

- Greatest volume and dollar value
 - Brick and concrete construction, paving, sandblasting
 - Glass production
- Child born in 2015 will use >1.4 million kg of minerals during lifetime (fossil fuels + construction material)
- Mining: removal of rock, soil, etc – extracting minerals of economic interest
- Most metals found in ore: mineral/group of minerals from which we extract metals
 - Small proportion of rock, so large amounts of material removed to obtain
 - Mining disturbs large areas of land + severe environmental impacts
- Processing methods very water and energy-intensive
 - Smelting: Heating ore beyond melting point + combining w/ chemicals to extract metal
 - Chemical reactions and heating emit air pollution
 - Tailings (portions of ore left over after extraction) pollutes surrounding area
- Aim of reclamation = restore site to a condition similar to condition before mining
 - Removing buildings and other mining structures
 - Replacing overburden
 - Filling in mine shafts
 - Replanting vegetation
- 1977 Surface Mining Control and Reclamation Act requires U.S. companies to cover costs of mining reclamation before permits are approved
- Magnetic and luminescent properties of rare earth elements (REE) make them essential components of digital and low carbon technologies
- Crustal abundance of light REE same as copper; less abundant heavy REE more abundant than gold
 - China controls Neodymium's global supply

How Do Humans Use The Earth's Surface?

- Land Cover: Physical or biotic nature of a site (e.g., forest, grassland)
- Land Use: Way humans use land
- 50% of Earth's ice-free land surface = transformed, managed or used by humans
- 40% of potential terrestrial plant growth (NPP) of Earth used or dominated by humans, or foregone as a result of land use change
- Grassland, timber production, cropland, recreational/wildlife lands

Public lands in the U.S.:

- Of the US's land, 42% is publicly held
- Federal government = largest landowner in U.S., 240 million hectares (25%)
- Government has adopted principle of multiple use in managing public land
- Most of the forested land in the western United States is on public land.

What is Soil, and Where Does it Come From?

- Soil: mixture of weathered rock, mineral particles (sediment), dead/decaying plant + animal matter, and organisms that live within these materials
 - Made by processes at Earth's surface (lithosphere, atmosphere, hydrosphere + biosphere interact) breaking down *parent material* to particles
 - Air spaces around particles (pores) allow water to move into soil via infiltration