

ROCKS AND MINERALS

KEY



Exploring the World of Science

Name: _____
School: _____

Directions: DO NOT open the packet until prompted to.
The test will be a 50 minute test and answer each question
to the best of your ability.

Total: _____/

PART 1: Rocks and Minerals ID

For numbers 1-21, identify the rock/mineral and what group it is classified under. Spelling counts. (2 pts each)



Ulexite
Borate



beryl
silicate



breccia
sedimentary



Albite
Feldspar-plagioclase



pyrite
sulfide



galena
sulfide



Almandine
Garnet group



pegmatite
igneous



sodalite
silicate



Slate
Metamorphic



apatite
phosphate



jasper
Quartz varieties



Corundum
oxides/hydroxides



chalcedony
quartz varieties



lepidolite
mica group



Amazonite
Feldspar-potassium



oolite
sedimentary limestone



alabaster
gypsum sulfate



Epidote
Silicate



chert
sedimentary



malachite
carbonate



PART 1: Multiple Choice

For questions 22-32, choose the best answer. (1 pt each)

22. Which of the following is not a clastic rock?
- a. Coquina
 - b. Oolite
 - c. Diatomite
 - d. Arkose
23. Of the following types of coal, which contains the least energy when burned?
- a. Lignite
 - b. Anthracite
 - c. Bituminous
 - d. Subbituminous
24. What is the main ore of lead?
- a. Pyrite
 - b. Galena
 - c. Bauxite
 - d. Sphalerite
25. What is the most abundant mineral in earth's mantle?
- a. Orthoclase
 - b. Plagioclase
 - c. Kaolinite
 - d. Olivine
26. Which of the following minerals has the highest specific gravity?
- a. Copper
 - b. Galena
 - c. Bauxite
 - d. Gold
27. Which of the following minerals does not have a botryoidal habit?
- a. Hematite
 - b. Malachite
 - c. Fluorite
 - d. Jasper
28. From which environment is beryl formed?
- a. Pegmatite environment
 - b. Metamorphic environment

- c. Hydrothermal environment
- d. Magmatic environment

29. What is the generic formula of limonite?

- a. $\text{Fe}_2\text{O}(\text{OH})$
- b. $\text{Fe}_2\text{O}(\text{OH})_2$
- c. $\text{FeO}(\text{OH})$
- d. $\text{Fe}_2\text{O}_2(\text{OH})$

30. What is the luster of sphalerite?

- a. Vitreous
- b. Resinous
- c. Pearly
- d. Dull

31. Based on Bowen's Reaction series, at which temperature would minerals have the most calcium?

- a. $800\text{ }^\circ\text{C}$
- b. $1000\text{ }^\circ\text{C}$
- c. $1400\text{ }^\circ\text{C}$
- d. $3000\text{ }^\circ\text{C}$

32. What is another name for azurite?

- a. Chessylite
- b. Peacock ore
- c. Television stone
- d. Fool's gold

PART 3: Short Answer

Questions 33-37 refer to the mineral below.



33. What is the name of the mineral? **halite**
34. What is it composed of? **NaCl**
35. What is its hardness and specific gravity? **Hardness: 2-2.5, SG: 2.1-2.6**
36. What is its crystal system? **Isometric**
37. When exposed to ultraviolet light, this mineral “glows” or fluoresces. What causes this phenomenon? **The mineral has the ability to temporarily absorb a small amount of light and an instant later release a small amount of light in a different wavelength. This change in wavelength causes a temporary color change of the mineral in the eye of a human observer.**

Questions 38-42 refer to the mineral below.



38. What is the name of the mineral? **jasper**
 39. What is this mineral mainly composed of? **SiO₂**
 40. What color does its streak have? **White**
 41. What would happen if it were placed in hydrofluoric acid?
It would dissolve
 42. This mineral is piezoelectric, what does that mean?
Piezoelectric Effect is the ability of certain materials to generate an electric charge in response to applied mechanical stress.
43. Amethyst derives from the Greek word “amethystos”. What was this mineral mainly used for during ancient Greece?

The name amethyst derives from the ancient Greek word amethystos, meaning sober. It was said that an amethyst could prevent the bearer from becoming excessively drunk and also instills a sober and serious mind.

44. Occasionally, andesites contain large, visible grains of plagioclase, amphibole, or pyroxene. These large crystals are known as "phenocrysts." How are they formed?

They begin forming when a magma, which is cooling at depth, approaches the crystallization temperature of some of its minerals. These high-crystallization-temperature minerals begin forming below the surface and grow to visible sizes before the magma erupts. When the magma erupts onto the Earth's surface, the rest of the melt crystallizes quickly. This produces a rock with two different crystal sizes: large crystals that formed slowly at depth (known as "phenocrysts"), and small crystals that formed quickly at the surface (known as "groundmass").

45. Describe the difference between pumice and scoria as a result of their composition.

Scoria forms from basaltic magmas, while pumice forms from rhyolitic magmas - which usually contain more gas. Pumice has a much higher concentration of trapped bubbles - so many that the walls between them are very thin. The vesicles in pumice contain enough air that the rock will float on water. The thick walls of scoria make it heavy enough to sink.

46. Aragonite and calcite both have the same chemical formula, CaCO_3 , how do they differ?

Their atoms are stacked in different configurations. That is, they are polymorphs. Aragonite has an orthorhombic structure and calcite has a trigonal structure.

47. What gives bornite its colorful appearance?

The colors are from an iridescent tarnish that forms on bornite upon exposure to air. The tarnish is made of assorted copper oxides or hydroxides that form a mere atoms thin layer over the bornite. The thickness of the layers is close to the wavelength of light. When light waves bounce between the bornite surface and the top of the tarnish layer they will leave with the wavelengths of various colors.

43. What is the difference between basalt and gabbro?

Basalt is extrusive (small crystals) whereas gabbro is intrusive (larger crystals)