

ESS Minerals

1. The table below shows some properties of four different minerals.

Mineral Variety	Color	Hardness	Luster	Composition
flint	black	7	nonmetallic	SiO ₂
chert	gray, brown, or yellow	7	nonmetallic	SiO ₂
jasper	red	7	nonmetallic	SiO ₂
chalcedony	white or light color	7	nonmetallic	SiO ₂

The minerals listed in the table are varieties of which mineral?

- (A) garnet (B) magnetite (C) olivine (D) quartz

2. In which group are all the earth materials classified as minerals?

- (A) feldspar, quartz, and olivine
 (B) granite, rhyolite, and basalt
 (C) cobbles, pebbles, and silt
 (D) conglomerate, sandstone, and shale

3. Silicate minerals contain the elements silicon and oxygen. Which list contains only silicate materials?

- (A) graphite, talc, and selenite gypsum
 (B) biotite mica, fluorite, and garnet
 (C) potassium feldspar, quartz, and amphibole
 (D) calcite, dolomite, and pyroxene

4. Minerals are identified on the basis of

- (A) the method by which they were formed
 (B) the type of rock in which they are found
 (C) their physical and chemical properties
 (D) the size of their crystals

5. Scratching a mineral against a glass plate is a method used for determining the mineral's

- (A) hardness (B) cleavage
 (C) color (D) luster

6. Which mineral property is illustrated by the peeling of muscovite mica into thin, flat sheets?

- (A) hardness (B) cleavage
 (C) streak (D) luster

7. The data table below gives information on mineral hardness.

MINERAL HARDNESS

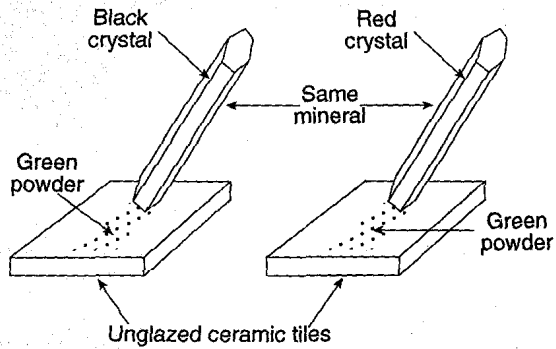
Moh's Hardness Scale	Approximate Hardness of Common Objects
Talc	1
Gypsum	2
Calcite	3
Fluorite	4
Apatite	5
Feldspar	6
Quartz	7
Topaz	8
Corundum	9
Diamond	10

Fingernail (2.5)
 Copper penny (3.5)
 Iron nail (4.5)
 Glass (5.5)
 Steel file (6.5)
 Streak plate (7.0)

Moh's scale would be most useful for

- (A) finding the density of a mineral sample
 (B) finding the mass of a mineral sample
 (C) identifying a mineral sample
 (D) counting the number of cleavage surfaces of a mineral sample

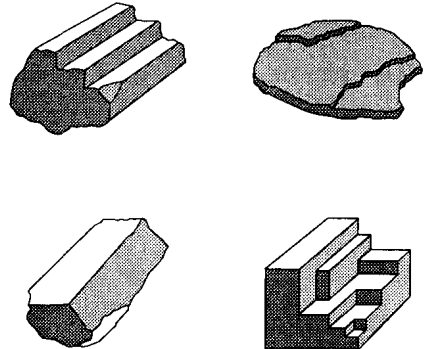
8. The diagram below shows the results of one test for mineral identification.



Which mineral property is being tested?

- (A) fracture
- (B) density
- (C) streak
- (D) luster

9. The diagrams below represent fractured samples of four minerals.



Which mineral property is best illustrated by the samples?

- (A) cleavage
- (B) density
- (C) streak
- (D) hardness

10. Which common mineral fizzes when dilute hydrochloric acid (HCl) is placed on it?

- (A) feldspar
- (B) talc
- (C) quartz
- (D) calcite

11. Which mineral is an ore of iron and has a characteristic reddish brown streak?

- (A) pyrite
- (B) olivine
- (C) hematite
- (D) magnetite

Base your answers to questions 12 through 15 on the data table below.

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	Fingernail (2.5)
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	Iron nail (4.5)
	Glass (5.5)
	Steel file (6.5)
	Streak plate (7.0)

12. Moh's scale arranges minerals according to their relative

- (A) specific heat
- (B) resistance to breaking
- (C) resistance to scratching
- (D) specific gravity

13. Which statement is best supported by the data shown?

- (A) An iron nail contains fluorite.
- (B) Topaz is harder than a steel file.
- (C) A streak plate is composed of quartz.
- (D) Apatite is softer than a copper penny.

14. The durable gemstones ruby and sapphire are valuable due to their color and hardness. These gemstones would most likely be located on Moh's scale at the hardness level of

- (A) 3 (B) 4 (C) 9 (D) 1

15. Moh's scale would be most useful for

- (A) finding the mass of a mineral sample
- (B) finding the density of a mineral sample
- (C) counting the number of cleavage surfaces of a mineral sample
- (D) identifying a mineral sample

16. What is the hardness of Sulfur?

- (A) 6.5 (B) 2
(C) 3 (D) 2.5

17. Which mineral has a greater hardness?

- (A) Galena (B) Biotite Mica
(C) Olivine (D) Garnet

18. Which mineral has a hardness of 2.5 – 3 and makes a good electrical insulator?

- (A) Pyroxene (B) Biotite Mica
(C) Gypsum (D) Magnetite

19. Which mineral will scratch glass (hardness = 5.5), but not pyrite?

- (A) gypsum (B) fluorite
(C) quartz (D) orthoclase

20. Which of the following elements is not found in Plagioclase Feldspar?

- (A) Si (B) Al
(C) Na (D) Pb

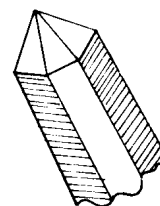
21. Which mineral shows no cleavage, has a hardness of 7, and a composition of SiO₂ ?

- (A) Garnet (B) Graphite
(C) Quartz (D) Halite

22. Which mineral has a hardness of 6, and shows cleavage?
- (A) Hematite
 - (B) Talc
 - (C) Olivine
 - (D) Potassium Feldspar
23. Which mineral is white or colorless, has a hardness of 2.5, and splits with cubic cleavage?
- (A) calcite
 - (B) mica
 - (C) halite
 - (D) pyrite
24. Which mineral leaves a green-black powder when rubbed against an unglazed porcelain plate?
- (A) hematite
 - (B) graphite
 - (C) pyrite
 - (D) galena
25. An unidentified mineral that is softer than calcite exhibits a metallic luster and cubic cleavage. This mineral most likely is
- (A) galena
 - (B) pyroxene
 - (C) halite
 - (D) pyrite
26. What is the best way to determine if a mineral sample is calcite or quartz?
- (A) Place the mineral near a magnet.
 - (B) Measure the mass of the mineral.
 - (C) Place a drop of acid on the mineral.
 - (D) Observe the color of the mineral.
27. The internal atomic structure of a mineral most likely determines the mineral's
- (A) hardness, cleavage, and crystal shape
 - (B) size, location, and luster
 - (C) origin, exposure, and fracture
 - (D) color, streak, and age

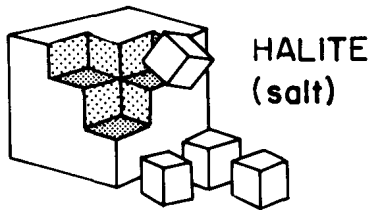
28. How are the minerals biotite mica and muscovite mica different?
- (A) Biotite mica contains iron and/or magnesium, but muscovite mica does not.
 - (B) Biotite mica is colorless, but muscovite mica is not.
 - (C) Muscovite mica cleaves into thin sheets, but biotite mica does not.
 - (D) Muscovite mica scratches quartz, but biotite mica does not.

29. The crystal characteristics of quartz shown in the accompanying diagram are the result of the



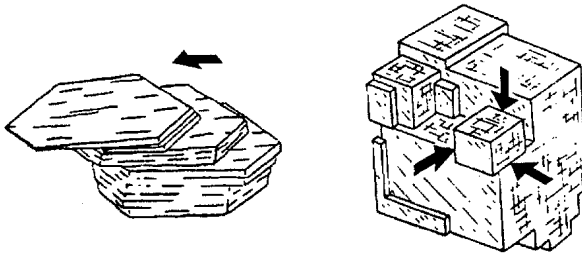
- (A) internal arrangement of the elements from which quartz is formed
 - (B) age of the quartz crystal
 - (C) amount of weathering that the quartz has been exposed to
 - (D) shape of the other rock crystals in the area where the quartz was formed
30. Although diamonds and graphite both consist of the element carbon, their physical properties are very different. The most likely explanation for these differences is that
- (A) the internal arrangement of carbon atoms is different in each mineral
 - (B) diamonds contain silicate tetrahedra but graphite does not
 - (C) graphite contains radioactive carbon-14 but diamonds do not
 - (D) graphite contains impurities not found in diamonds

31. What causes the characteristic crystal shape and cleavage (breaking along flat surfaces) of the mineral halite as shown in the diagram below?



- (A) the internal arrangement of the atoms in halite
- (B) metamorphism of the halite
- (C) the shape of other minerals located where the halite formed
- (D) the amount of erosion the halite has undergone

32. The diagrams below illustrate a specific property of certain minerals.



This property is most closely related to the

- (A) softness of the mineral
- (B) arrangement of atoms in the mineral
- (C) density of the mineral
- (D) impurities found in the mineral

33. A mineral's physical characteristics, such as hardness, cleavage, and luster, are dependent on the

- (A) method by which the mineral sample was broken
- (B) age of the mineral sample
- (C) internal arrangement of the mineral's atoms
- (D) size of the mineral sample

34. The physical properties of minerals result from their

- (A) density and color
- (B) internal arrangement of atoms
- (C) texture and color of streak
- (D) type of cleavage and hardness

35. Differences in hardness between minerals are most likely caused by the

- (A) internal arrangement of atoms
- (B) number of cleavage planes
- (C) number of pointed edges
- (D) external arrangement of flat surfaces