

**Chapter 16.1 Environmental Science – MINERAL AND MINERAL RESOURCES Chart**

**Directions: Fill in the information from the classroom or online chart.**

***Environmental Science Standard and element:***

**SEV4. Students will understand and describe availability, allocation and conservation of energy and other resources.**

- a.) **Differentiate between renewable and nonrenewable resources including how different resources are produced, rates of use, renewal rates, and limitations of sources. Distinguish between natural and produced resources.**

**STUDENT CHECKLIST**

- |  |          |         |
|--|----------|---------|
| 1.) Put the chart in your Science Notebook behind the Chapter 15 Word Study after it has been checked. | _____yes | _____no |
| 2.) The CHART was accurate and complete with no abbreviated information.                               | _____yes | _____no |
| 3.) The Information was written neatly and large and dark enough to be easily seen.                    | _____yes | _____no |
| 4.) All information was complete with no grammar or spelling errors.                                   | _____yes | _____no |

**MINERALS**

<b>Mineral</b>	<p>Mineral Facts:</p> <ul style="list-style-type: none"> <li>• Naturally occurring</li> <li>• Usually inorganic solids</li> <li>• Can contain the atoms of one specific element or several different atoms of elements making it a <b><i>compound</i></b></li> <li>• The arrangement of the atoms, along with the strength of the chemical bonds determine the physical properties of minerals</li> <li>• Gold, silver, and copper are considered minerals called <b><i>native elements</i></b> because they are found in nature uncombined with other elements</li> <li>• There are about 20 native elements and about 3,800 minerals</li> <li>• Iron, calcium, potassium, and sodium are essential minerals needed for the human body to function properly</li> <li>• The 14 minerals that have been shown by research to be essential to human health are: Calcium, Phosphorus, Magnesium, Sodium, Potassium, Chloride, and Sulfur, Iron, Manganese, Copper, Iodine, Zinc, Fluoride, and Selenium. These 14 essential minerals are crucial to the growth and production of bones, teeth, hair, blood, nerves, skin, vitamins, enzymes and hormones; and the healthy functioning of nerve transmission, blood circulation, fluid regulation, cellular integrity, energy production and muscle contraction.</li> <li>• Almost all foods contribute to a varied intake of essential minerals. Most minerals are easy to obtain in quantities required by the body. The study of minerals is called <b><i>mineralogy</i></b>.</li> </ul>
<b>Ore Minerals</b>	<ul style="list-style-type: none"> <li>• <b><i>Ore minerals</i></b> are valuable and economical to extract from the Earth.</li> <li>• <b><i>Metallic minerals</i></b> conduct electricity, have shiny surfaces, and are opaque. Gold, silver, and copper are metallic minerals.</li> <li>• <b><i>Nonmetallic minerals</i></b> are usually good insulators, they may have shiny or dull surfaces, and they allow light to pass through them. Nonmetallic minerals can also be either native elements or compounds.</li> </ul>

**HOW ORE MINERALS FORM**

Metallic minerals	<ul style="list-style-type: none"> <li>• Metallic minerals form below ground when magma cools and hardens. The metallic minerals sink to the lower part of the magma because they are denser. This means important ores are concentrated in specific areas making them easier to extract.</li> </ul>
Hydrothermal Solutions	<ul style="list-style-type: none"> <li>• Hot subsurface waters that contain dissolved minerals are called hydrothermal solutions. These solutions flow through the cracks in rocks and dissolve the minerals they come in contact with. New minerals crystallize out of those solutions and form ore deposits called <b><i>veins</i></b>.</li> </ul>
Evaporites	<ul style="list-style-type: none"> <li>• As rivers and streams wash over land surfaces, they dissolve salts and carry them into seas or lakes. When the water in those seas or lakes evaporates , deposits of those salts called evaporates are left behind.</li> </ul>

Uses of Important Metallic and Nonmetallic Elements
<b>Aluminum:</b> cans, foil; windows, doors, siding; appliances, cooking utensils; automobiles, aircraft
<b>Copper:</b> cables, wires; electrical and electronic products; plumbing, heating; alloys; coinage
<b>Gold:</b> computers; communications equipment; spacecraft; dentistry, medicine; jewelry
<b>Iron:</b> steel making
<b>Lead:</b> batteries; ammunition; glass; ceramics
<b>Silicon:</b> computer chips; glass; ceramics
<b>Silver:</b> photography; electrical and electronic products; mirrors; chemistry
<b>Sulfur:</b> Sulfuric acid; gunpowder; rubber; fungicides
<b>Titanium:</b> jet engines, aircraft bodies, spacecraft, missiles; pigments
<b>Zinc:</b> coatings on steel; brass; chemical compounds in rubber and paints

The variety of the composition and properties of nonmetallic minerals determines the complex nature of their use. Nonmetallic minerals are ordinarily divided into four groups on the basis of the field in which they are used:

(1) **chemical raw materials** (apatite, halite, sylvinit, carnallite, bischofite, polyhalite, native sulfur, sulfur pyrite, celestite, barite, borosilicates, nitrates, natural salt, and so on), most of which are used to produce mineral fertilizers;

(2) **metallurgical raw materials**, including nonmetallic minerals used to produce refractories (refractory clays, dolomite, magnesite, quartzite, and so on), as fluxes (limestones, dolomites, quartzites, and fluorite) and molding materials (molding clays and sands), and agglomerations of fine ore (bentonite clays);

(3) **construction materials**, including nonmetallic construction materials (granite, labradorite, diorite, limestone, dolomite, marble, quartzite, tuff, sandstone, and so on), ceramic and glass raw materials (high-melting clays, sands, kaolins, feldspar, wollastoite, and rhyolites), raw material for the production of binders (low-melting clays, limestone, and marl), mineral dies (ochers and colcothar), and thermal and acoustic insulation materials (perlite and vermiculite);

(4) **nonmetallic nonore raw materials**, represented by the industrial crystals (diamond, piezo quartz, Iceland spar, muscovite, phlogopite, and agate) and precious and semiprecious stones (jewelry diamond, emerald, topaz, ruby, agate, malachite, turquoise, jasper, and amber). Asbestos, talc, graphite, and abrasive materials (corundum and emery) are also ordinarily classed with this group.