

2002 NEW MEXICO REGIONAL SCIENCE OLYMPIAD
LOS ALAMOS
Rocks and Minerals
Answer Key

Station 1 – Physical Properties of Minerals

Identify the five minerals at this station and place them in their relative order, from softest to hardest, on Mohs hardness scale. A glass slide is provided.

Gypsum

Calcite

Apatite

Orthoclase

Topaz

Station 2 – Economic Uses of Minerals

Identify the mineral or minerals in each of these specimens and name an economic use for each mineral. A streak plate and magnet are provided.

<u>Mineral Name</u>	<u>Economic Use</u>
<i>Specimen A (2 minerals)</i> Reddish yellow Sphalerite	Ore of Zinc
Cubic Galena	Ore of Lead
<i>Specimen B</i> Hematite	Ore of Iron
<i>Specimen C</i> Barite	Drilling mud
<i>Specimen D</i> Black mineral Magnetite	Ore of Iron
<i>Specimen E (2 minerals)</i> Blue Azurite	Ore of Copper
Green Malachite	Ore of Copper

Station 3 – Rock Classification

There are 6 rocks at this station. Identify each rock according to its general rock classification (igneous, metamorphic, and sedimentary) and then give each rock a rock name.

<u>General Classification</u>	<u>Rock Name</u>
A Igneous	Vesicular basalt
B Metamorphic	Muscovite schist
C Sedimentary	Sandstone
D Igneous	Granite
E Metamorphic	Marble
F Sedimentary	Conglomerate

Station 4 – Depositional Environments

Name these four sedimentary rocks and describe where they were deposited (e.g., beach, stream, alluvial fan).

<u>Rock Name</u>	<u>Depositional Environment</u>
A Travertine	Spring
B Fossiliferous limestone	Marine
C Sandstone	Difficult to determine; layered; quiet water
D Conglomerate	Alluvial fan or stream

Station 5 – Economic Uses of Rocks

Name the four rocks at this station and give an economic use (e.g., building stone, road construction).

<u>Rock Name</u>	<u>Economic Use</u>
A Pumice	Blue jean softener; abrasive
B Limestone	Cement; road material
C Scoria	Landscaping; road material
D Marble	Building stone

Station 6 – Degree of metamorphism

Name these metamorphic rocks and place them in order of increasing metamorphism.

Phyllite

Staurolite garnet muscovite schist

Gneiss

What is the brown, elongated mineral in the specimen labeled A?

Staurolite [Also accept garnet]

Station 7 – Depth of igneous rock emplacement

Name the six igneous rocks at this station and classify them as plutonic, volcanic, or hypabyssal.

<u>Rock Name</u>	<u>Plutonic, Volcanic, or Hypabyssal?</u>
A Gabbro	Plutonic
B Diorite	Plutonic
C Basalt porphyry	Hypabyssal
D Pumice	Volcanic
E Porphyritic granite	Plutonic
F Obsidian	Volcanic

Station 8 – Mineral Identification

1. Identify these two minerals. What properties did you use to make your decision?

- A. **Hornblend** **Cleavage**
- B. **Pyroxene**

2. Which of these two minerals have the higher specific gravity? What are these two minerals?

- C. **Barite** **Higher specific gravity**
- D. **Gypsum**

3. What is this mineral? What properties did you use to make your decision?

- E. **Plagioclase feldspar** **Striations & Cleavage**

Station 9 – Crystal Form versus Cleavage

Define crystal form.

Crystal shape acquired as crystal grows

Define cleavage

Shape resulting from breakage along planes of weakness

Examine these five minerals. Which minerals show crystal form and which show cleavage? What is the geometry of the crystal form or cleavage (e.g., cubic, hexagonal)?

Crystal form or cleavage?

Geometry of crystal form or cleavage?

A Form

Cubic

B Cleavage

Rhombohedral

C Form

Hexagonal

D Form

Cubic (Accept isometric)

E Cleavage

Octahedral (Accept isometric)

Station 10 – Tell me a story

Examine this pebble, which is from the banks of the Rio Grande. Name the two rock types preserved in this pebble. Explain the geologic history of this pebble.

Metamorphic (Gneiss) and Igneous (Diorite)

- **Parent rock, either a sediment or granite, metamorphosed to become a gneiss.**
- **Intruded by diorite.**
- **Rock eroded and carried by Rio Grande.**