

LIFE CYCLE OF GOLD MINING



CHAMBER OF MINES
of South Africa

MINING
FOR SCHOOLS

STEP 1 (SURFACE): EXPLORATION



- Geochemical and geophysical techniques are used to find gold-bearing ore deposits
- Geologists drill to check mineral quality
- South African government regulates the mining licence process

STEP 2 (SURFACE): CONSTRUCTION



- The mine site is prepared
- The headgear, shafts and mining, milling and processing infrastructure are constructed

STEP 3 (UNDERGROUND): GOING UNDERGROUND



- Miners, materials and equipment are transported via a vertical shaft as deep as 3.5km
- Open-pit mining extracts ore via surface excavation

STEP 6 (UNDERGROUND): BLASTING AND HAULING



- The stope is blasted and the broken up gold-bearing ore is collected
- The ore is transported to the shaft via conveyers and locos and hoisted to surface

STEP 5 (UNDERGROUND): DRILLING



Drilling begins in preparation for blasting of the reef

STEP 4 (UNDERGROUND): PLANNING



Tunnels are established to open up the earth and the stope face so the gold-bearing reef can be accessed

STEP 7 (SURFACE): TRANSPORTING



The ore is conveyed by conveyer, rail or truck to crushing and milling circuits

STEP 8 (SURFACE): CRUSHING



The ore is fed into a series of crushers and grinding mills to break it down into sand-like particles so the gold can be more easily extracted

STEP 9 (SURFACE): PROCESSING



- The ore particles are combined with water and cyanide and carbon to dissolve the gold and help with its extraction
 - The gold particles attach themselves to the carbon
 - The carbon is stripped from the gold
- Reprocessing
- Most gold mining companies retreat their tailings for gold, uranium and sulphides. DRDGold is a world leader in surface gold tailings retreatment

STEP 12 (SURFACE): CLOSURE AND REHABILITATION



Once the gold reserves at a mine have been exhausted, the owner must close and finally rehabilitate the site. Underground tunnels are stabilised and entrances are sealed off

STEP 11 (SURFACE): REFINING



The doré bars are sent to refineries for refining to a purity of at least 99.5%

STEP 10 (SURFACE): SMELTING



The gold is then heated at high temperature so that it turns to liquid and can be poured to form doré bars