

# PEOPLE AND EARTH'S MINERALS

## Word Search Story

Ancient people used **minerals** that came from the Earth. They used **chert**, **flint**, **jasper**, **obsidian** and **quartzite** for tools and weapons which they shaped by using deer antlers (which are shed every year) or other hard-pointed sticks or rocks.

Ancient people used **clay** to make pots for cooking and jars to hold water or store food. Some minerals and **gems**, such as **agate**, **jade**, **opal**, and **turquoise**, were prized possessions and were often used for trading and bartering.

Ancient people learned how to mix soil and water to make **mud**. Straw and grass were added to the mud to make it stronger. This mixture was then formed into brick-like shapes and dried. The bricks, called adobe, could be stacked and stuck together with more mud. Today, bricks are made of clay.

Even ancient people experienced the violent actions of **earthquakes** or **volcanoes** that change Earth's **form**. The land we live on has many forms and is always changing. In some places there are **mountains**. In other places there are **canyons** and **valleys**. Each type of land form has a name. In the San Luis Valley of Colorado you will find sand **dunes**. The wind action keeps the dunes in one area but their shapes are constantly changing. In Utah there is a land form called Arches National Monument. The wind, rain, and snow have actually worn huge holes all the way through **limestone** outcrops. Forms that look like rock bridges are called **arches**. There are many odd shapes formed by the erosion of wind and water. Some even look like people.

Modern people have an easier way of life than the ancient people because of advances in **science** and technology. All of the products we use today also come from the Earth. The raw materials used to make the products we need have to be mined.

**Mining** for minerals is done in many ways. Some minerals are found near the surface of the Earth. They can be mined by the open pit or strip mining method. Minerals that are hidden deep in the Earth are extracted by digging a deep shaft straight down. Horizontal drifts are mined off certain levels of the shaft. All mining depends on where economic concentration of minerals (**ore**) are found.

When economic amounts of a mineral are found it is called an **orebody**. As an example, **halite** (salt) is found in almost pure form in the state of Kansas. Halite is usually mined underground by the room-and-pillar mining method. This method is also used to mine trona and **potash**. Potash is used as a fertilizer. **Marble** (the metamorphic form of limestone) is mined by the **quarry** method. It is taken out of the ground in big blocks and is used for buildings, flooring, and for art works such as statues.

An orebody may contain a combination of metals such as **tin**, **titanium**, **lead**, **zinc**, **tungsten**, **gold**, and **silver**. When more than one mineral is found in an ore body a scientist (metallurgist) has to decide which processes will be needed to recover each mineral. Processing several metals/minerals can be expensive.

To determine the size and value of an ore body, geologists drill holes in the Earth. The drill they use is called a core drill. The entire core is brought to the surface where the geologist inspects its mineral content. Geologists call this core "**drill core**." The **logging** (recording) of the drill core is very important. The geologist records the depth at which the core was taken and the amount of mineral present. **Assays** by a chemist are made to determine the quantity and quality of the mineral or metals present. Sometimes many holes have to be drilled to show the outline of the ore body. After the drilling data is plotted on a map the geologist can determine whether the ore body is large enough to mine at a profit.

**Oil** and **gas** are also mined, but in a different way than metals and minerals. Holes (called wells) are drilled into the ground until they hit rocks containing economic amounts of oil or gas. Oil and gas fill the tiny spaces between the grains of porous rocks, usually sandstone. Oil and gas move upward in these porous rocks until they are stopped (trapped) by nonporous rocks, usually a shale called caprock. There are three types of **traps**. An upward bulge of rock layers is called an **anticline** trap. Where caprock is moved by faulting on top of oil and gas-bearing beds, the trap is called a **fault** trap. The hardest place to find oil is in a **stratigraphic** trap. A stratigraphic trap is where a body of sandstone (like a sandbar or river channel) is enclosed by nonporous rock.

There are 48 words in bold-face. These words can be found in the Word Search puzzle on the next page.

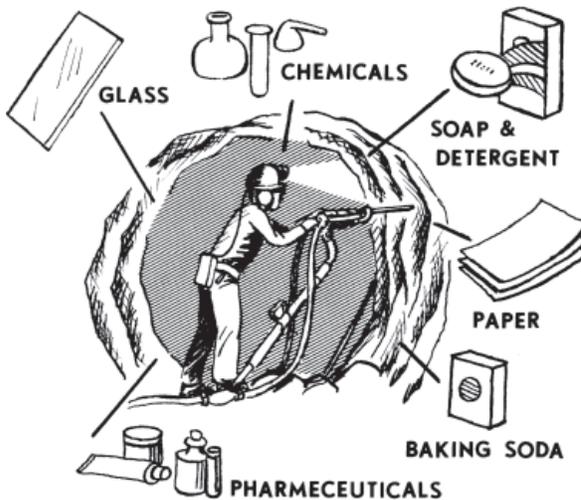
Formations containing oil and gas, coal, as well as minerals and metals may lie under mountains, deserts, marshes, or seas. They may be two or three miles below the surface. Some are deeper.

Natural resources are a gift to Earth's people. We should use and conserve them wisely. The quest for a better life-style has brought untold benefits to the human beings who inhabit our Earth—none of which would exist but for the ingenuity and thought processes of the human mind.

To investigate more about our Earth and its natural resources, just for fun—try your school or local library . . . which book will you use for starters?

The bold-face words used in the lesson you have read are shown to the right. Have fun finding them in the word search below!

(Note: there are only 5 diagonal words.)



### TRONA MINING and USES

The world's largest deposit of trona is found in Wyoming's Green River Basin, located in the southwestern part of the state. This deposit produces about 95% of the United States' supply of natural soda ash.

- Agate
- Anticline
- Arch
- Assay
- Brick
- Canyons
- Chert
- Clay
- Drill Core
- Dunes
- Earth
- Earthquake
- Fault
- Flint
- Form
- Gas
- Gems
- Gold
- Halite
- Jade
- Jasper
- Lead
- Limestone
- Logging
- Marble
- Minerals
- Mining
- Mountains
- Mud
- Obsidian
- Oil
- Opal
- Ore
- Orebody
- Potash
- Quarry
- Quartzite
- Science
- Silver
- Stratigraphic
- Tin
- Titanium
- Tungsten
- Turquoise
- Trap
- Valleys
- Volcano
- Zinc

M	Q	T	L	U	A	F	O	R	E	B	O	D	Y	T	E
O	Y	I	U	G	K	T	U	N	G	S	T	E	N	R	A
U	T	T	G	R	O	R	E	G	O	Y	A	S	S	A	R
N	X	A	J	A	D	E	R	H	T	U	O	M	T	O	T
T	E	N	Y	U	N	H	E	A	J	H	G	I	X	Y	H
A	R	I	E	L	H	C	S	L	A	R	E	N	I	M	B
I	O	U	L	F	A	T	H	E	S	I	M	I	N	A	G
N	C	M	B	O	L	E	A	D	P	E	S	N	T	A	C
S	L	U	R	R	I	O	T	P	E	H	E	G	L	B	E
P	L	E	A	M	T	X	F	W	R	R	K	C	I	R	B
O	I	L	M	X	E	C	L	A	Y	E	L	A	M	E	R
R	R	O	B	S	I	D	I	A	N	V	A	S	E	N	U
K	D	P	E	I	T	I	N	L	O	L	G	C	S	I	O
Q	U	A	R	T	Z	I	T	E	T	I	A	I	T	L	Y
V	O	L	Q	U	I	E	H	A	E	S	T	E	O	C	D
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Y	O	R	G	I	K	O	J	H	U	U	H	G	A	S	D
S	P	R	G	S	G	W	C	N	D	A	W	T	L	N	Y
T	I	Y	O	E	X	R	Y	E	M	K	J	E	R	E	O
E	V	O	L	C	A	N	Y	O	N	S	Y	T	I	A	B
S	T	R	A	T	I	G	R	A	P	H	I	C	G	N	E