Mining

Mining in Canada

Canada is rich in minerals. As a result, mining is an important part of our economy.

Employment in Mining

- There are 2 types of employment:

1. **Direct** – refers to jobs where people actually work in the mines
2. **Indirect** – includes jobs in **supply** and **service** industries that meet the needs of mining companies and employees.
   - Selling, servicing equipment, transporting the minerals, smelting and refining the metal ores, etc.
   - Don't forget grocery stores, medical offices, insurance brokers, etc.

Employment in Mining

Over the years, the number of Canadians **directly** involved in the **primary industry** of mining has **decreased**, while the value of production has steadily **increased.**

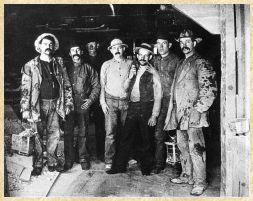
Why?

Workers ↓ Production ↑ Why?

1. **Global competition** has forced mining companies to become more **efficient**.
2. **Computer technology** and **advanced equipment** have combined with other labour-saving devices

- In 1961, the average mine worker produced $27,000 worth of minerals. By 1992 rising prices and increased production had raised this figure to $382,000.

Multiplier Effect



The **Multiplier Effect** (Ripple Effect) is the total impact on the economy that results from the expansion of one of its parts.

Multiplier Effect

- For example, opening a new mine might create 500 jobs **directly** and another 1500 **indirectly**. These indirect jobs could be in either in mining, or in another industry.
- Therefore, in this example, the multiplier effect is 3. So, for every job created in mining, 3 more are created in **other parts of the economy**.
- The multiplier effect is also active in other countries. Canada exports **approximately 80%** of its minerals. These need to then be processed, therefore, jobs are then created in other countries.

Mineral Deposits and Locations

Mineral Deposits and Locations

- Some minerals contain metals or non-metals that are useful to people.
- Minerals are classified into four categories. Each category is generally associated with either **metamorphic, sedimentary or igneous rock.**

Terms to know:

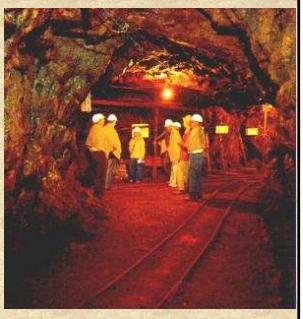
- **Minerals** are **naturally occurring** substances found in rocks, soils, or sediments.
- **Mineral deposits** that are large enough to be mined profitably are called **ores**.

Terms to be familiar with:

- ***Metamorphic Rock:*** Is rock that has been transformed by heat or pressure beneath the earth's surface.
- ***Sedimentary Rock:*** Rocks composed of sediments, usually formed in layers.
- ***Igneous Rock:*** Is very hard, impervious rock formed from molten magma beneath the earth's surface.

Mineral Categories

1. Metallic Minerals
2. Fuel Minerals
3. Industrial Minerals
4. Structural Minerals



Metallic Minerals

- Most often associated with **Intrusive Igneous Rock**
- Once contained in **magma** but later forced up to earth's crust through **fissures**.
- Super heated **brines** dissolved the metallic elements from the magma and flowed into these fissures where they cooled and formed **veins of ore**
- They are large enough to be mined profitably and are called **Ore Bodies**
- Include gold, silver, lead, copper and zinc

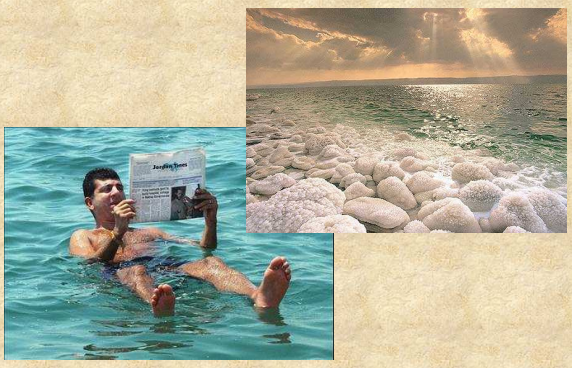
Fuel Minerals

- Almost all of this type is found in **Sedimentary Rock**
- Formed from **remains of living organisms** transformed over time by **heat** and **pressure**.
- Formed into coal, oil or natural gas.
- Referred to as **Fossil Fuels**

Industrial Minerals

- Found mainly in **Sedimentary Rock**
- Formed in shallow seas located in regions with **hot, dry climates.**
- As water evaporated, became more & more **salty**
- Salt became so **concentrated** that it built up on the sea bottom in **layers**, sometimes completely drying the sea
- This left behind **non-metallic mineral** deposits such as gypsum, potash, or rock salt
- Seen in Great Salt Lake in Utah, the Dead Sea in Israel & Jordan

Dead Sea



Structural Minerals

- Sand, gravel and clay are results of **wind, river and glacial deposition**.
- Associated with all rock types and are used mainly as **construction materials.**

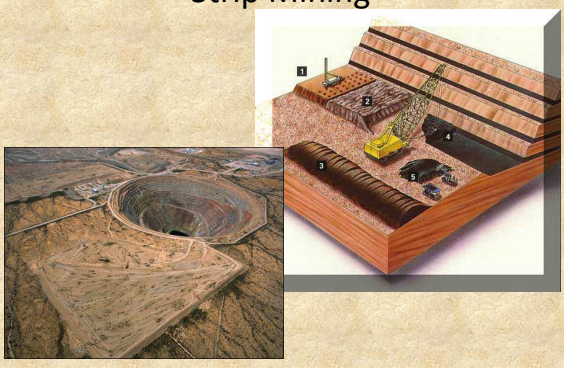
Strip Mining

- Is used to extract minerals, such as coal and oil sands, that are located in horizontal layers near the surface.
- Overburden (trees, earth, rock) is removed.
- Blasting may be necessary for some mineral deposits.

Strip Mining Cont'd

- Material is loaded onto trucks or conveyor belts by shovels or draglines.
- Material is taken to storage area for shipment to market or processing.

Strip Mining



Open Pit Mining

- Is used to extract minerals that are located near the surface but that may extend deep into the earth.
- Overburden is removed.
- Holes are drilled 10-15m deep and filled with explosives. The rock is blasted apart

Open Pit Mining Cont'd

- Ore is loaded into large trucks (which may carry 90 to 250 t) by huge shovels.
- Ore can now be taken to a storage site near the mill.

Open Pit Mining

Underground Mining

- Is used to extract mineral ores located deep in the earth.
- Miners take an elevator (cage) from the headframe down to the working area (stope).
- Holes are drilled in the rock face at the stope and filled with explosives.

Underground Mining Cont'd

- The explosive is set off by an electric charge. The rock is blasted apart.
- After the blast, miners test the walls and ceiling. Rock bolts or timber supports are used to prop up weak areas.

Underground Mining Cont'd

- Blasted rock is called 'muck'. Front-end loaders or small trains remove the muck to a central underground location. The muck is dropped down a large hole (ore pass) to the crusher.
- The muck is crushed and loaded onto a hoist, called a skip. The skip lifts the ore to the surface.

Underground Mining

Mining Methods