# www.MINEPORTAL.in

(All Mining Solutions)

DOWNLOAD MINEPORTAL APP FROM GOOGLE PLAY STORE

- **ONLINE TEST SERIES FOR**
  - **DGMS COAL/METAL FIRST & SECOND CLASS**
  - **GATE MINING**
  - **COAL INDIA EXAMS**
  - **OTHER PSUs MINING EXAMS**
- **FREE STUDY MATERIAL-MINEPORTAL NOTES & USER NOTES**
- **MINING VIDEO LECTURES**
- **DISCUSSION FORUM**
- **WHATSAPP CHAT SUPPORT FOR MINING EXAMS & QUERY RELATED TO MINING**

**CALL/WHATSAPP- 8804777500**

**VISITING SITE-** www.MINEPORTAL.in **Facebook-** www.fb.com/mineportal.in

**EMAIL-** INFO@MINEPORTAL.IN

# IIT(BHU) ,VARANASI

# STUDENT'S NOTES

COURTESY:-MAYANK

# MINE DEVLOPMENT

# www.MINEPORTAL.in

- ONLINE TEST SERIES
  - COAL/METAL FIRST/SECOND CLASS
  - GATE MINING
  - CIL MT & OTHER PSUs EXAMS
- STUDY MATERIAL & VIDEO LECTURES

**DOWNLOAD MINEPORTAL APP FROM GOOGLE PLAY STORE**

# GEOLOGICAL TERMINOLOGY

- ORE
- COAL SEAM
- STRATA
- HANGING  WALL
- FOOT WALL
- MINERAL
- HOST ROCK

# GEOLOGICAL TERMINOLOGY

- STRIKE LENGTH
- STRIKE DIRECTION
- DIP
- FOLDS
- FAULTS
- JOINTS

# ORE

- IT IS A NATURAL AGGRIGATE OF ONE OR MORE MINERALS WHICH CAN BE USED FOR ECONOMICAL EXTRACTION OF METAL AFTER PROCESSING TO SEPRATE MINERAL FROM GANGUE.
- Generally, the ore and the gangue are mined together—i.e., taken out of the host rock in a mass by either mechanical or manual means. Then the ore is separated from the gangue by various operations known collectively as mineral processing, or ore dressing. The desired metallic element is then extracted from the ore by various smelting, roasting, or leaching processes.

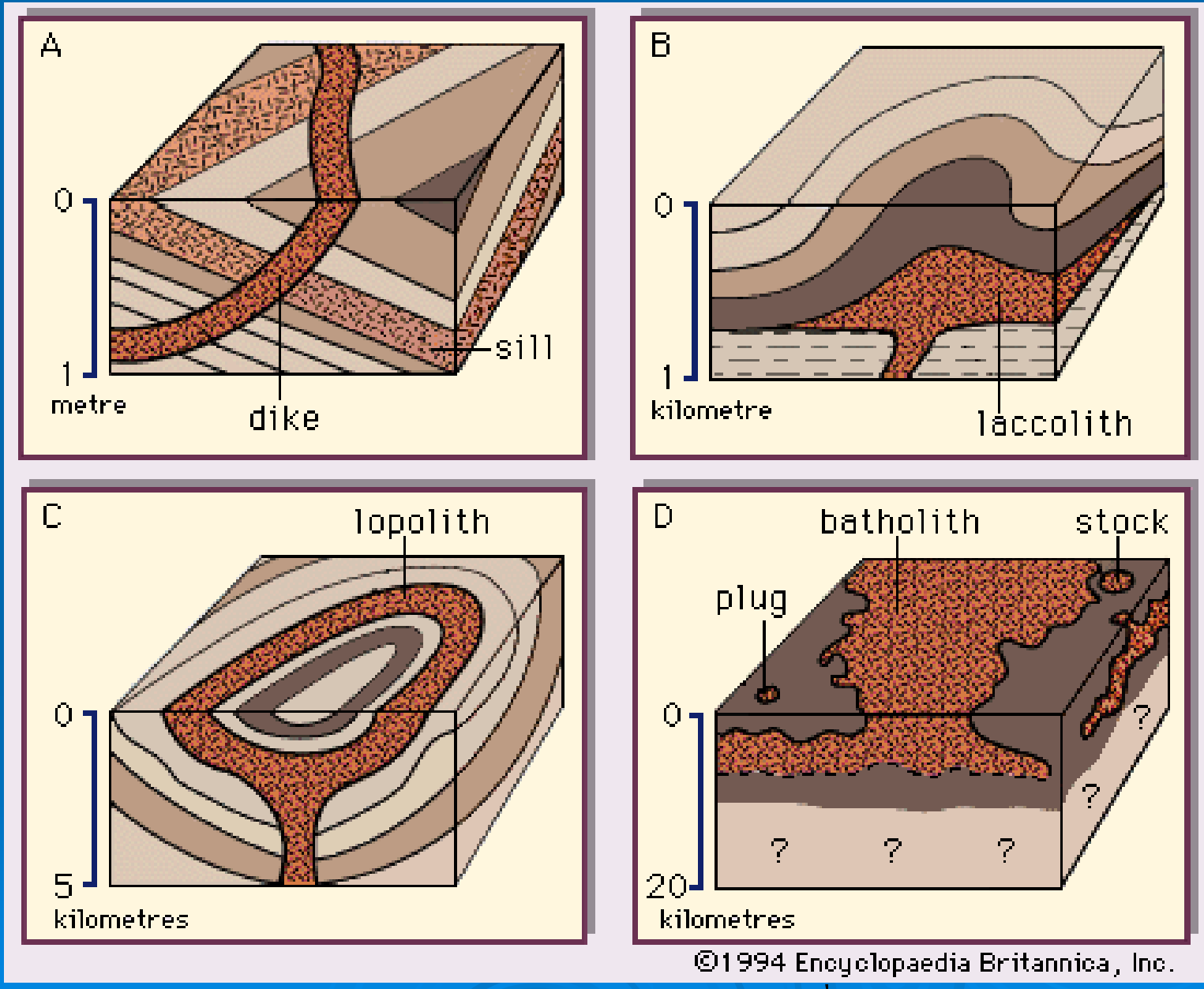
- Although more than 2,800 mineral species have been identified, only about 100 are considered ore minerals. Among these are hematite, magnetite, limonite, and siderite, which are the principal sources of iron; chalcopyrite, bornite, and chalcocite, the principal sources of copper; and sphalerite and galena, the principal sources, respectively, of zinc and lead. Copper, molybdenum, and gold are commonly found in disseminated deposits—i.e., scattered more or less uniformly through a large volume of rock.

# COAL SEAM

- **Coal seam – a seam of coal - a stratum of ore or coal thick enough to be mined with profit.**

# STRATA

- **sedimentary rock layer bounded by two stratification planes, the latter being produced by visible changes in the grain size, texture, or other diagnostic features of the rocks above and below the plane. A stratum that is less than one centimetre (0.4 inch) in thickness is termed a lamina, whereas one greater than this thickness is a bed.**



# HANGING WALL & FOOT WALL

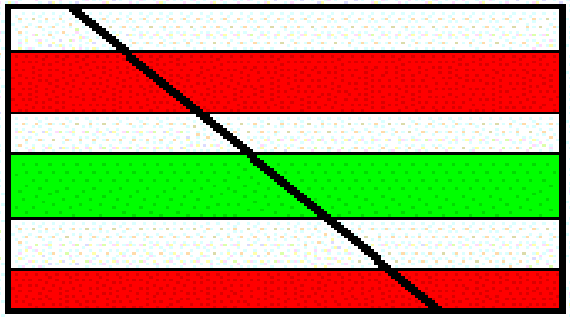
FOOT WALL

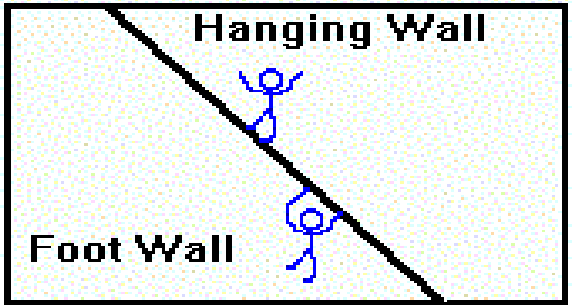
- The block of rock lying under an inclined geologic fault plane.
- The mass of rock underlying a mineral deposit in a mine.

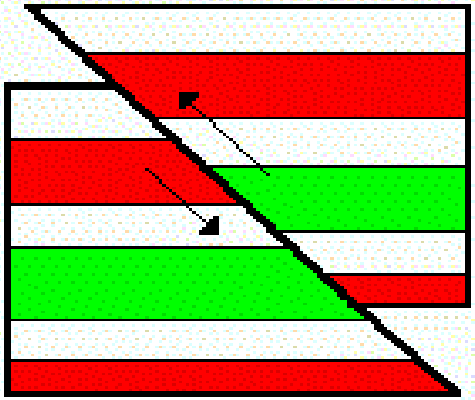
HANGING WALL

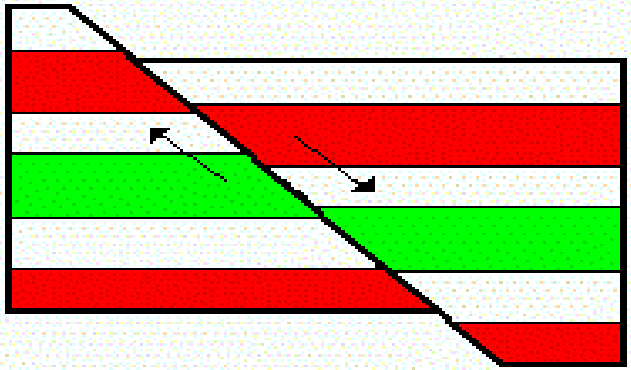
- The overlying block of a fault having an inclined fault plane.

- The mass of rock overlying a mineral deposit in a mine.







Reverse Fault
HW up, FW down
(compressional stress)

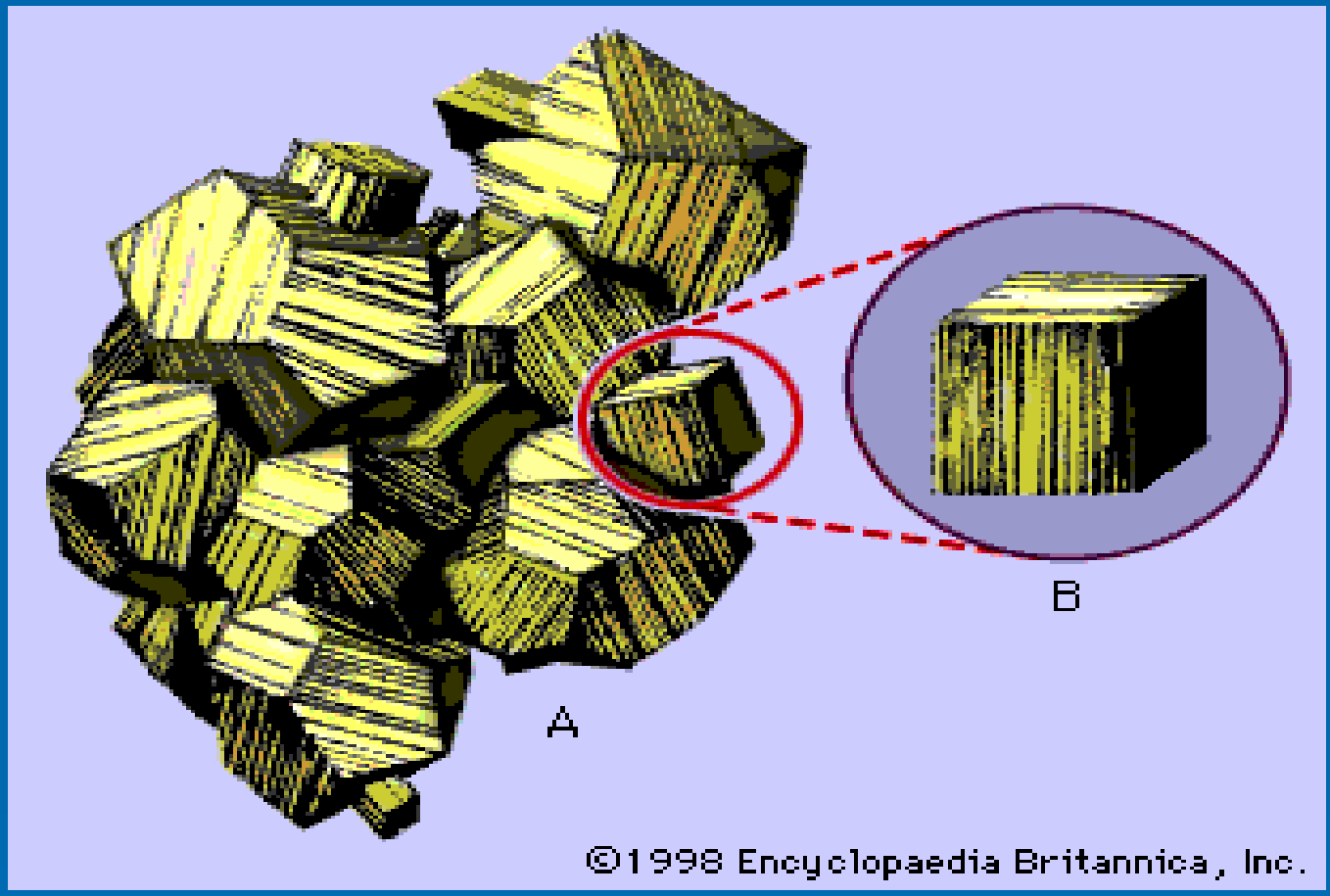
Occurs at convergent plate boundaries

Normal Fault
HW down, FW up
(tensional stress)

Occurs at divergent plate boundaries

# MINERAL

- naturally occurring homogeneous solid with a definite chemical composition and a highly ordered atomic arrangement; it is usually formed by inorganic processes. There are several thousand known mineral species, about 100 of which constitute the major mineral components of rocks; these are the so-called rock-forming minerals.


A
B
©1998 Encyclopaedia Britannica, Inc.

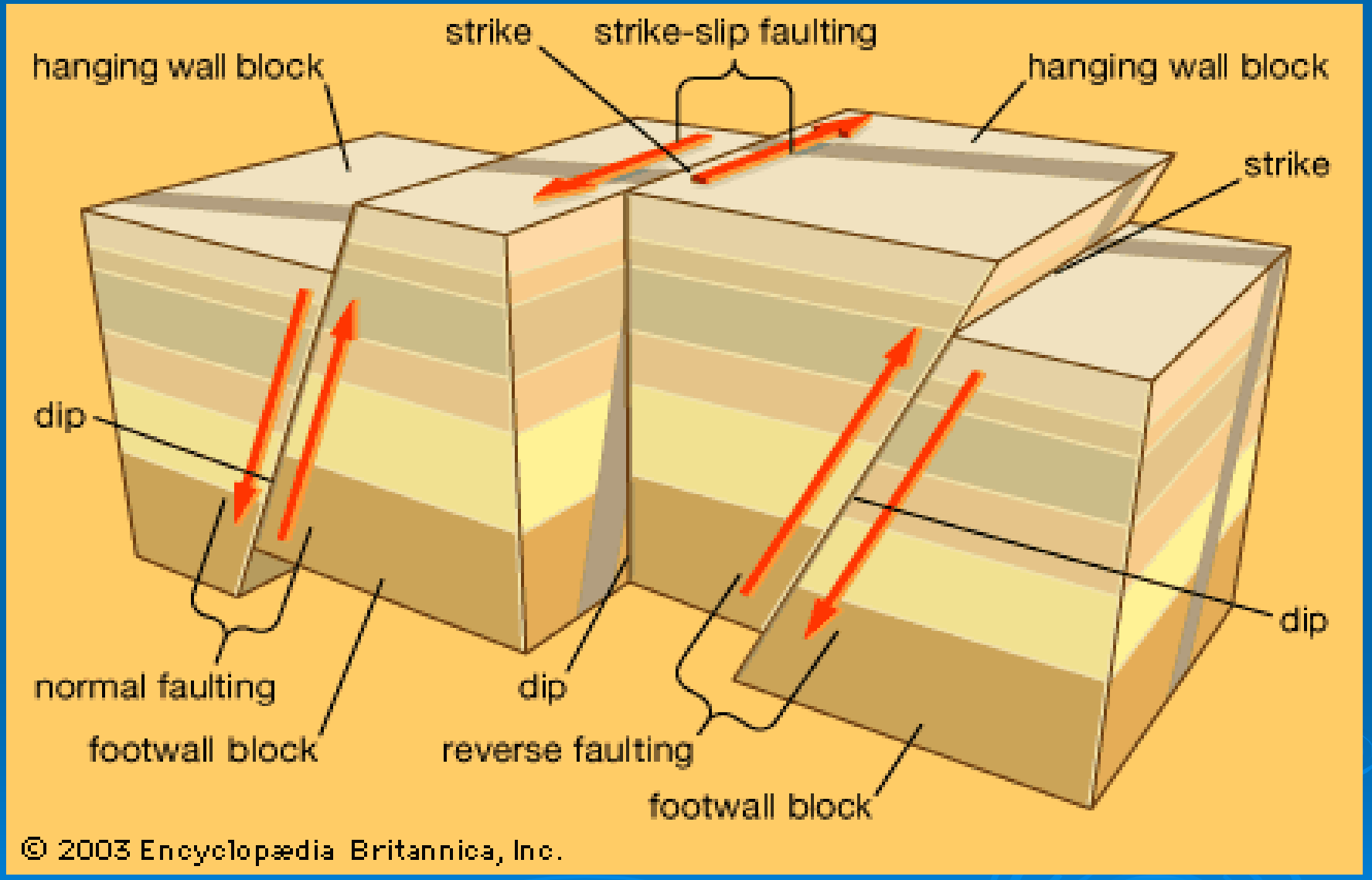
# HOST ROCK

- Rock which serves as a host for other rocks or for mineral deposits.

ruby stone in its host rock

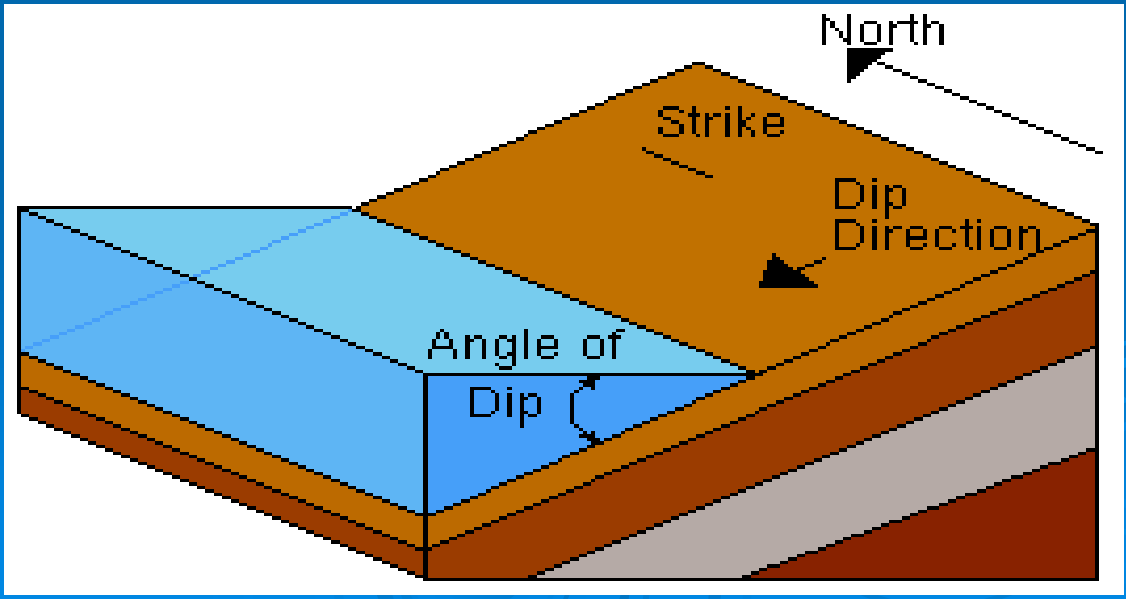
# STRIKE LENGTH & DIRECTION

- direction of the line formed by the intersection of a fault, bed, or other planar feature and a horizontal plane. Strike indicates the attitude or position of linear structural features such as faults, beds, joints, and folds. Trend is the direction of the line formed by the intersection of the planar feature with the ground surface; trend is the same as strike only if the ground surface is parallel to the horizontal plane


strike
strike-slip faulting
hanging wall block
hanging wall block
strike
dip
dip
normal faulting
dip
footwall block
reverse faulting
footwall block
© 2003 Encyclopædia Britannica, Inc.

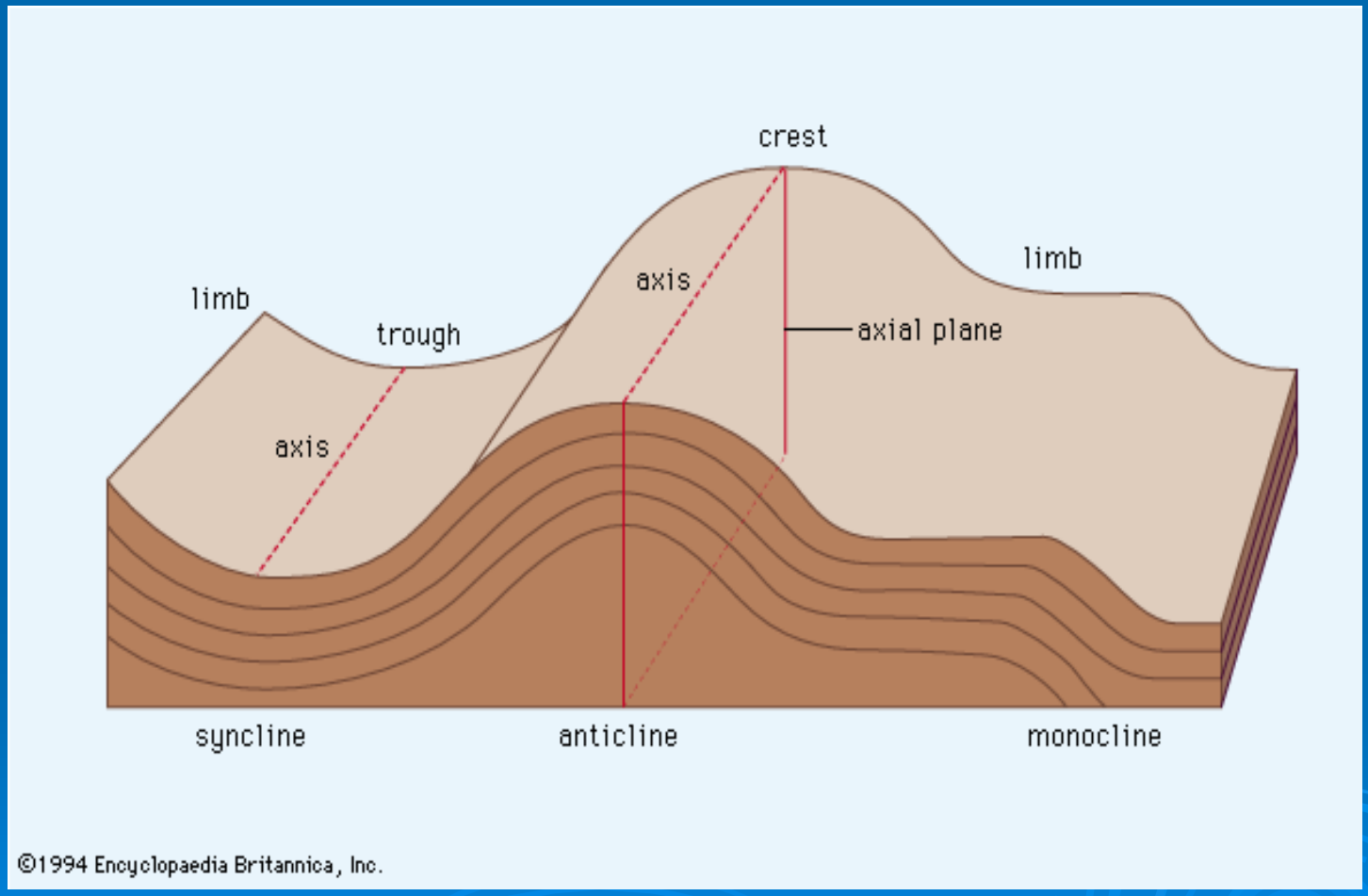
# DIP

- Dip is the angle of the bed with the horizontal plane.
- The dip direction is perpendicular to the strike direction.



# FOLDS

- Stratified rocks were originally formed from sediments that were deposited in flat, horizontal sheets, but in a number of places the strata are no longer horizontal but have been warped. Sometimes the warping is so gentle that the inclination of the strata is barely perceptible, or the warping may be so pronounced that the strata of the two flanks may be essentially parallel or lie nearly flat (as in the case of a recumbent fold). Folds vary widely in size; some are several kilometres or even hundreds of kilometres across, and others measure just a few centimetres or less.


crest
limb
axis
limb
trough
axial plane
axis
syncline
anticline
monocline
©1994 Encyclopaedia Britannica, Inc.

- An anticline is a fold that is convex upward, and a syncline is a fold that is concave upward.
- A symmetrical fold is one in which the axial plane is vertical. An asymmetrical fold is one in which the axial plane is inclined.

# FAULTS

- a planar or gently curved fracture in the rocks of the Earth's crust, where compressional or tensional forces cause relative displacement of the rocks on the opposite sides of the fracture.
- Faults range in length from a few centimetres to many hundreds of kilometres, and displacement likewise may range from less than a centimetre to several hundred kilometres along the fracture surface (the fault plane).

# JOINTS

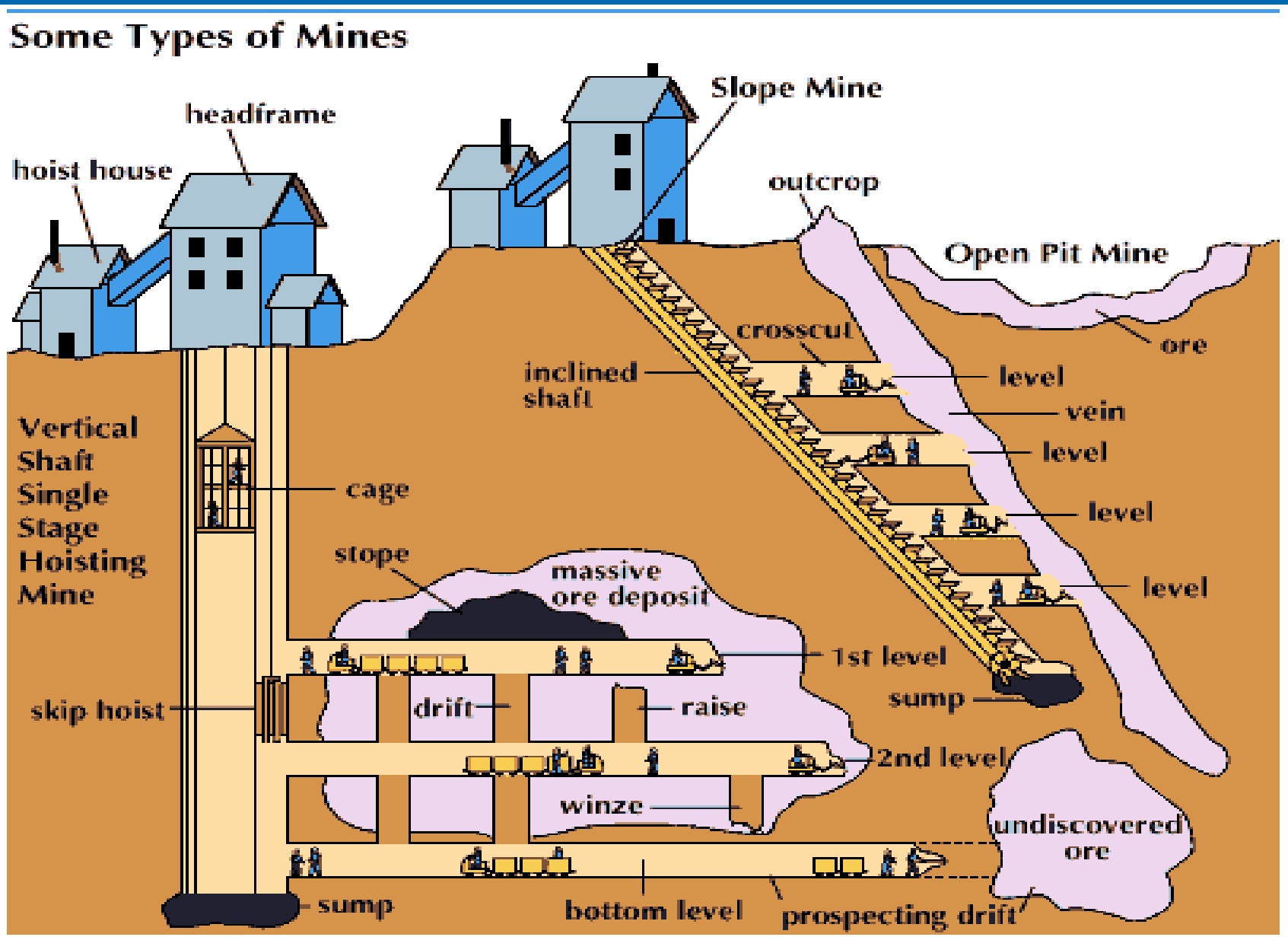
- a brittle-fracture surface in rocks along which little or no displacement has occurred.
- Present in nearly all surface rocks, joints extend in various directions, generally more toward the vertical than to the horizontal. Joints may have smooth, clean surfaces, or they may be scarred by slickensides, or striations.

# MINE ENTRIES

- Shaft
- Incline
- Decline
- Ramp
- Adit

# SHAFT

- All the early coal seams were worked from the surface, in fully exposed outcroppings. In the later Middle Ages, however, exhaustion of outcrop coal in many places forced a change from surface to underground, or shaft, mining.
- shafts had to be restricted to depths of 90 to 105 metres (300 to 350 feet) and a mining radius of 180 metres.


Some Types of Mines
Slope Mine
headframe
hoist house
outcrop
Open Pit Mine
crosscut
ore
inclined shaft
level
vein
level
level
level
Vertical Shaft Single Stage Hoisting Mine
cage
stope
massive ore deposit
1st level
skip hoist
drift
raise
sump
2nd level
winze
undiscovered ore
sump
bottom level
prospecting drift

# ADIT

- a horizontal or near-horizontal passage driven from the Earth's surface into the side of a ridge or mountain for the purpose of working, ventilating, or removing water from a mine.
- the generally lower cost of driving an adit, the saving in the cost of pumping water, and the ease of hoisting ore through the shaft dictate in favour of the adit.
- Adits as long as one to three kilometres (one or two miles) are often economically feasible.
- The size and cross section of an adit depend upon its use, with a horseshoe shape especially common. The walls may be of the natural rough rock or may be lined with concrete, wood, or steel.