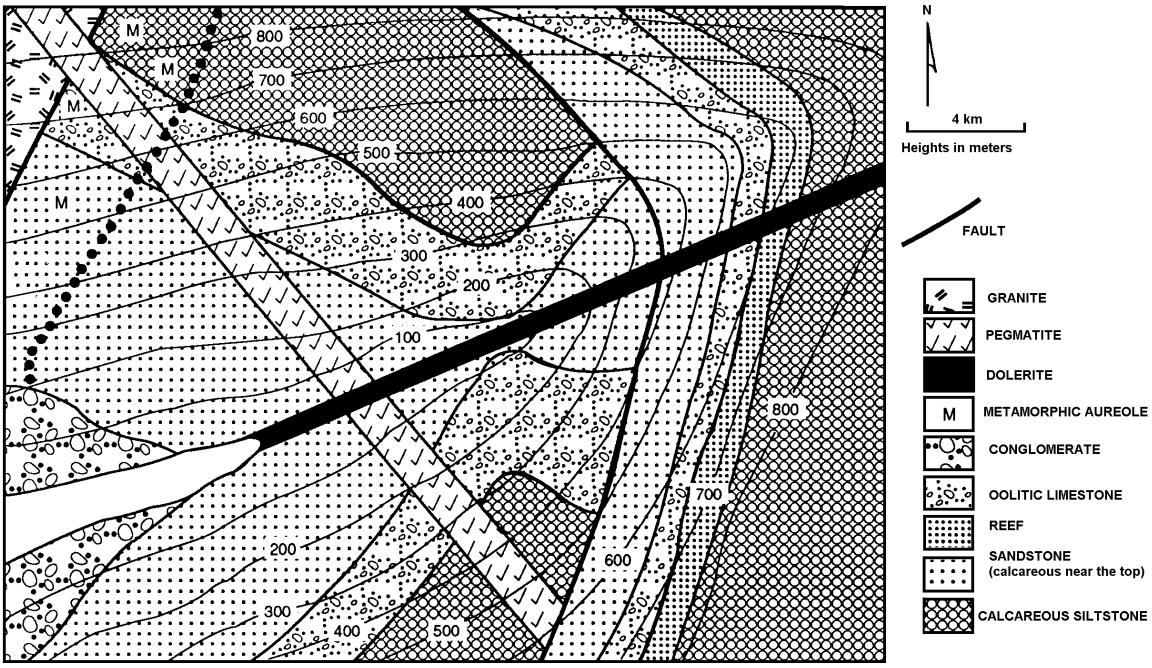
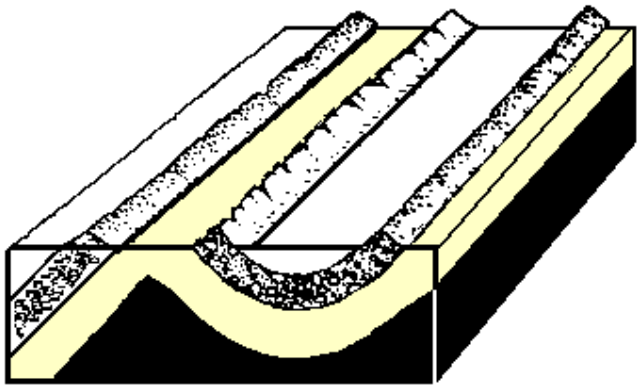
Last Updated October 23, 2003

STRUCTURAL GEOLOGY

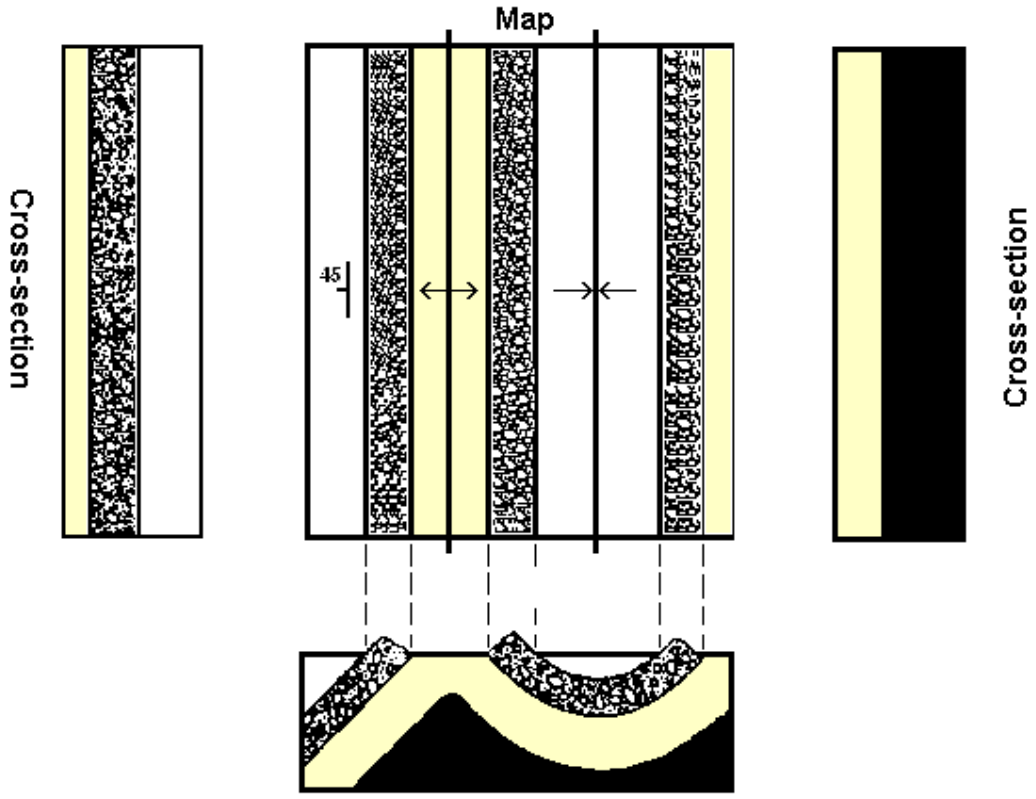
STRUCTURAL GEOLOGY	-Study of the form, arrangement and internal structure of rocks. -Study of the 3-D configuration of bedrock units



GEOLOGIC MAP	Shows the **surface** distribution of bed formations
GEOLOGIC BLOCK DIAGRAM	3-D representation of formations
GEOLOGIC CROSS-SECTION	Shows the **subsurface** configuration of formations



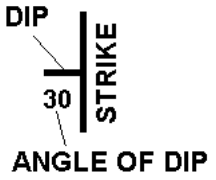
Block Diagram

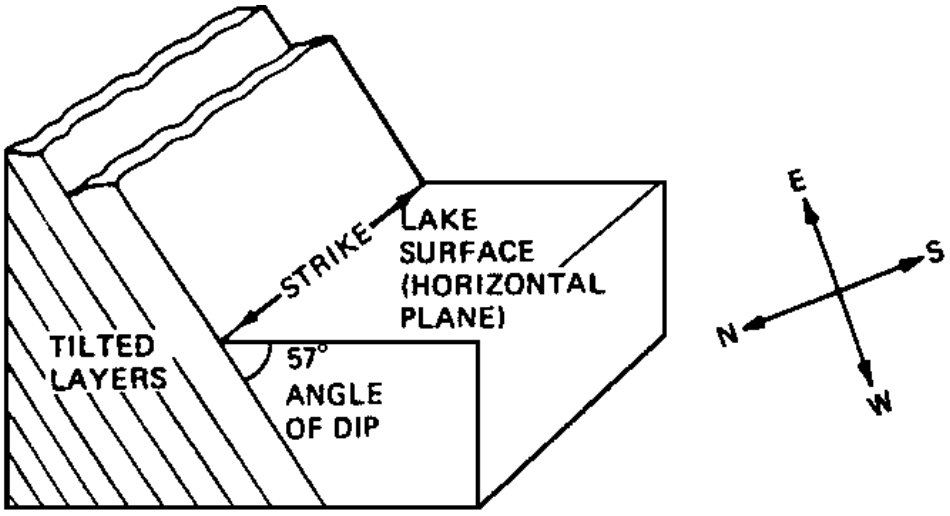


Geologic Map. Map showing the aerial extent of formations and structures (symbols) at the earth's surface.

Geologic Block Diagram. 3-D drawing showing the geometric configuration of formations or structures.

Geologic Cross Section of Profile. Shows a side-view of formations or structures

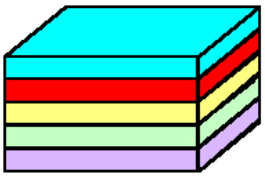
STRIKE	Direction of the line of intersection between inclined layers and a horizontal plane (parallel to the surface to the earth)
Angle of **DIP**	Acute angle measured from inclined layer to the horizontal plane
DIP (direction)	Direction in which a layer is inclined. Its measured perpendicular to the strike
SYMBOLS	



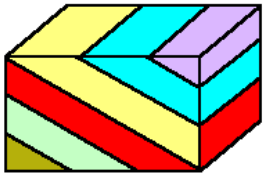
The position of any rock layer with respect to the earth's surface can be described by its dip, strike and angle of dip

STRIKE	**The compass ditection of the line of intersection between the rock layer and an imaginary horizontal plane (parallel to the earths' surface.**
ANGLE OF DIP	**Acute angle formed between the tilted (inclined) rock and an imaginary horizontal plane.**
DIRECTION OF DIP	**Direction in which the acute angle opens, going doward from the imaginary horizontal plane.**

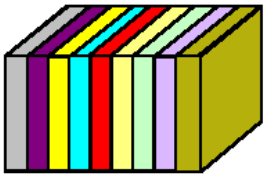
HORIZONTAL
LAYERS
Angle of dip = 0°
(No dip)



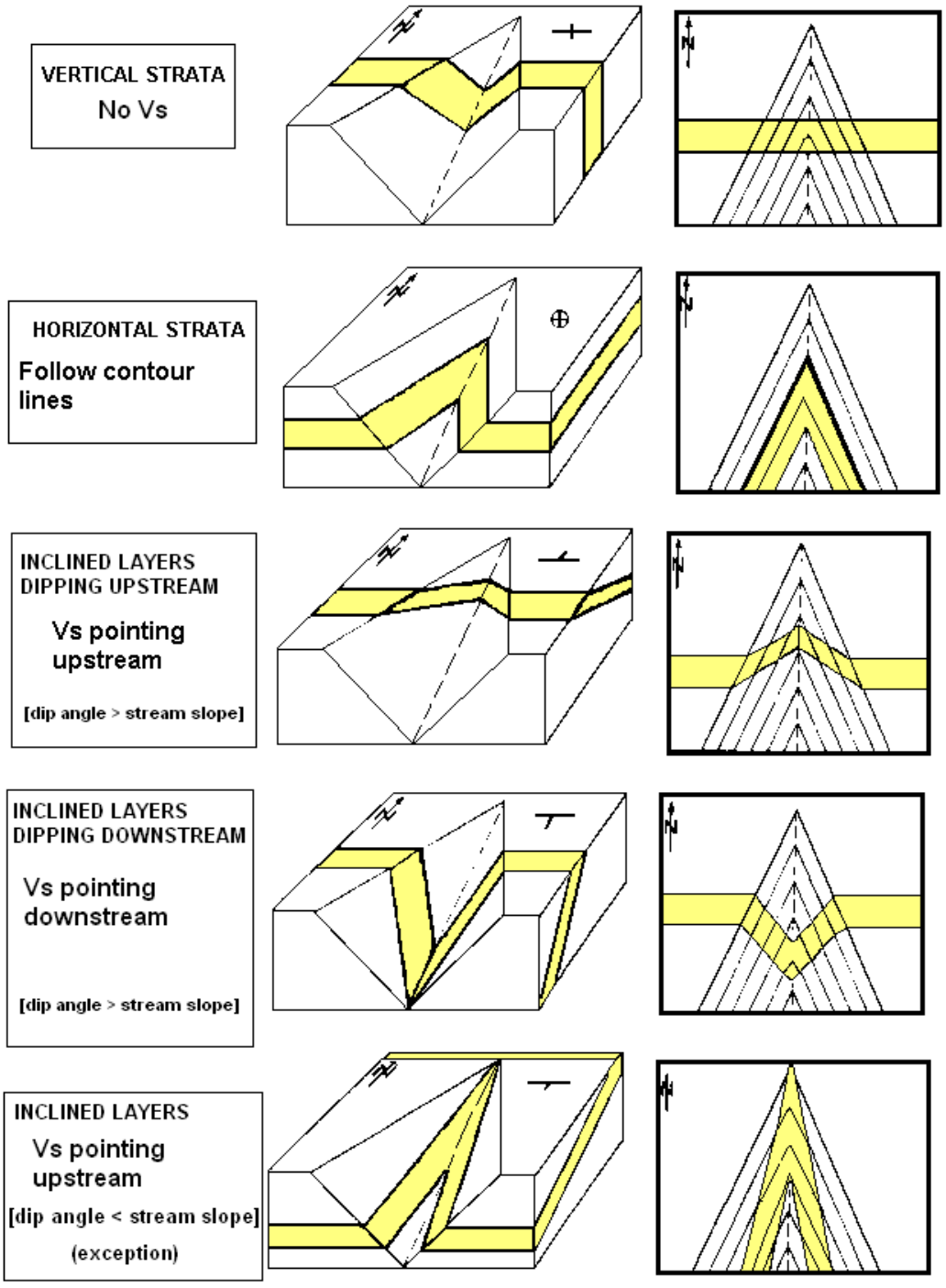
INCLINED
LAYERS
(TILTED)
Angle of dip 0°- 90°



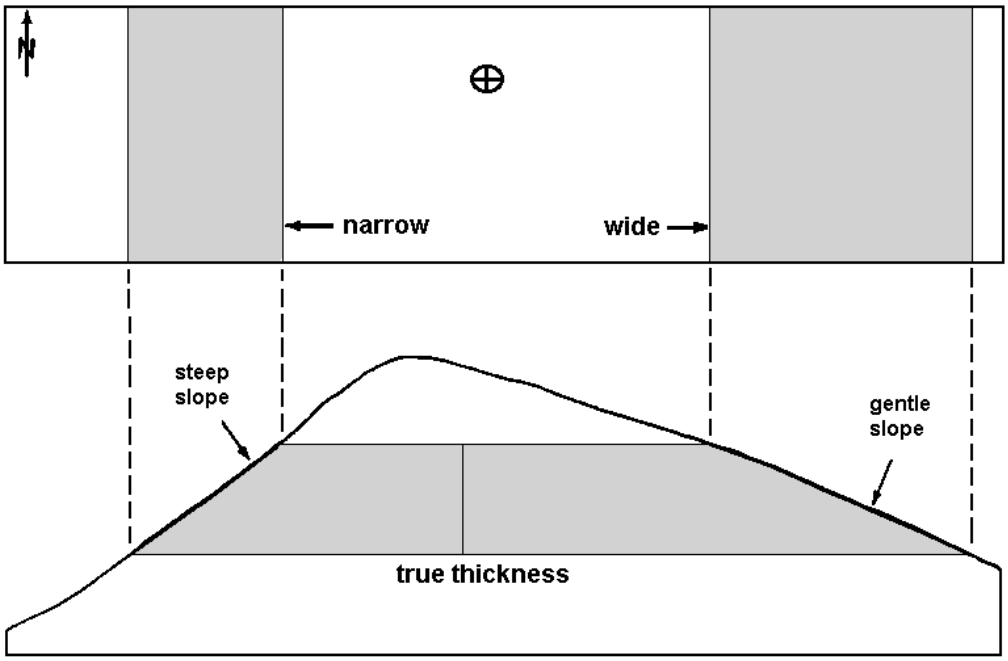
VERTICAL
LAYERS
Angle of dip = 90°
(No dip)



TOPOGRAPHY and LAYERS	
HORIZONTAL LAYERS	Contacts follow contour lines (they make Vs pointing upstream
INCLINED LAYERS	Contacts form Vs The V points in the direction of dip. (Upstream or downstream)
VERTICAL LAYERS	Contacts do not form Vs. The cut straight across contour lines

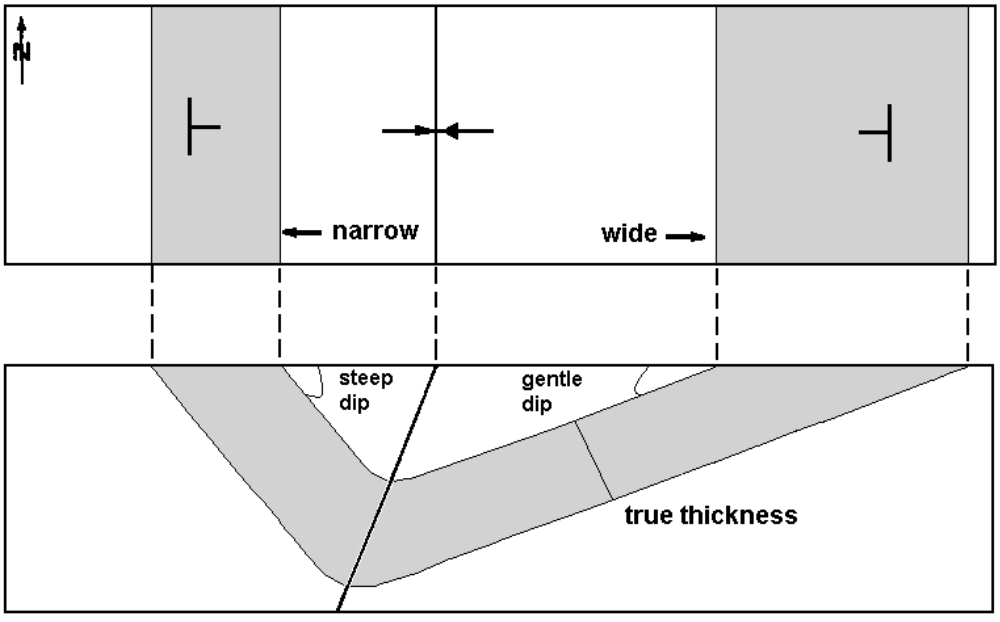

VERTICAL STRATA
No Vs
HORIZONTAL STRATA
Follow contour lines
INCLINED LAYERS DIPPING UPSTREAM
Vs pointing upstream
[dip angle > stream slope]
INCLINED LAYERS DIPPING DOWNSTREAM
Vs pointing downstream
[dip angle > stream slope]
INCLINED LAYERS
Vs pointing upstream
[dip angle < stream slope]
(exception)

RULE OF Vs

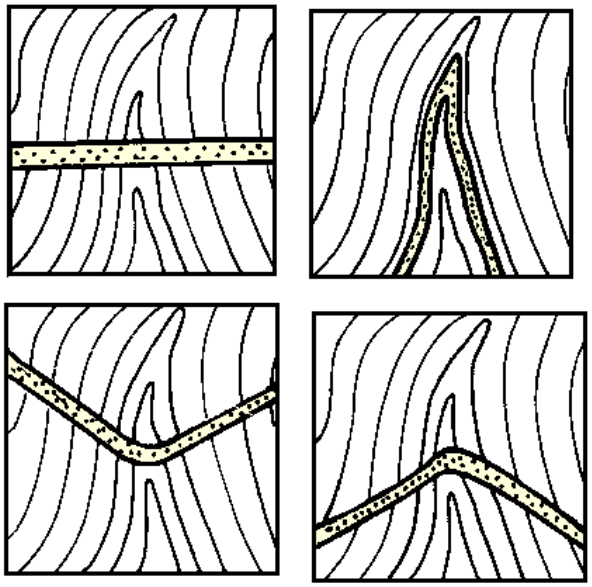


Geologic Cross-Section

Geologic Map

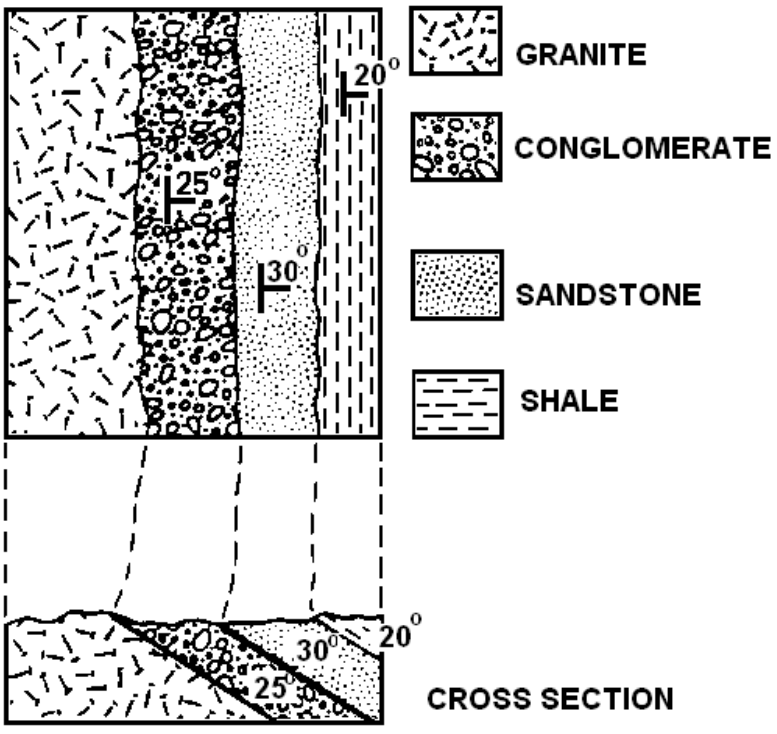


Geologic Cross-Section

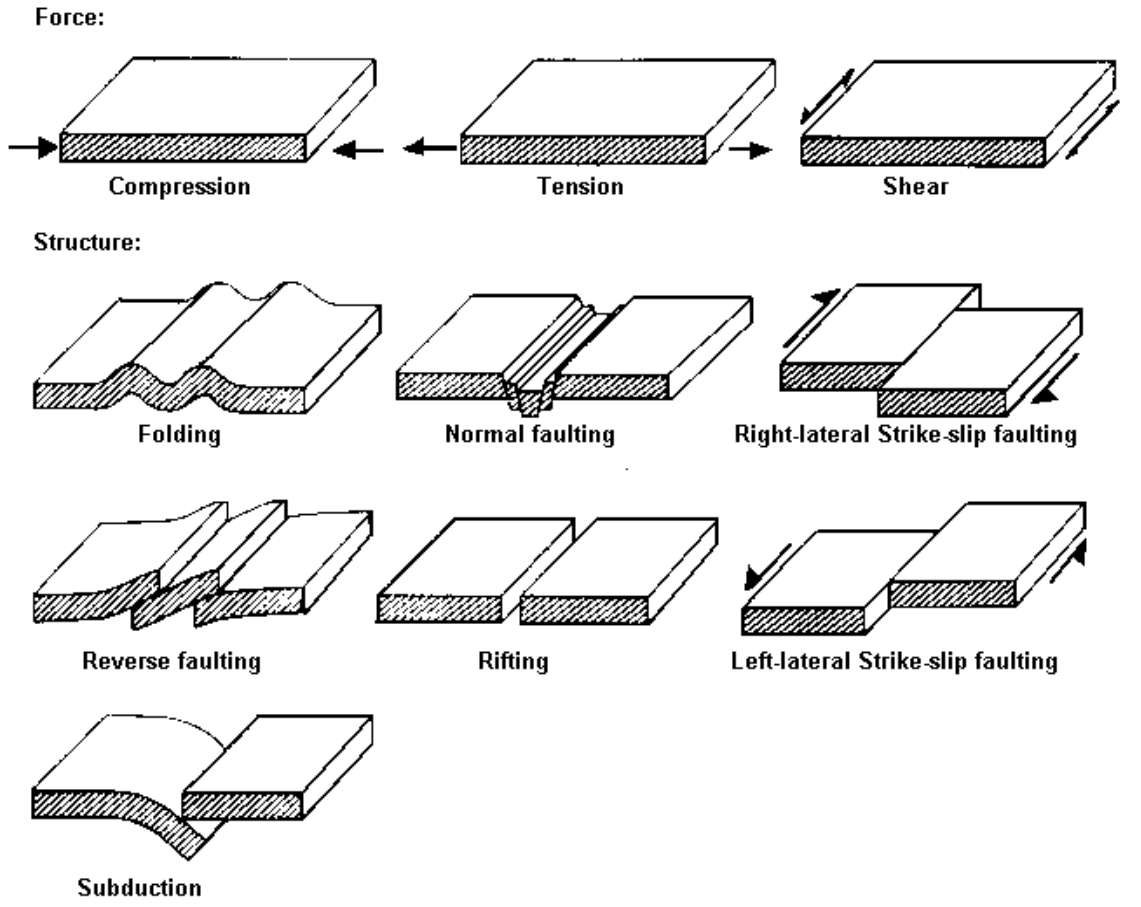


Practice identifying
Horizontal, Inclined and Vertical
layers

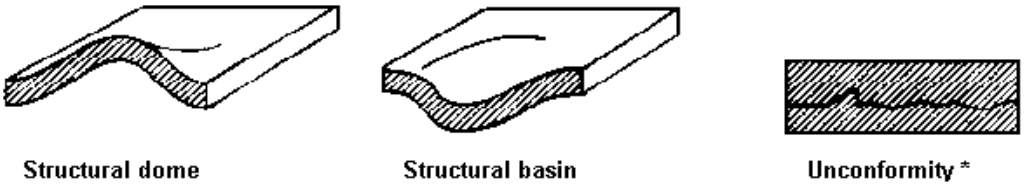
Simple geologic cross section.



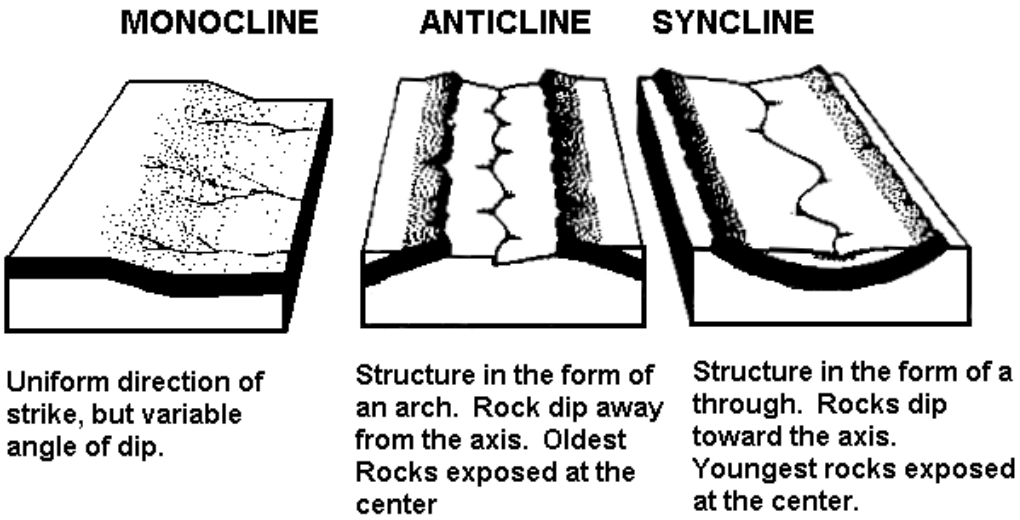
Forces that cause deformation of rocks



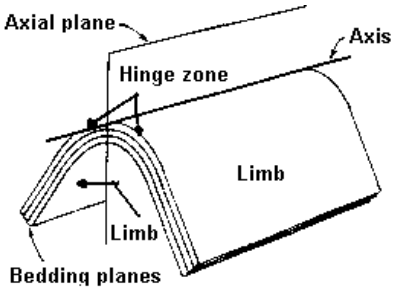
Fourth force:
Vertical uplifting or subsidense



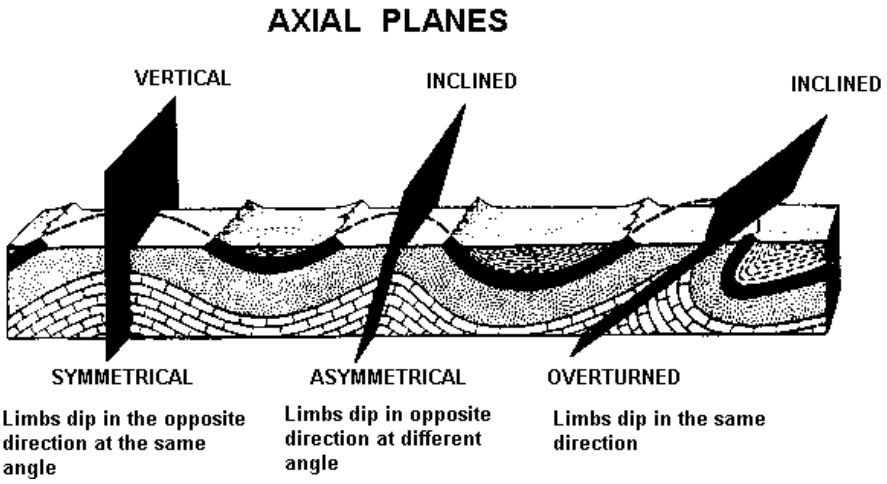
Last



FOLD PARTS	
LIMBS (SIDES or FLANKS)	Non curved parts of a fold
HINGE ZONE	Curved portion of fold
AXIS	Imaginary line that connects points of maximum curvature along the hinge zone
AXIAL PLANE	Imaginary plane that divides the fold as symmetrically as possible
TRACE OF THE AXIAL PLANE	Imaginary line formed by the intersection of an axial plane with the ground surface

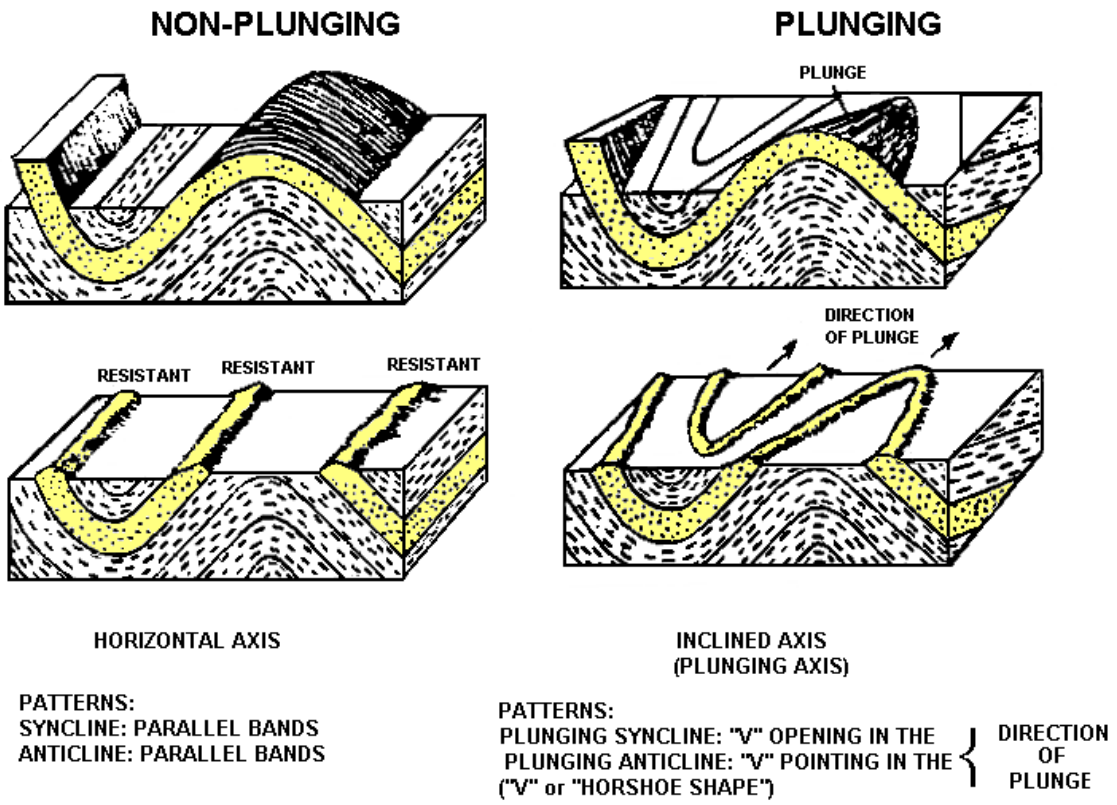


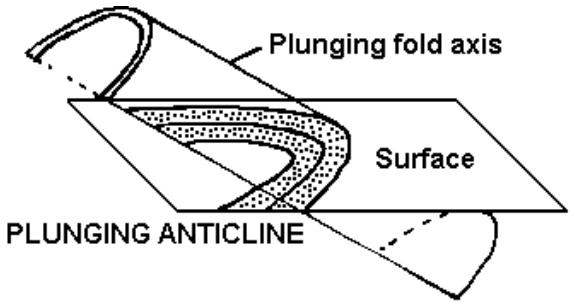
Schematic diagram showing the nomenclature of folded strata.

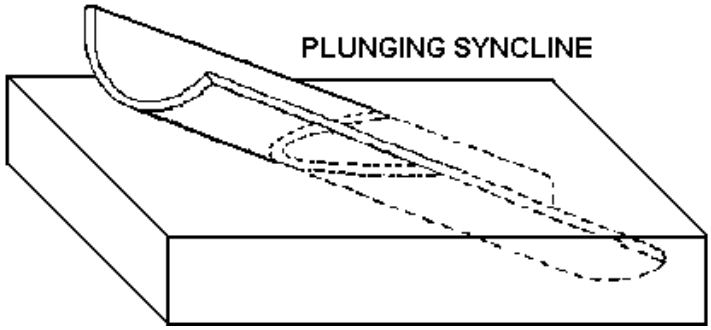


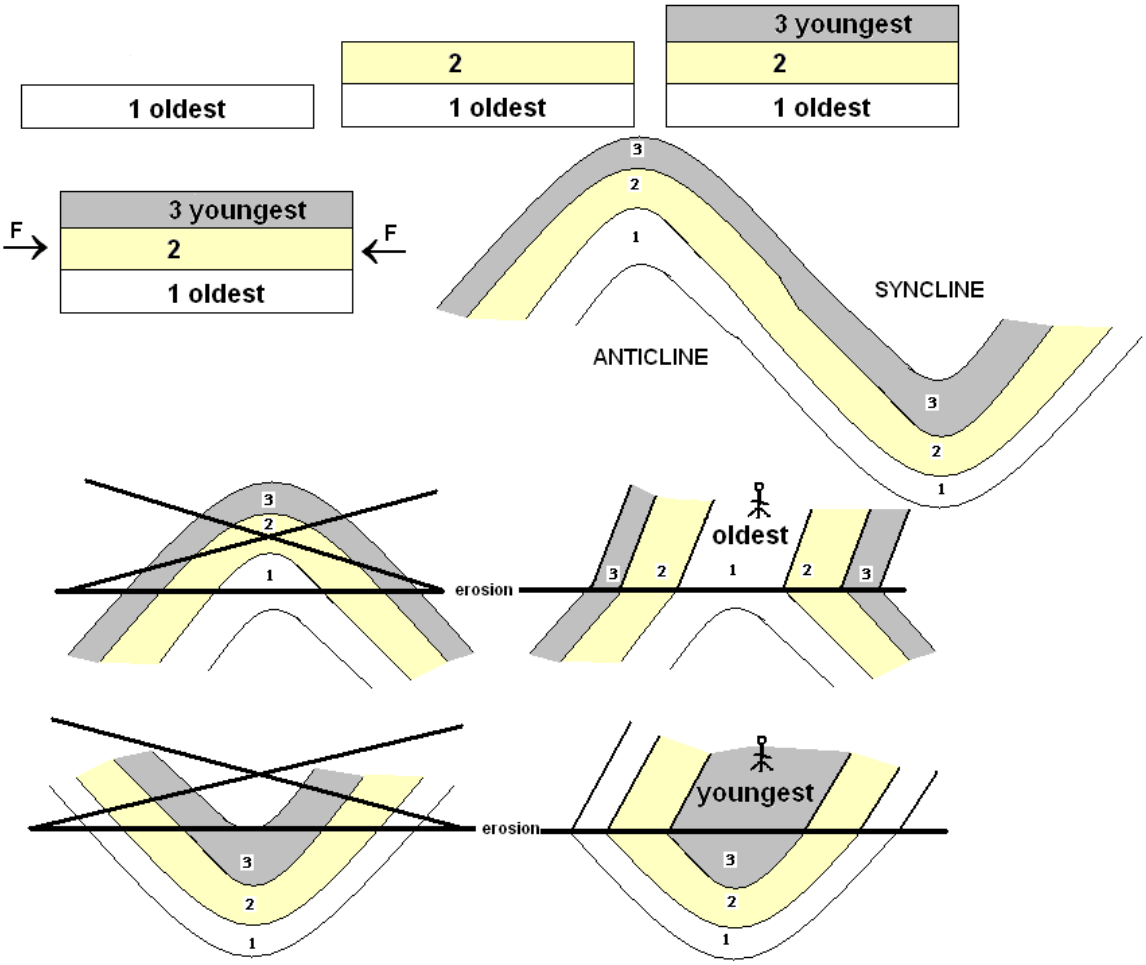
CLASSIFICATION OF FOLDS ACCORDING TO THE **POSITION OF THE AXIAL PLANE**	POSITION OF THE AXIAL PLANE (with respect to the surface of the earth)	ATTITUDE OF THE LIMBS
UPRIGHT **SYMMETRICAL**	VERTICAL	DIP OPPOSITE DIRECTION WITH THE SAME ANGLE OF DIP
UPRIGHT **ASYMMETRICAL**	INCLINED	DIP IN OPPOSITE DIRECTION WITH DIFFERENT ANGLE OF DIP
OVERTURNED	INCLINED	DIP IN THE SAME DIRECTION

CLASSIFICATION OF FOLDS ACCORDING TO THE **POSITION OF THE AXIS**	**POSITION OF THE AXIS** (with respect to the surface of the earth)
NON-PLUNGING	Horizontal (parallel to the surface of the earth)
PLUNGING	Inclined (plunging)




Plunging fold axis
Surface
PLUNGING ANTICLINE


PLUNGING SYNCLINE


1 oldest
2
1 oldest
3 youngest
2
1 oldest
F
3 youngest
2
1 oldest
F
3
2
1
SYNCLINE
ANTICLINE
3
2
1
erosion
oldest
3
2
1
2
3
erosion
youngest
3
2
1
3
2
1

FAULT. A fracture or break in a rock along which movement occurs

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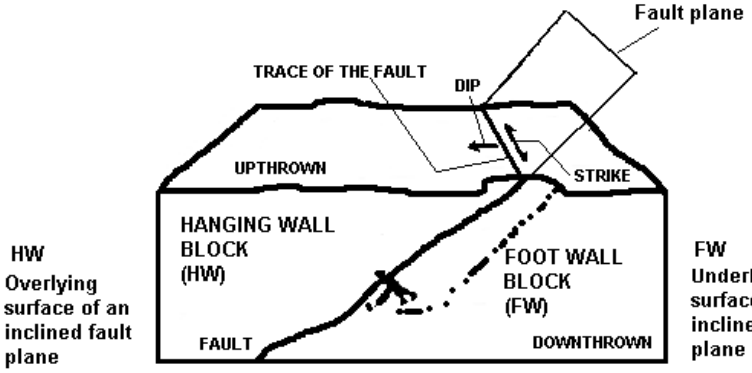
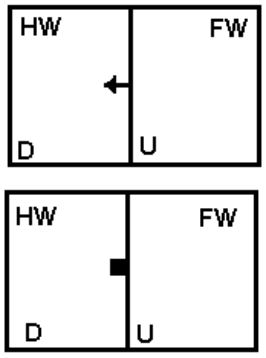
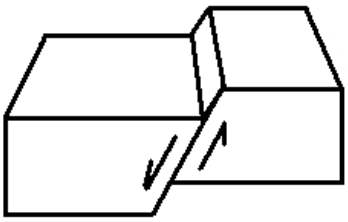
FAULT PARTS		
FAULT TRACE	Imaginary line formed by the intersection of a fault surface with	
FAULT PLANE		
HANGING WALL BLOCK		
FOOT WALL BLOCK		



MAPS

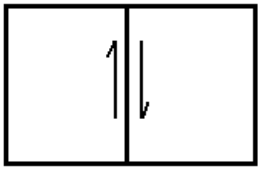


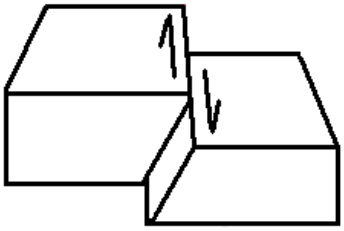
FAULT TYPES



DIP-SLIP
Relative displacement parallel to the dip of the fault plane

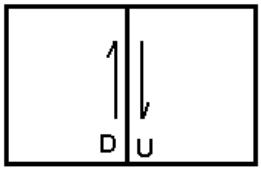
(UP & DOWN)
(Vertical)

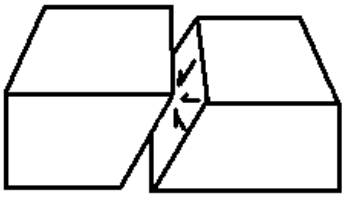




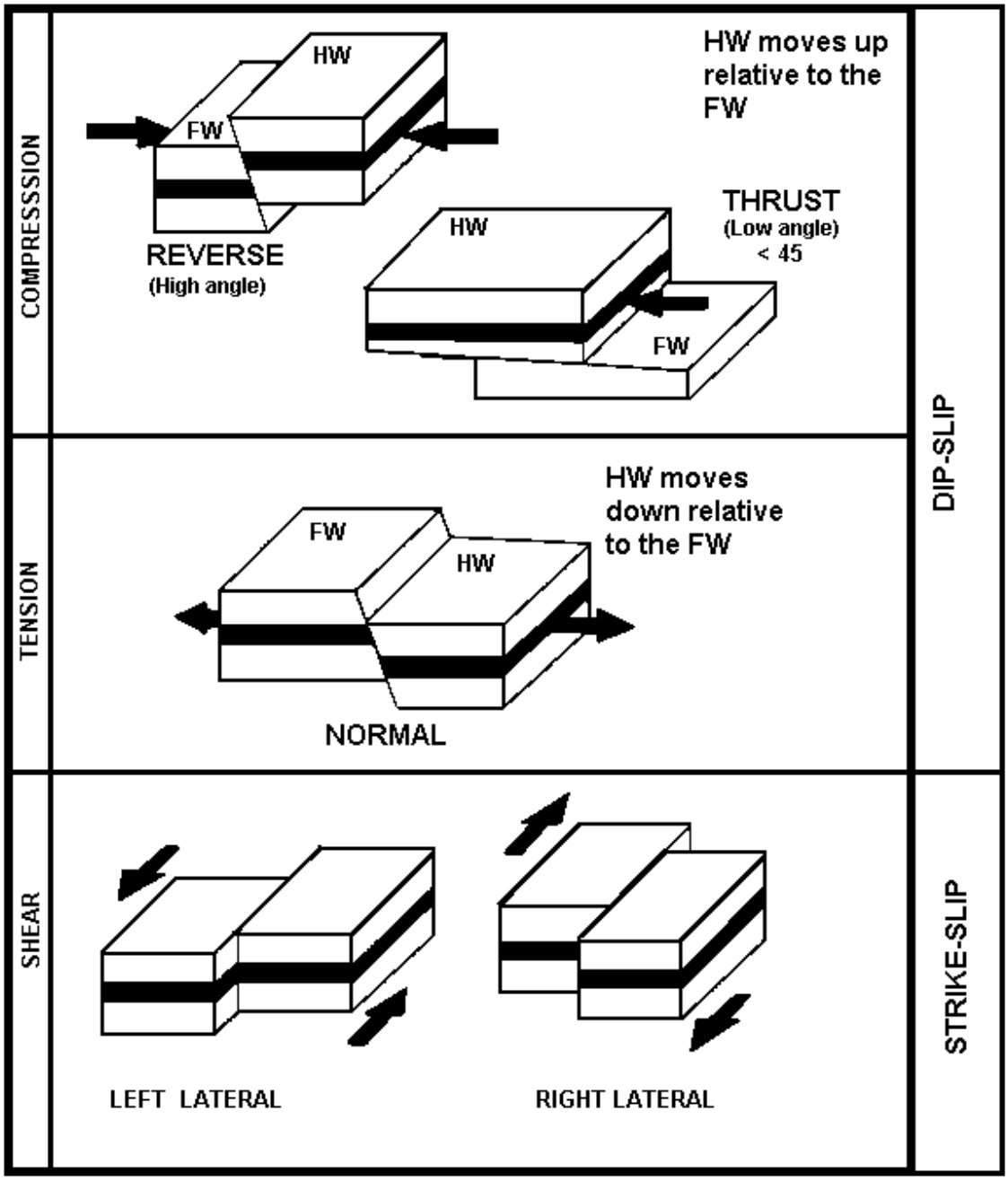
STRIKE-SLIP
Relative displacement parallel to the strike of the fault plane.

(LEFT & RIGHT)
(Horizontal)

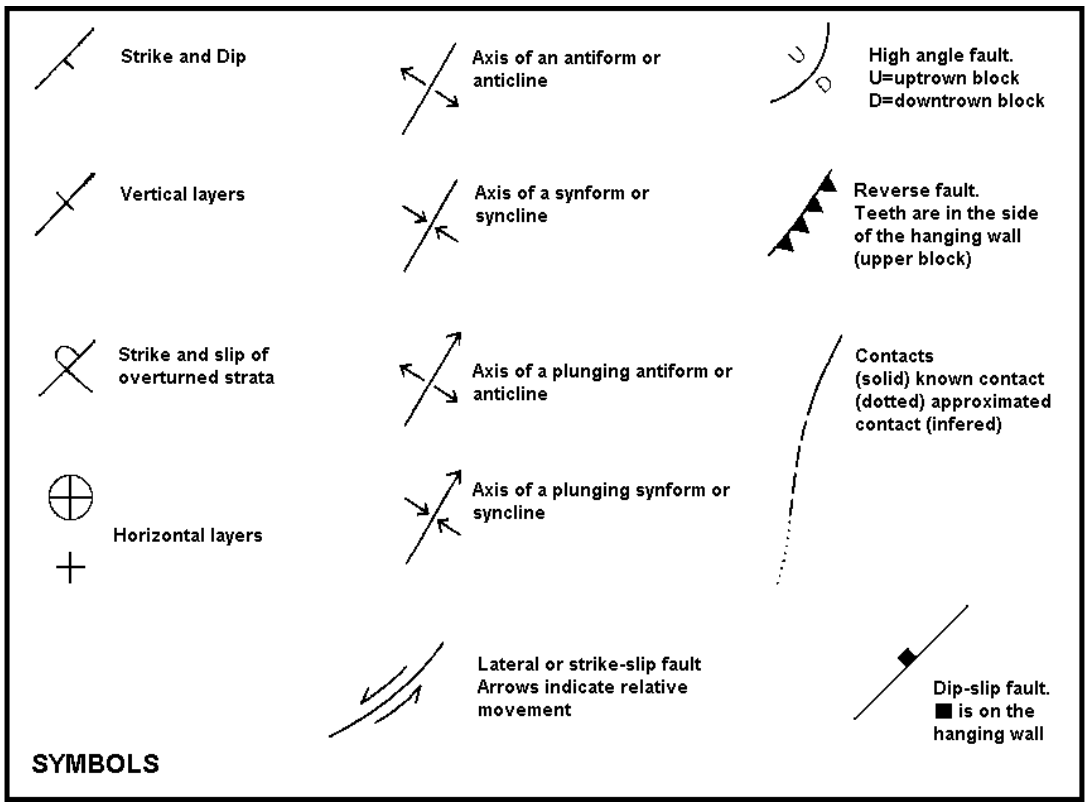




OBLIQUE-SLIP
Movement along the direction of strike and dip (COMBINATION)


COMPRESSSION
TENSION
SHEAR
DIP-SLIP
STRIKE-SLIP
HW moves up relative to the FW
HW
FW
REVERSE
(High angle)
THRUST
(Low angle)
< 45
HW
FW
HW moves down relative to the FW
FW
HW
NORMAL
LEFT LATERAL
RIGHT LATERAL

GEOLOGIC MAP SYMBOLS



NOTES