

Team Name \_\_\_\_\_

Team Number

**Mineral List:**

A. Lepidolite  
D. Feldspar  
AC. Apatite  
BC. Galena  
CD. Chalcopyrite  
ABC. Biotite  
ACD. Olivine  
ABCD. Amethyst

B. Calcite  
E. Halite  
AD. Hematite  
BD. Pyrite  
CE. Staurolite  
ABD. Microcline  
ACE. Muscovite  
ABCE. Bauxite

C. Dolomite  
AB. Quartz  
AE. Magnetite  
BE. Gypsum  
DE. Albite  
ABE. Orthoclase  
ADE. Augite  
ABDE. Talc

**Rock List:**

A. Gneiss  
D. Schist  
AC. Diorite  
BC. Obsidian  
CD. Breccia  
ABC. Shale  
ACD. Limestone

B. Marble  
E. Slate  
AD. Gabbro  
BD. Pumice  
CE. Conglomerate  
ABD. Bituminous Coal

C. Quartzite  
AB. Basalt  
AE. Granite  
BE. Rhyolite  
DE. Sandstone  
ABE. Chalk

**Igneous Rock Texture List: (Station 7)**

A. Phaneritic  
D. Pegmatite  
AC. Vesicular

B. Aphanitic  
E. Glassy

C. Porphyritic  
AB. Pyroclastic

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**Station 1.**

Question 1. Identify Rock Sample 1 (Sandstone)

Question 2. What mineral is Rock Sample 1 primarily composed of? (Quartz)

Question 3. Identify Rock Sample 2 (Shale)

Question 4. Identify Rock Sample 3 (Conglomerate)

What process may lead to the changing of sediment sizes observed in the samples of these station?

(Erosion breaks down rock into smaller fragments, with water carrying the fragments down slope through streams and rivers. The farther from the source rock, the smaller and rounder the fragments become)

Is the mineral from question 2 easy or difficult to break down? What mineral property is primarily responsible for this?

(Difficult due to Quartz having a hardness of 7)

List the above rock samples in order of maturity.

[(Least Mature] Rock Sample 3, Rock Sample 1, Rock Sample 2 [Most Mature])

**Station 2.**

Describe the habit of the mineral provided.

(Bladed)

Describe the luster of the mineral provided.

(Metallic)

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**Station 3.**

Sort the following rocks into their appropriate rock type:

Choose from the following answers.

A. Sedimentary

B. Igneous

C. Metamorphic

Question 5. What rock type is Rock Sample 5? (Metamorphic)

Question 6. What rock type is Rock Sample 6? (Igneous)

Question 7. What rock type is Rock Sample 7? (Sedimentary)

**Station 4.**

Question 8. Identify Rock Sample 8. (Granite)

Describe the environment that Rock Sample 8 likely formed.

(Intrusive igneous rock, subsurface magma intrusion)

Question 9. Identify Rock Sample 9. (Schist)

Describe the environment that Rock Sample 9 likely formed.

(Zone of regional metamorphism, area of high pressure and high heat)

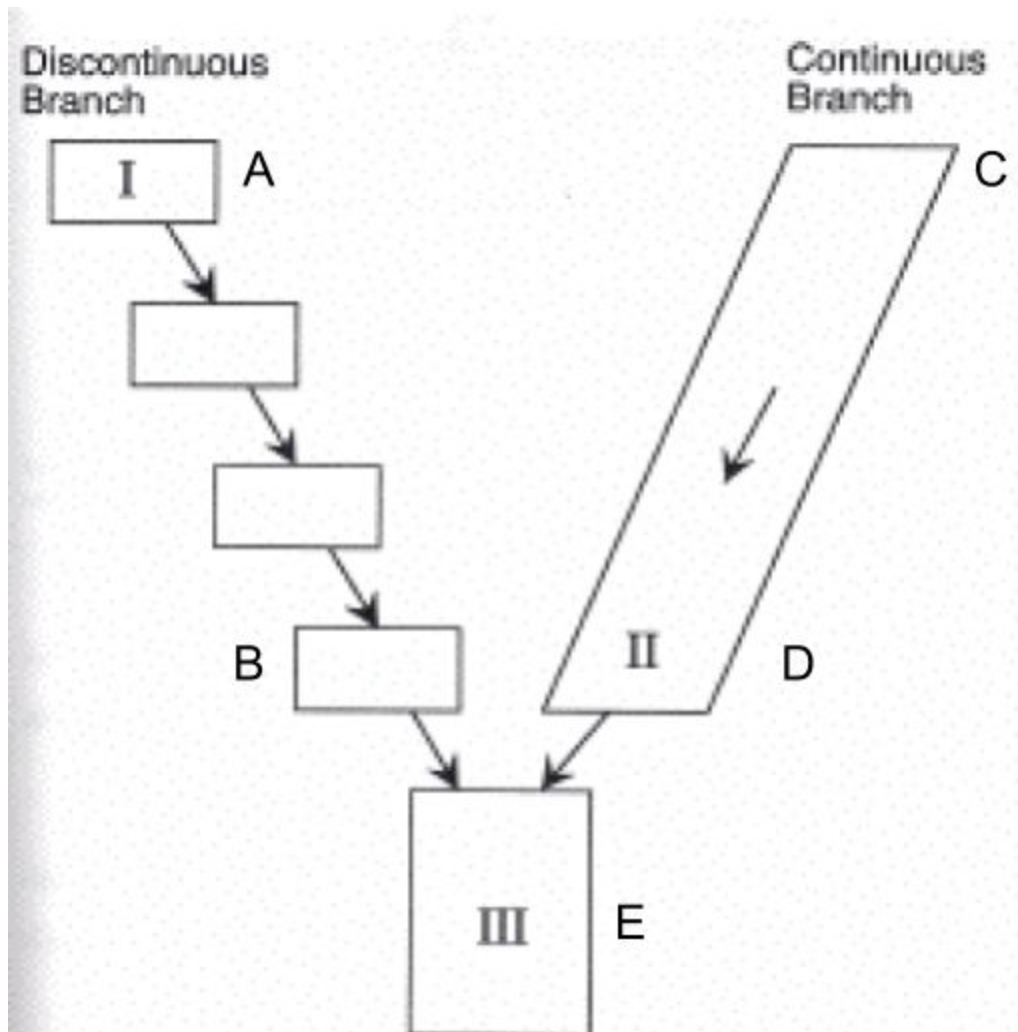
Question 10. Identify Rock Sample 10. (Limestone)

Describe the environment that Rock Sample 9 likely formed.

(Deep ocean)

**Station 5.**

Identify the mineral and indicate where on Bowen's reaction series the mineral belongs.



Question 11. Identify Mineral Sample 11. (Albite)

Question 12. Where on Bowen's Reaction Series does Mineral Sample 11 belong? (D)

Question 13. Identify Mineral Sample 12. (Olivine)

Question 14. Where on Bowen's Reaction Series does Mineral Sample 12 belong? (A)

Question 15. Identify Mineral Sample 13. (Quartz)

Question 16. Where on Bowen's Reaction Series does Mineral Sample 13 belong? (E)

Question 17. Identify Mineral Sample 14. (Biotite)

Question 18. Where on Bowen's Reaction Series does Mineral Sample 14 belong? (B)

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### Station 6.

Indicate if the below minerals are used in

- A. Electronics
- B. Food Preservation
- C. Health/Beauty
- D. Industrial
- E. Construction / Housing

Question 19. Identify mineral sample 15 (Gypsum)

Question 20. How is this mineral used? (Construction / Housing)

Question 21. Identify mineral sample 16 (Muscovite)

Question 22. How is this mineral used? (Health / Beauty)

Question 23. Identify mineral sample 17 (Halite)

Question 24. How is this mineral used? (Food Preservation)

Question 25. Identify mineral sample 18 (Lepidolite)

Question 26. How is this mineral used? (Electronics)

Question 27. Identify mineral sample 19 (Quartz)

Question 28. How is this mineral used? (Electronics, Industrial, Construction / Housing)

### Station 7.

Question 29. Identify one mineral present in Rock Sample 20. (Gabbro)

Question 30. Describe the texture of Rock Sample 20. (Phaneritic)

Question 31. Identify one mineral present in Rock Sample 21. (Basalt)

Question 32. Describe the texture of Rock Sample 21. (Vesicular)

Question 33. Identify one mineral present in Rock Sample 22. (Basalt)

Question 34. Describe the texture of Rock Sample 22. (Porphyritic)

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**Station 8.**

What is the chemical composition of the following minerals?

Quartz:  $(\text{SiO}_2)$

Hematite:  $(\text{Fe}_2\text{O}_3)$

Pyrite:  $(\text{FeS}_2)$

Calcite:  $(\text{CaCO}_3)$

Dolomite:  $(\text{CaMg}(\text{CO}_3)_2)$

**Station 9.**

Question 35. Identify mineral sample 23. (Galena)

Question 36. How many cleavage does this minerals express?

A. None

B. One

C. Two

**D. Three**

E. Four

What characteristic of the mineral determines how many directions of cleavage are possible.

**(The mineral structure allows for bonds two break in flat planes and at right angles)**

**Station 10.**

Examine the following rock samples. What is the parent rock of the samples?

**(Shale)**

Describe the process that forms these rocks.

**(Shale is compressed in a convergent continental boundary, creating a regional metamorphic zone. The area is characterized by high tectonic pressure and high heat.)**

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**Station 11.**

What mineral identification properties are more likely to lead to a mineral being classified as a gemstone?

(The gemstones are all on the upper end of the Moh's hardness scale. These minerals are resistant to scratching and are less likely to break down over time.)

**Station 12.**

Question 37 and 38. What two minerals are classified as carbonates? (Calcite and Dolomite)

Question 39, 40, and 41. What three rocks are composed of carbonate minerals?

(Limestone, Chalk, Marble)

Carbonate minerals effervesce when HCl is applied to the sample. What gas is released during this reaction?

(CO<sub>2</sub>)

**Station 13.**

Question 42. Identify the Mineral Sample 24. (Apatite)

What is the chemical formula for this mineral?

$\text{Ca}_5(\text{PO}_4)_3(\text{F,Cl,OH})$

While it is not technically a mineral, how is this chemical formula important for life?

(Human bones are composed of the above mineral.)

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**Station 14.**

The following rock sample is from Pikes Peak, Colorado.

Question 43, 44, and 45. Identify the three minerals in this rock sample.

(Microcline, Quartz, Muscovite)

What mineral forming environment did this rock form?

(Igneous, intrusive)

What is that name of this rock?

Pegmatite (2 points) Granite (1 point)

**Station 15.**

Question 46. Identify the following Rock Samples. (Gneiss)

Question 47. Name one mineral present in these samples. (Orthoclase, Quartz, Biotite)

What is the parent rock does this rock originate from?

(Granite)

**Station 16.**

Question 48. Identify the following Mineral Sample. (Staurolite)

What is the name of the mineral phenomenon commonly expressed in this mineral?

(Penetration twin (2 points) Twinning (1 point))