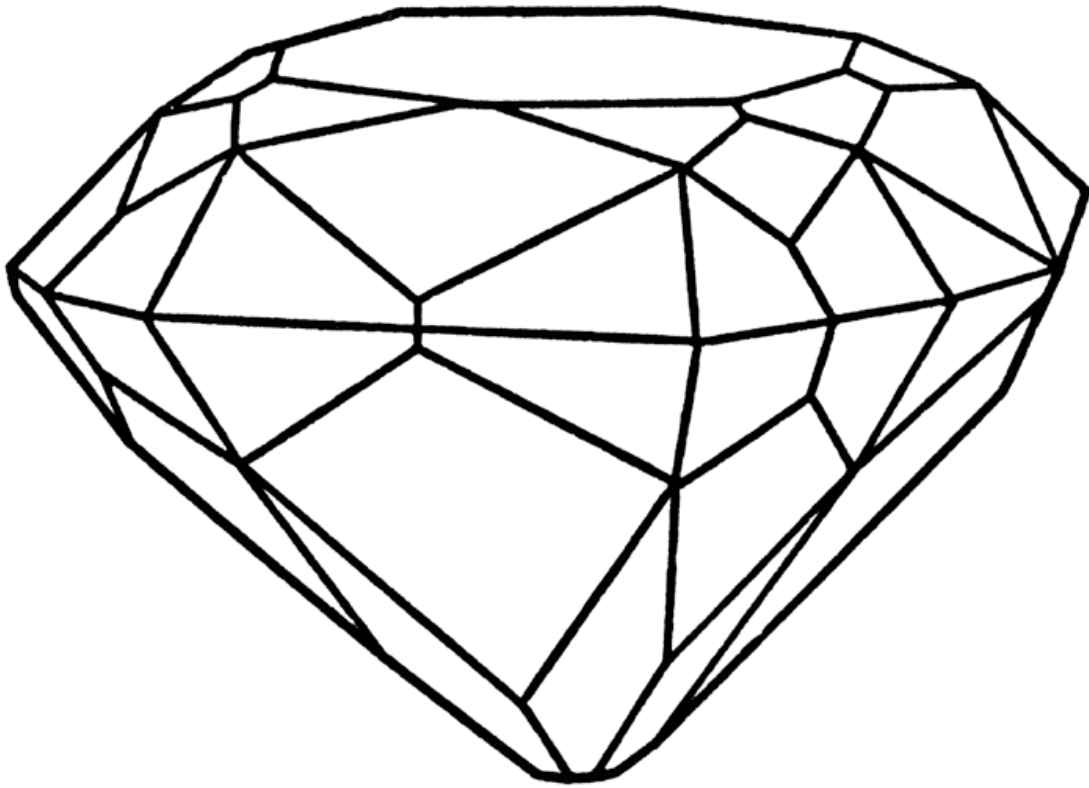


Minerals



Name: _____

Period: _____

What is a mineral?

- To be considered a mineral, the substance in question must meet the following criteria:
 - Naturally occurring
 - Solid
 - Inorganic
 - Definite chemical composition
 - Definite crystalline structure

How do we identify minerals?

- **COLOR**- Most visible characteristic, but unreliable because many minerals share the same color and many minerals exist in different colors.
- **STREAK**- The color of the mineral in powdered form (use a “streak plate”). Very reliable tool for identifying samples. Note: the color of the powdered form is often different from the color of the solid form.
- **FRACTURE/ CLEAVAGE**- Cleavage is the tendency of a mineral to split along one or more smooth, flat surfaces. If a mineral does not display cleavage, it is said to have fracture, which means it breaks unevenly.
- **HARDNESS**- The mineral's resistance to being scratched. Minerals are compared to the ten minerals on the “Moh's Scale of Hardness”. Minerals are often compared to glass (hardness: 5.5)
- **LUSTER**- Either metallic (shiny, like a polished metal) or nonmetallic (dull, with no shine). Types of nonmetallic luster include glossy, pearly, greasy, earthy, etc.
- **OTHER CHARACTERISTICS** that can be tested include: magnetism, reaction with chemicals, taste, specific gravity, crystal form, fluorescence, optics.

A mineral is a naturally occurring, inorganic, solid, with a definite chemical composition and crystal structure. All physical characteristics are a result of the mineral's internal arrangement of atoms.

Minerals ESRT Practice Questions

1. What are the two different types of luster?

2. What is the range of hardness found on the chart?

3. What type of breakage is more common: cleavage or fracture?

4. What is the most common element found in the composition of minerals?

5. For the mineral quartz, identify the following:

Luster: _____ Hardness: _____ Breakage: _____ Color: _____ Composition: _____

6. For the mineral galena, identify the following:

Luster: _____ Hardness: _____ Breakage: _____ Color: _____ Composition: _____

7. For the mineral olivine, identify the following:

Luster: _____ Hardness: _____ Breakage: _____ Color: _____ Composition: _____

8. For the mineral fluorite, identify the following:

Luster: _____ Hardness: _____ Breakage: _____ Color: _____ Composition: _____

9. Which minerals can scratch glass, has a non-metallic luster, has fracture and is a dark red color?

10. Which mineral can be easily scratched by a finger nail, has cleavage, a metallic luster and has a black streak?

11. Which two elements are found in all minerals on the chart?

Minerals Reading Comprehension

Silicon and oxygen, the two most common chemical elements in the Earth's crust, combine as silicon dioxide to form the mineral quartz. Quartz is the most abundant mineral in the Earth's crust. Quartz has been found in meteorites and in some rocks collected on the moon.

Quartz has the chemical formula SiO_2 . There are many varieties of quartz, which occurs in nearly all types of igneous, metamorphic and sedimentary rocks. It is an essential mineral in granites, granodiorites and rhyolites. Metamorphism of quartz-bearing igneous and sedimentary rocks typically increases the amount of quartz and its grain size.

Quartz is very resistant to weathering and, therefore, concentrates as sandstones and other detrital rocks. Most sands are weathered fragments of quartz. Sandstone and quartzite are the same materials that are re-lithified (compressed into rock).

Quartz has many commercial applications. In science and industry, quartz sand is used for manufacturing sandpaper and other abrasives, polishing powders and soaps. It is used to make building materials, heat-resistant materials known as refractories and for the bearings of precision instruments.

Quartz sand is also used in the manufacture of porcelain, glass and metal casting molds. Precision-cut plates of quartz are used for frequency control in radios, TVs, clocks and watches.

Scientists have developed a method of "growing" flawless quartz crystals in industrial plants that are used to manufacture optical devices. Silica glass (fused quartz) is used in optics to transmit ultraviolet light and to make laboratory tubing and vessels, as well as fibers employed in sensitive weighing devices.

Compositionally, quartz is usually quite pure, with only traces of other elements like aluminum, sodium, potassium and lithium. Quartz is found as large crystals that are often beautifully colored by impurities. The many varieties of quartz are due to formation of different geometric arrangements of its tetrahedral crystals. This accounts for different crystal structures, and, therefore, different physical properties. Many of the quartz variations are gemstones.

Answer the following questions using information from the reading and from your knowledge of Earth Science.

1. What is the chemical name for quartz?
2. What is the result of extreme weathering of quartz?
3. What gives quartz it many beautiful colors?
4. Quartz is very common on Earth. Is there quartz in space?
5. Name a use of quartz in precision instruments.
6. In which types of rocks can quartz be found?
7. Why is powdered or ground up quartz used as an abrasive?

Minerals Regents Questions

1. The mineral mica breaks evenly along flat sheets mainly because of its
 - A) density
 - B) chemical composition
 - C) atomic arrangement
 - D) hardness
2. According to the ESRTs, which element is most abundant in the Earth's crust?
 - A) silicon
 - B) oxygen
 - C) nitrogen
 - D) hydrogen
3. Which property is most useful in mineral identification?
 - A) size
 - B) color
 - C) texture
 - D) hardness
4. Certain minerals usually break along flat surfaces, while other minerals break unevenly. This characteristic is due to the
 - A) luster of the mineral
 - B) age of the mineral
 - C) force with which the mineral is broken
 - D) internal arrangement of the mineral's atoms
5. According to the Properties of Common Minerals Earth Science reference table, which mineral scratches dolomite and is scratched by olivine?
 - A) quartz
 - B) potassium feldspar
 - C) muscovite mica
 - D) galena
6. The mineral mica breaks evenly along flat sheets mainly because of its
 - A) atomic arrangement
 - B) chemical composition
 - C) hardness
 - D) density
7. According to the Properties of Common Minerals Earth Science reference table, which mineral leaves a green-black powder when rubbed against an unglazed porcelain plate?
 - A) hematite
 - B) galena
 - C) graphite
 - D) pyrite