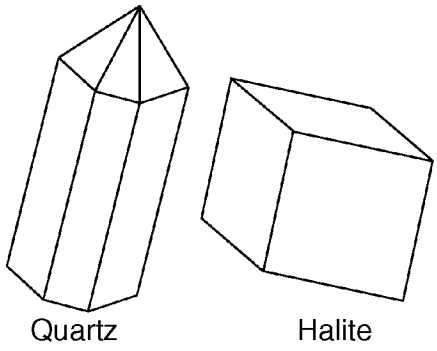
Name: _____

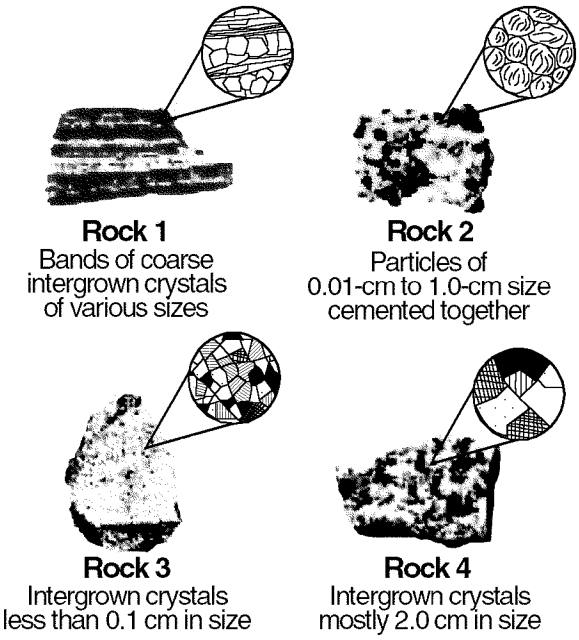
1) The diagrams below show the crystal shapes of two minerals.



Quartz and halite have different crystal shapes primarily because

A) light reflects from crystal surfaces
B) of impurities that produce surface variations
C) energy is released during crystallization
D) of the internal arrangement of the atoms

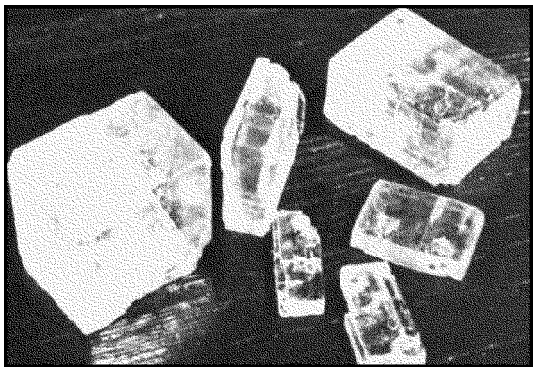
2) Magnified views of the pictures of four rocks below are shown in the circles.



What do *all* four rock samples have in common?

A) They contain minerals.
B) They show cleavage.
C) They formed on Earth's surface.
D) They are organically formed.

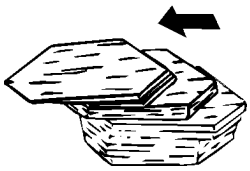
3) The photograph below shows a piece of halite that has been recently broken.



Which physical property of halite is demonstrated by this pattern of breakage?

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

4) The diagram below shows how a sample of the mineral mica breaks when hit with a rock hammer.

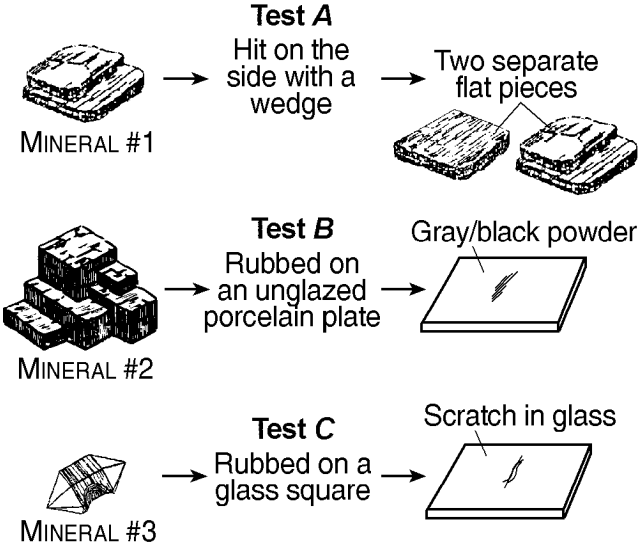


This mineral breaks in smooth, flat surfaces because it

A) has a regular arrangement of atoms
B) contains large amounts of iron
C) is very dense
D) is very hard

Questions 5 and 6 refer to the following:

The diagram below shows three minerals with three different physical tests, *A*, *B*, and *C*, being performed on them.



5) Which sequence correctly matches each test, *A*, *B*, and *C*, with the mineral property tested?

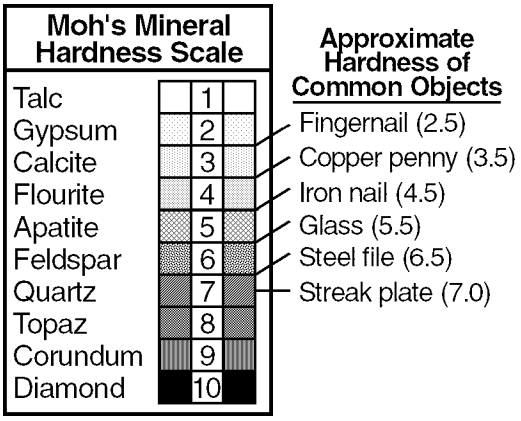
A) *A* — cleavage; *B* — hardness; *C* — streak
B) *A* — cleavage; *B* — streak; *C* — hardness
C) *A* — streak; *B* — cleavage; *C* — hardness
D) *A* — streak; *B* — hardness; *C* — cleavage

6) The results of *all* three physical tests shown are *most* useful for determining the

A) environment where the minerals formed
B) rate of weathering of the minerals
C) geologic period when the minerals formed
D) identity of the minerals

Questions 7 and 8 refer to the following:

The diagrams below represent *Moh's Mineral Hardness Scale* and a chart showing the approximate hardness of some common objects.



7) Which statement is *best* supported by this scale?

A) A piece of glass can be scratched by quartz, but not by calcite.
B) A fingernail will scratch quartz, but not calcite.
C) A fingernail will scratch calcite, but not quartz.
D) A piece of glass can be scratched by calcite, but not by quartz.

8) The hardness of these minerals is most closely related to the

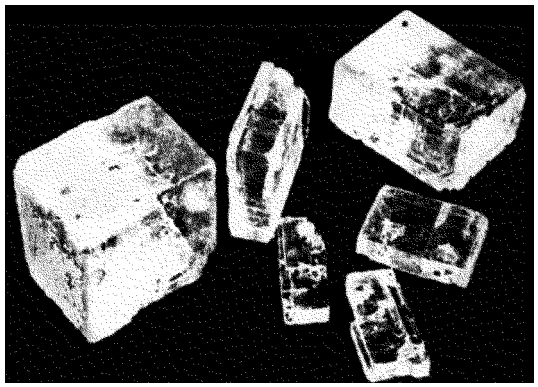
A) internal arrangement of the mineral's atoms
B) amount of iron the mineral contains
C) mineral's abundance in nature
D) mineral's color

9) 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

Questions 10 and 11 refer to the following:

The photograph below shows several broken samples of the same colorless mineral.



10) Which mineral is most likely shown in the photograph?

A) galena
B) halite
C) quartz
D) calcite

11) Which physical property of the mineral is most easily seen in the photograph?

A) fracture
B) streak
C) cleavage
D) hardness

12) A human fingernail has a hardness of approximately 2.5. Which two minerals are softer than a human fingernail?

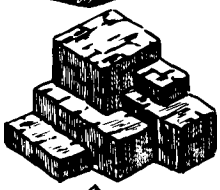
A) graphite and talc
B) pyrite and magnetite
C) calcite and halite
D) sulfur and fluorite

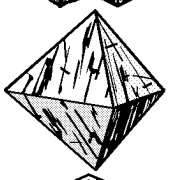
13) What is the *best* way to determine if a mineral sample is calcite or quartz?

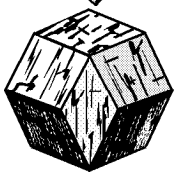
A) Measure the mass of the mineral.
B) Observe the color of the mineral.
C) Place a drop of acid on the mineral.
D) Place the mineral near a magnet.

14) Halite has three cleavage directions at 90° to each other. Which model *best* represents the shape of a broken sample of halite?

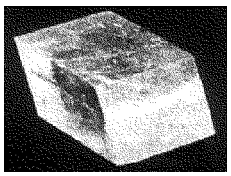
A) 

B) 

C) 

D) 

15) The photograph below shows a broken piece of the mineral calcite.



The calcite breaks in smooth, flat surfaces because calcite

A) contains certain impurities
B) has a regular arrangement of atoms
C) is very soft
D) is very dense

16) Which mineral is white or colorless, has a hardness of 2.5, and splits with cubic cleavage?

A) calcite
B) pyrite
C) halite
D) mica

17) The internal atomic structure of a mineral most likely determines the mineral's

A) origin, exposure, and fracture
B) color, streak, and age
C) size, location, and luster
D) hardness, cleavage, and crystal shape

18) 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 scratches quartz, but biotite mica does not.
D) Muscovite mica cleaves into thin sheets, but biotite mica does not.

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

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

20) What mineral is an ore of iron and has a characteristic reddish brown streak?

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

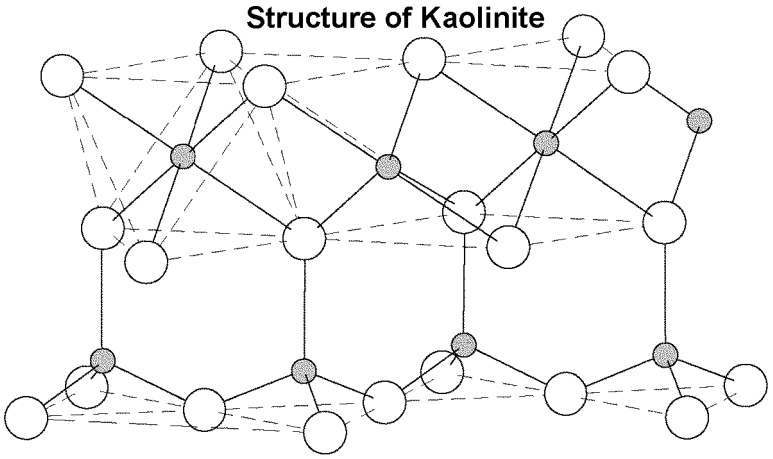
21) According to the *Properties of Common Minerals* Earth Science reference table, which mineral scratches dolomite and is scratched by olivine?

A) quartz
B) galena
C) potassium feldspar
D) muscovite mica

22) 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

23) The diagram below represents a part of the crystal structure of the mineral kaolinite.



An arrangement of atoms, such as the one shown in the diagram, determines a mineral's

A) age of formation
B) temperature of formation
C) infiltration rate
D) physical properties

24) The hardness and density of a gemstone is based primarily on the gemstone's

A) natural abundance
B) internal arrangement of atoms
C) geologic time of formation
D) oxygen content

25) The mineral graphite is often used as

A) a cementing material
B) a source of iron
C) an abrasive
D) a lubricant

26) The table below shows some observed physical properties of a mineral.

Physical Property	Observation
color	white
hardness	scratched by the mineral calcite
distinguishing characteristic	feels greasy
cleavage/fracture	shows some definite flat surfaces

Based on these observations, the elements that make up this mineral's composition are

A) sulfur, oxygen, and hydrogen
B) oxygen, silicon, aluminum, and iron
C) oxygen, silicon, hydrogen, and magnesium
D) sulfur and lead

27) Which two minerals have cleavage planes at right angles?

A) quartz and calcite
B) halite and pyroxene
C) biotite mica and muscovite mica
D) sulfur and amphibole

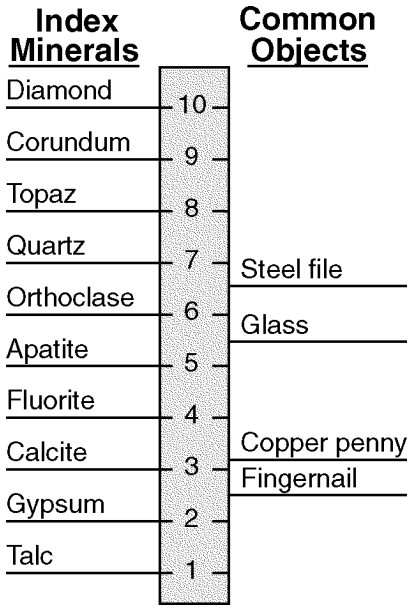
28) Which mineral is the major component of drywall?

A) selenite gypsum
B) muscovite mica
C) talc
D) calcite

29) Which mineral has a metallic luster, a black streak, and is an ore of iron?

A) pyroxene
B) graphite
C) magnetite
D) galena

30) The diagram below shows the index minerals of Moh's hardness scale compared with the hardness of some common objects.



Which statement is *best* supported by the diagram?

A) Calcite will be scratched by a copper penny.
B) The mineral apatite will scratch topaz.
C) A fingernail will scratch calcite but not gypsum.
D) A steel file has a hardness of about 7.5.

31) Which one of the following minerals is commonly used as a food additive?

A) talc
B) fluorite
C) calcite
D) halite

32) What property is *most* useful in distinguishing pyroxene from amphibole?

A) hardness
B) angles of cleavage
C) type of luster
D) sample size

33) Silicate minerals contain the elements silicon and oxygen. Which list contains only silicate minerals?

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

34) The minerals Kyanite, Sillimanite, and Andalusite all have the same chemical composition (Al_2SiO_5). Which of the following minerals has a chemical composition *most* similar to these three minerals?

A) gypsum
B) pyrite
C) potassium feldspar
D) dolomite

35) Some of the bedrock in the Green Mountains in Vermont is actually green in color because of the presence of the mineral chlorite. Which other mineral can cause rocks to appear green?

A) magnetite
B) sulfur
C) halite
D) olivine

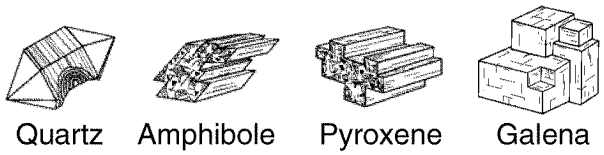
36) A student created the table below by classifying six minerals into two groups, *A* and *B*, based on a single property.

Group *A*	Group *B*
olivine	pyrite
garnet	galena
calcite	graphite

Which property was used to classify these minerals?

A) chemical composition
B) hardness
C) luster
D) color

37) The diagram below shows four mineral samples, each having approximately the same mass.



If all four samples are placed together in a closed, dry container and shaken vigorously for 10 minutes, which mineral sample would experience the *most* abrasion?

A) quartz
B) galena
C) amphibole
D) pyroxene

38) Part of a gemstone's value is based on the way the gemstone shines in reflected light. The way a mineral reflects light is described as the mineral's

A) luster
B) fracture
C) streak
D) hardness

39) The table below shows the hardness of four common materials.

Hardness of Four Materials

Material	Hardness
human fingernail	2.5
copper penny	3.0
window glass	4.5
steel nail	6.5

Which statement *best* describes the hardness of the mineral dolomite?

A) Dolomite can scratch window glass, but cannot be scratched by a fingernail.
B) Dolomite can scratch a copper penny, but cannot be scratched by a steel nail.
C) Dolomite can scratch window glass, but cannot be scratched by a steel nail.
D) Dolomite can scratch a copper penny, but cannot be scratched by a fingernail.

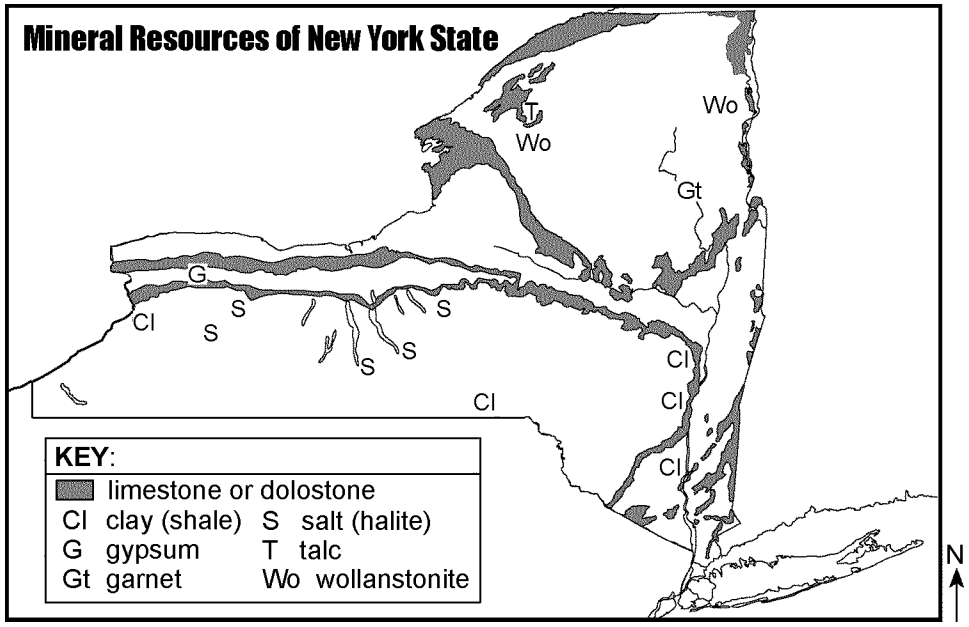
40) The table below shows some properties of four different minerals.

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 type of mineral?

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

41) The map below shows areas where certain minerals were mined in significant amounts during 1989.



The mineral wollastonite has a hardness of 4.5 to 5. Which of the other New York State minerals shown on the map could easily scratch wollastonite?

A) talc B) gypsum C) garnet D) halite

42) Table 1 below shows the composition, hardness, and average density of four minerals often used as gemstones. Table 2 lists the minerals in *Moh's Scale of Hardness* from 1 (softest) to 10 (hardest).

TABLE 1:

Gemstone Mineral	Composition	Hardness	Average Density (g/cm^3)
emerald	$Be_3Al_2(Si_6O_{18})$	7.5–8	2.7
sapphire	Al_2O_3	9	4.0
spinel	$MgAl_2O_4$	8	3.8
zircon	$ZrSiO_4$	7.5	4.7

KEY:	
Al = aluminum	O = oxygen
Be = beryllium	Si = silicon
Mg = magnesium	Zr = zirconium

TABLE 2:

Moh's Scale of Hardness
1 talc
2 gypsum
3 calcite
4 fluorite
5 apatite
6 feldspar
7 quartz
8 topaz
9 corundum
10 diamond

According to the tables, Sapphire is a gemstone variety of which mineral on *Moh's Scale of Hardness*?

A) diamond B) topaz C) fluorite D) corundum