

MINERALS/ROCKS



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What are They?

Anything solid that is not animal or vegetable can be called a mineral. Minerals have characteristic chemical compositions and physical properties. Gold is a mineral, and so is salt. Rocks are made up of one or more minerals, and have varying compositions and properties depending on the minerals in them, and how they were formed. Shale is a type of rock, and so is granite.

Gifts from the Land

Rocks and minerals are essential for making the things we use each day. As you read this, look around. Almost everything you see—the building, your chair and table, the picture frame and the glass in it—all have been made using minerals mined from the Earth. Even if what you see is made of wood, then its manufacture and delivery

was made possible only by using Earth

resources. We couldn't generate electricity without minerals. Minerals also help put food on your table – fertilizers from minerals help fruits and vegetables grow. In Canada, we are fortunate to have huge resources of all kinds of minerals: more than 60 are mined. The mining industry is a major employer, supporting more than a million Canadians.

Polaris Mine Cafeteria, Nunavut



S. McCracken, NRCCan



S. McCracken, NRCCan

Twin Otter, Griffith Island, Nunavut

For 10,000 years?

People have been mining in Canada for a long time. The first people who arrived about 40,000 years ago used minerals and rocks to make tools, weapons, and decorative objects. On Manitoulin Island in Ontario, quartzite was mined from a quarry 10,000 years ago. From about 7500 to 3500 years ago, the Maritime Archaic people of Labrador were mining Ramah chert and trading it as far south as the northeastern United States! And more than 5000 years ago, people in the Lake Superior region were trading in copper. Much later, European settlers used local materials, such as stone, clay, sand, and lime for building. In 1639, the first coal mine in North America was opened in New Brunswick. In Quebec, iron ore was first smelted for iron in 1737. Canada's first gold rush was triggered by the discovery of gold on the Queen Charlotte Islands of British Columbia in 1862.



GSC A94S0081

Copper slab, Victoria Island



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Ramah chert biface and two projectile points, northern Labrador, Newfoundland and Labrador

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What is Mined in Canada?

Metals like copper and gold, precious stones like diamonds, and industrial minerals like gypsum, are all mined in Canada. There are many ways to classify mineral and rock resources, but one simple way is to use three groups:

- **Metallic Minerals**
- **Industrial Minerals**
- **Precious and Ornamental Stones**

Some fall into more than one group. For example, diamond is used industrially as an abrasive, and of course it is precious and ornamental. Gold is metallic, but it is also precious, ornamental, and has important industrial uses.

Big Nickel Monument, Sudbury, Ontario



EMR-7968

Gold bars at Inco's refinery



EMR-8234



NRCCan-3189

Zinc ore processing, Langlois mine, Quebec



EMR-5648

ESSO petrochemical refinery, Cold Lake, Alberta

Metallic Minerals are used to make metals. Precious metals (noble metals) like gold and silver are relatively rare, and because of their desirability, they have high value. Base metals (such as iron, copper, lead, zinc, and nickel) have lower value because they are more common. Inexpensive jewellery can be made with a 'base' of copper or nickel, and 'plated' with gold.



Rare Earth Elements in monitor, DVD burner, hard drives

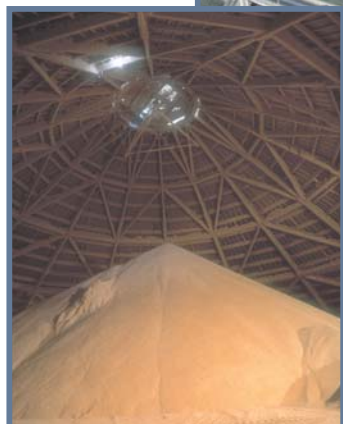
B. Rutley, NRCCan

When we think of platinum we most often think of jewellery. But the Platinum Group Metals (PGM) have many uses in the petrochemical and automotive industries. Rare Earth Elements (REE) such as yttrium and scandium are not especially rare in the Earth's crust, but they are rarely concentrated in one place. The REEs are important because they are critical in the production of lasers, TV screens and computer monitors, supermagnets in computer drives, and environmentally friendly rechargeable batteries.

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Industrial Minerals are abundant and have many uses. Salts from ancient seas are used in fertilizer (potash) and as flavouring in our food (halite). Halite is also an important ingredient in the chemical industry. Drywall is made from gypsum. Stone cladding on buildings is called dimension stone and includes limestone, like that quarried at Garson, Manitoba, and labradorite from near Nain in Labrador.

There are more than 3000 stone quarries and sand and gravel pits in Canada. Sand and gravel (aggregate) are used in road and rail construction, and building foundations. Clay is used to make bricks and tiles.



Potash storage, Esterhazy, Saskatchewan

Décarie-Metropolitan Boulevard interchange, Montreal, Quebec



GSC F92/S0100

EMR-7141

Garson quarry, Manitoba



G. Nowlan, NRCan



Labradorite. Artist Jamie Meyer

B. Rutley, NRCan

Precious and Ornamental Stones are pretty. Some dimension stones, such as labradorite and Tyndall Stone, can be called ornamental if they are carved or sculpted. Jade from British Columbia, amethyst from northern Ontario, pyrophyllite from Newfoundland, and serpentinite from Nunavut are made into

jewellery and ornaments by artists. Canada is one of the world's leading producers of diamonds, which are mined and cut in northern Canada. Other important gemstone discoveries include emeralds in Yukon and Ontario, sapphire on Baffin Island, aquamarine in Yukon, and ammolite (shell of ammonites) in Alberta.



Jade

British Columbia Geological Survey Branch



Emeralds

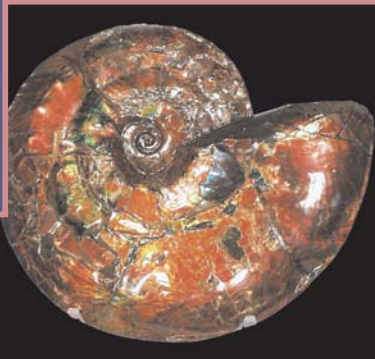
Image compiled by Dillmedia © True North Gems Ltd.

Amethyst



GSC 199/1542

© Canada Fossils Ltd.



Ammonite fossil



Pyrophyllite, Manuels, NL Artist Nathaniel Thomas Noel

B. Rutley, NRCan

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What is Responsible Use of Resources?

Despite its huge influence on Canada's economy, mining disrupts very little of the land. Less than 3000 km² of Canada's land area (that's less than 0.03%) has been used to produce minerals and mineral products. These days mined areas can be returned back to almost the way they were before mining began. It hasn't always been this way, but people and mining companies understand environmental responsibility better now. Even reusing resources has become an industry. Millions of tonnes of metals and other minerals are recycled annually.



Reclaimed open pit, Luscar Mine, Elk Valley Coal Corp., near Hinton, Alberta

G. Nowlan, NRCan



Metal for recycling

NRCan



Sulphur at Shell Canada's Waterton Gas Complex, Alberta

EMR-6892

An example of using resources in an environmentally responsible way has been the recovery of sulphur from sour gas. This is natural gas that contains hydrogen sulphide. This hydrogen sulphide can be removed and converted to sulphur, which is a valuable resource. Almost 90 per cent of sulphur produced in Canada is from gas deposits in Alberta. It has many uses – pharmaceuticals, fertilizers, asphalt, matches, paints, detergents, glass, steel, plastics, and many others.

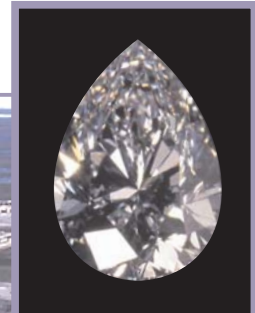
Opportunities in the North

Exploration is taking place now in northern Canada. Diamond mining is a relatively new but major industry, and it is centered in the north. Discoveries of other minerals have led to new mines in northern Quebec and Labrador. And exploration for other precious stones such as emerald and sapphire is going on in northern Canada. Learning more about the geology of the land will allow its hidden gifts to be discovered and turned into opportunity and wealth.



Panda Pit, Ekati Diamond Mine, NWT

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