

# Mining



## The basics...



- ☞ Mining is the extraction of any valuable mineral or geologic material from the Earth
- ☞ Desired products are extracted from ores, veins, and deposits of materials of mixed value
- ☞ Often the extracted material has to be processed to get the desired final product
- ☞ Necessary for anything we cannot grow or make synthetically



## Main Categories



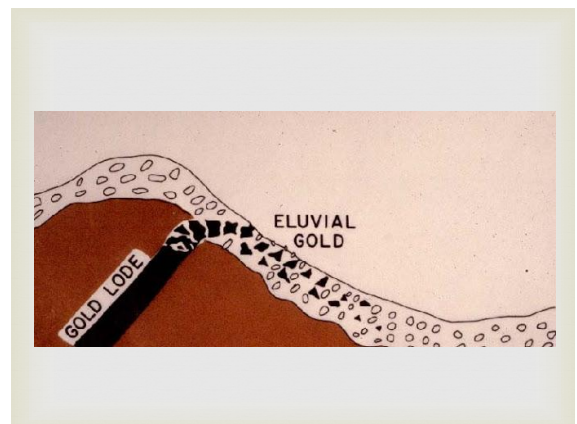
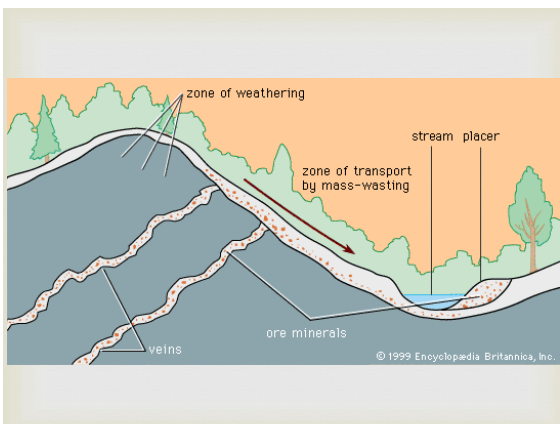
- ☞ Mining breaks down into two main categories...
  - ☞ Surface mining: removal of materials from the surface down
  - ☞ Subsurface mining: also called underground mining. The removal of materials without disturbing the majority of surface conditions



## Mining seeks out two classes of materials...



- ☞ Two main categories of material:
  - ☞ Placer deposits: loose sands, river gravel, unconsolidated materials
  - ☞ Lode deposits: veins of minerals in the Earth have to be dug out
- ☞ Both types of material are mined by both surface and subsurface techniques



## Issues with Mining



- ☞ Mining produces a lot of waste material that is often challenging to replace or reclaim
- ☞ Many types of mining completely destroy the habitats in which they are undertaken, and all at least degrade the environment above them
- ☞ Mining can give off toxic chemicals or leach toxins that were once trapped in rock into the environment and water table



## Surface Mining



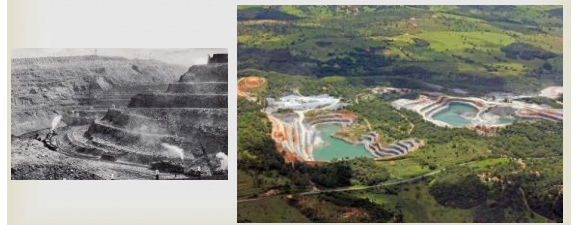
- ☞ Much more common
- ☞ Produces more than 80% of minerals in the US and 98% of our metallic ores



## Open-Pit Mining



- ☞ Exactly like it sounds: giant, open pit in the ground
- ☞ Vegetation above mineral resource is clear-cut and the **overburden** (rock and debris the miners don't want) is removed
- ☞ Pit is enlarged until resource close to the surface is exhausted
- ☞ Reclamation: pit filled and occasionally clayed over to prevent acid leaching
- ☞ How we often get: clays, coal, gold, copper, diamonds, etc.



## Quarrying



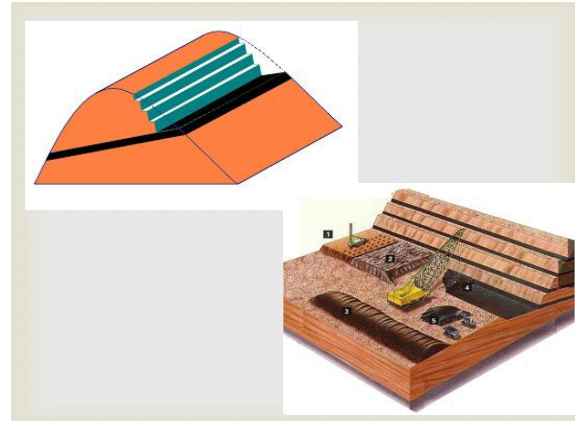
- ☞ A type of open-pit mine primarily for building materials
- ☞ Rocks and blocks are removed in large slabs so that they may be cut and processed into appropriate sizes later



## Strip Mining



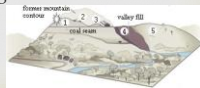
- ☞ Overburden and vegetation are removed in long strips
- ☞ Can be on flat terrain or contoured to hillsides
- ☞ Most commonly used for mining coal
- ☞ Similar environmental problems to open-pit mines



## Mountain Top Removal



- ☞ Mass topographical changes to reach ores and minerals (usually coal) deep in the Earth
- ☞ Miners use explosives to blast mountain tops and dump overburden in surrounding valleys
- ☞ Most destructive, and IMPOSSIBLE to completely reclaim
  - ☞ Reclamation efforts usually are just to stabilize rock and prevent erosion. Nonnative grasses are often planted rather than reforestation







## Subsurface Mining



- ☞ Typical mine-shaft scenario
- ☞ Tunnels are dug usually with hydraulic drills and ore and waste material are brought to the surface
- ☞ Can be more expensive as tunnels have to be stabilized
- ☞ Can be more dangerous because tunnels can collapse

