

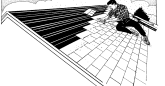

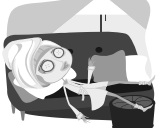



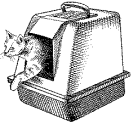


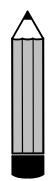








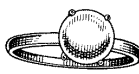
Uses of Industrial Minerals Mined in British Columbia

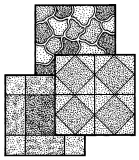
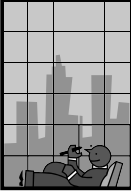



| Commodity | What it is | Main Uses |
|------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Aggregate / light weight aggregate | Loose <i>rock</i> that can be either river/beach sand or gravel, or crushed hard rock (e.g. granite, limestone) or loose volcanic rock fragments | Commonly used to build roads and make highways, to make asphalt and concrete, as railroad ballast and to improve icy and snowy road surfaces.  |
| Andesite | A fine-grained <i>igneous volcanic rock</i> , intermediate in composition (and colour) between basalt and rhyolite, commonly with crystals of plagioclase feldspar. | Used in BC as a building stone. |
| Barite | An <i>ore mineral</i> (BaSO_4) most commonly found in sedimentary rocks such as limestone or dolostone; locally occurs in veins. | Commonly used as a filler and whitener in paint, is used to increase the specific gravity (weight) of drilling mud, and is ingested to conduct x-ray diagnostic tests on the human digestive tract.  |
| Basalt | A dark-coloured, fine-grained <i>igneous volcanic rock</i> ; may have vesicles (trapped gas bubbles) like pumice, but is very dense and heavy. | May be crushed into granules that are used to make asphalt roofing shingles. Larger basalt pieces are also used in landscaping.  |
| Bentonite | A soft, light-coloured clay that forms by the weathering of a volcanic ash layer, mostly made of an expandable clay <i>mineral</i> named montmorillonite ($(\text{Na,Ca})_{0.33}(\text{Al,Mg})_2\text{Si}_4\text{O}_{10}(\text{OH})_2 \cdot n\text{H}_2\text{O}$). | Commonly used in drilling mud and as a sealing agent. It is also used to make kitty litter and other absorbents used in industry and agriculture.  |
| Clay ¹ (Medical) | A soft, very fine-grained sedimentary deposit, not completely compacted or cemented enough to be called a rock, which may be bentonite clays, Fuller's Earth or other absorbing clays. | Used for facial masks.  |
| Dimension stone | Refers to any number of sedimentary, metamorphic, and igneous rocks, especially sandstone, granite, and marble that can be cut in different sizes and used in construction in various ways | Used as decorative rock, <i>ashlar</i> (rectangular block of chiseled stone used in buildings), and facing rock. Cut pieces of solid rock are used to face buildings, make monuments, and to make floor tiles and countertops.  |
| Dolomite | A <i>mineral</i> ($\text{Ca,Mg}(\text{CO}_3)_2$) that makes up the sedimentary rock dolostone. | A source of lime (calcium oxide) and magnesium, used to neutralize acidic soils, as a flux in steelmaking, as an ingredient in glassmaking, in cement production, fertilizer, and paint.  |
| Fireclay | A type of shale (<i>sedimentary rock</i>) that is made up of aluminum-rich clay minerals such as kaolinite and montmorillonite (see above), and the very fine mica-like mineral illite. | Used to make refractory ceramic products such as crucibles and firebrick. Refractory minerals are resistant to extreme heat and exposure to corrosives. The clays provide excellent thermal insulation; fireclay bricks are used to line kilns, smelting vessels and containers used in pulp and paper, chemical, mining, water treatment and food making processes.  |

¹ Clay (Medical) is currently (2010) not mined in BC.

| Commodity | What it is | Main Uses |
|-----------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Flagstone | Refers to rock that can easily be split into flat pieces, commonly, but not always referring to a <i>metamorphosed</i> sedimentary rock – slate, phyllite or schist. | Used to make floors, and to build retaining walls (layers placed horizontally one on top of another), to build fireplaces or make sidewalks and pavements. |
| Fuller's Earth | An earthy material containing clay <i>minerals</i> , mostly <i>montmorillonite</i> and commonly some <i>bentonite</i> . | Used to make household and industrial absorbents (e.g. kitty litter); used for refining and decolourizing fats and oils, absorbing skin oils in clay facial masks and as a natural bleach. Also used as a carrier for pesticides, and an anti-caking additive to animal feed.  |
| Gabbro | A dark-coloured, coarse-grained <i>igneous plutonic</i> rock made mostly of calcium-rich plagioclase feldspars and iron-magnesium rich silicate minerals. | May be quarried in large pieces that can be cut and polished for interior floor tiles and counter tops or cut for facing stones on buildings or tombstones and monuments. Crushed and used in BC for railway ballast. |
| Gneiss | A coarsely-crystalline <i>metamorphic rock</i> with distinctive dark- and light-coloured mineral bands, commonly derived from granitic or coarse-sedimentary parent rock. | May be quarried in large pieces that can be cut and polished for interior floor tiles and counter tops or cut for facing stones on buildings or tombstones and monuments. |
| Granite | A light-coloured, coarse-grained, <i>igneous plutonic</i> rock that is made up mostly of potassium feldspar and quartz, plus mica and hornblende. | May be quarried in large pieces that can be cut and polished for interior floor tiles and counter tops or cut for facing stones on buildings or tombstones and monuments. Crushed at some BC quarries to make aggregate for road base and to make concrete.  |
| Granodiorite | A coarse-grained <i>igneous plutonic</i> rock similar to but generally darker in colour and poorer in quartz than granite, and which also contains mostly feldspar minerals plus mica, and hornblende. | May be quarried in large pieces and used in ways similar to granite. In south central BC and elsewhere it may be melted and spun to form mineral wool insulation.  |
| Graphite ² | A <i>mineral</i> composed of carbon (C) which most commonly occurs in <i>metamorphic</i> rocks. It can be found as large crystalline plates or small flakes. | Used in pencil lead, in automobile gaskets and brake linings, in high technology electrical circuitry, in fuel cells, in sports equipment, as a flame retardant in paint and carpet, as a high-temperature lubricant, in refractory bricks, and many other specialty applications.  |
| Gypsum | A soft, white evaporite <i>mineral</i> (CaSO ₄ -2(H ₂ O)), which makes up a layered <i>sedimentary rock</i> also called gypsum. | A main ingredient in wallboard and building materials, plaster of Paris, and Portland Cement. Also ground and used as a soil conditioner to allow water and air to penetrate the soil, and to prevent it from compacting and losing its leaching ability. Gypsum is also used as a filler in paint.  |

² Graphite is currently (2010) not mined in BC.

| Commodity | What it is | Main Uses |
|-----------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Jade | The common name for the <i>minerals</i> jadeite (Na (Al, Fe)Si ₂ O ₆) (a type of amphibole) and nephrite (Ca ₂ (Mg, Fe)5Si ₈ O ₂₂ (OH) ₂) (a type of actinolite) which form by metamorphic alteration of other sodium- and calcium-rich minerals. | This hard, green mineral is commonly used to make jewelry, gemstones, carved objects, and ornamental objects.  |
| Limestone | A common <i>sedimentary rock</i> composed mostly of the mineral <i>calcite</i> (CaCO ₃). | Used as an ingredient in cement; roasted in a kiln to produce lime; used in construction aggregate, flux in steel manufacturing, in fertilizer, in poultry feed, a filler and whitener in paint and plastics, glass, soil conditioner; also used for sewage and water treatment.  |
| Magnesite | A magnesium-rich carbonate <i>mineral</i> (MgCO ₃) commonly occurring in the sedimentary rock dolostone. | Source of magnesia (magnesium oxide); used as a refractory in steel furnaces and cement kilns because it is very resistant to heat; used in animal feeds, stucco, Epsom Salt, special cements and magnesium chemicals. Small chunks are used for landscaping. In its powdered form, it is used by gymnasts and weightlifters for grip.  |
| Magnetite | An iron-bearing <i>mineral</i> (Fe ₃ O ₄) occurring in small amounts in all types of rocks. (In BC, it is recovered from a tailings deposit at a closed copper mine near Merritt.) | Mixed with water to form a dense liquid that is used in the coal mining industry to separate coal from rock. Mined elsewhere as a main source of iron used in the manufacture of steel.  |
| Marble | A <i>metamorphic rock</i> that originated as the sedimentary rock limestone. | Used as ornamental stone for buildings, memorials, and statues; used as a filler in paint and plastics.  |
| Monzonite | A light-coloured, coarse-grained, <i>igneous plutonic</i> rock that is rich in sodium-rich feldspar minerals, lesser amounts of potassium-rich feldspar, and poor in quartz. | Quarried in south central BC for processing into mineral wool. |
| Opal | A type of very finely crystalline quartz, a <i>mineral</i> (SiO ₂ - nH ₂ O), which occurs in veins associated with some volcanic rocks. | Cut and polished into cabochons and used to make jewelry such as rings, earrings, necklaces, pendants, and mounted on gold or silver settings.  |
| Pumice | A light-coloured, light-weight <i>igneous volcanic rock</i> that is full of vesicles (trapped gas bubbles). | Pumice naturally occurs in pebble to boulder size pieces that are used in landscaping, lightweight aggregate, abrasives (stonewashing), baseball diamonds, and sport tracks. It is also used as a cosmetic abrasive (removing calluses), and to make stonewashed jeans. |

| Commodity | What it is | Main Uses |
|-----------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Shale | A fine-grained <i>sedimentary rock</i> made mostly of clay minerals and silt. | Crushed and processed for brick-making and ceramic tiles; ground and used in cement-production.  |
| Silica | Generally refers to the silicon-rich <i>mineral quartz</i> (SiO ₂). It is common in many kinds of rocks, but is a dominant mineral in many ancient sandstones. | Source of elemental silicon; used to make glass, as a flux in steel making, to cast metal, a main ingredient in cement, and used to make memory chips in computers.  |
| Slag | A glassy-looking by-product of the smelting process. | Produced by water-cooling molten slag into a granular form or crushed to sand-size grains that may be used in road bases, asphaltic aggregates, abrasives, fills, mineral wool, cement, and concrete applications. |
| Slate | A fine-grained <i>metamorphic rock</i> that originated as shale, and has strong cleavage planes along which the rock readily breaks apart. | Used as decorative building stone, ornamental stone, roofing tiles, and in flooring; the original blackboard. |
| Sulphur | A bright-yellow <i>element (S)</i> derived as a by-product of crude oil, natural gas, and tar sands refining. | Used to make sulphuric acid which is used in many industrial processes, one important use of which is the production of fertilizer; ingredient in match sticks.  |
| Tufa | A type of <i>limestone</i> formed by the precipitation of the mineral calcite from hot springs in volcanic areas. | This unusual deposit displays internal layers and smooth, irregular surfaces so it is decorative and commonly used in gardening, landscaping, water fountains, ponds, and sculptures.  |
| Zeolite | One of several sieve-like <i>minerals</i> that form by weathering of feldspars in volcanic rocks or weathering of volcanic glass. | Uniquely capable of absorbing gases and liquids, and capturing metals. Used to produce absorbent pellets for animal litter, for example in kitty boxes and livestock pens (e.g. used in stables along with horse bedding to prevent ammonia fumes from damaging the horse's lungs and coat); used as molecular sieves in oil refining and other industrial processes; component of some fertilizers.  |