



Exploring the World of Science

Inaugural University of Michigan
Science Olympiad Invitational Tournament

Rocks and Minerals

Test length: 50 Minutes

Team number: _____

School name: _____

Student names: _____

UMSO Rocks and Minerals 2018

Each team is allowed up to 2 participants. Each team may bring one magnifying glass and one three-ring binder of any size containing information in any form and from any source attached using the available rings; which may be removed during the event.

Participants will move from station to station, with the length of time at each station predetermined and announced by the event supervisor. Participants may not return to stations, but may change or add information to their original responses while at other stations.

The test will be a total of 50 minutes. The test will consist of 15 stations, with each station being 3 minutes long. Move directly to the next station as each rotation will begin immediately. Give yourself enough time to return each specimen to its original position.

Several stations ask for you to identify the type of each sample (i.e. rock type, mineral class). When answering this question, be as specific as possible. For example, name the igneous rock type, class of sedimentary, and foliation of metamorphic.

The first three tiebreakers are marked on the answer sheet.

Station Number	Points	Total	Station Number	Points	Total
1		9	10		8
2		12	11		11
3		8	12		10
4		12	13		5
5		7	14		16
6		5	15		15
7		8			
8		10	Overall Score		140
9		4	Placement		45

Station 1

1. Give the name of each specimen.
 - a. Sample 1A:
 - b. Sample 1B:
 - c. Sample 1C:
 - d. Sample 1D:
2. Identify the type of each sample (i.e. rock type, mineral class)
 - a. Sample 1A:
 - b. Sample 1B:
 - c. Sample 1C:
 - d. Sample 1D:
3. What is an important economic use of sample 1B?

Station 2

1. Give the name of each specimen.
 - a. Sample 2A:
 - b. Sample 2B:
 - c. Sample 2C:
 - d. Sample 2D:
 - e. Sample 2E:
2. Identify the type of each sample (i.e. rock type, mineral class)
 - a. Sample 2A:
 - b. Sample 2B:
 - c. Sample 2C:
 - d. Sample 2D:
 - e. Sample 2E:
3. Samples A and B have a very similar appearance. What key characteristic regarding their cleavage differentiates the two?

Station 3

1. Give the name of each specimen.
 - a. Sample 3A:
 - b. Sample 3B:
2. For each sample, identify whether its composition is mafic, felsic, or intermediate. If not igneous, then what is the rock type?
 - a. Sample 3A:
 - b. Sample 3B:
3. What causes the difference in color between mafic, felsic, and intermediate rocks?

4. Each specimen is formed within a specific volcanic setting – either above or beneath Earth’s surface. In what way does the formation of each sample differ? (Tie-breaker #3)

Station 4

1. Give the name of each specimen.
 - a. Sample 4A:
 - b. Sample 4B:
 - c. Sample 4C:
2. Identify the type of each sample (i.e. rock type, mineral class)
 - a. Sample 4A:
 - b. Sample 4B:
 - c. Sample 4C:
3. Sample 4A is often mistaken for gold; however, several characteristics differentiate the two. Compare their specific gravity, hardness, and streak.

4. Aside from their similar appearance, give another reason as to why Sample 4A might be mistaken for gold.
5. Is there any relationship between Samples B and C. If so, what is it?

Station 5

1. Give the name of each specimen.
 - a. Sample 5A:
 - b. Sample 5B:
2. Identify the type of each sample (i.e. rock type, mineral class)
 - a. Sample 5A:
 - b. Sample 5B:
3. Sample 5A has a distinctive crystal structure. What is the name of this structure?
4. Describe the formation of this crystal structure.
5. What is an economic use of sample B?

Station 6

- 1.
- 2.
- 3.
- 4.
- 5.

Station 7

1. Give the name of each specimen.
 - a. Sample 7A:
 - b. Sample 7B:
 - c. Sample 7C:

2. Identify the type of each sample (i.e. rock type, mineral class)
 - a. Sample 7A:
 - b. Sample 7B:
 - c. Sample 7C:
3. Sample 7B and C are typical volcanic rocks. What type of volcano is associated with these types of rock? (Tie-breaker #2)

Station 8

1. Give the name of each specimen.
 - a. Sample 8A:
 - b. Sample 8B:
 - c. Sample 8C:
2. Identify the type of each sample (i.e. rock type, mineral class)
 - a. Sample 8A:
 - b. Sample 8B:
 - c. Sample 8C:
3. What are at least two similarities and two differences between Samples A and B?

Station 9

- 1.
- 2.
- 3.
- 4.

Station 10

1. Give the name of each specimen.
 - a. Sample 10A:
 - b. Sample 10B:
2. Identify the type of each sample (i.e. rock type, mineral class)
 - a. Sample 10A:
 - b. Sample 10B:
3. Using Moh's hardness scale, what is the hardness of each sample?
 - a. Sample 10A:
 - b. Sample 10B:
4. Describe the formation of Sample B.

Station 11

1. Give the name of each specimen.
 - a. Sample 11A:
 - b. Sample 11B:
 - c. Sample 11C:
2. Identify the mineral habit of each sample. If not a mineral, indicate as such.
 - a. Sample 11A:
 - b. Sample 11B:
 - c. Sample 11C:
3. What is the streak color of each sample? If not a mineral, indicate as such.
 - a. Sample 11A:
 - b. Sample 11B:
 - c. Sample 11C:
4. List a unique property for Sample 11B and 11C.
 - a. Sample 11B:
 - b. Sample 11C:

Station 12

1. Give the name of each specimen.
 - a. Sample 12A:
 - b. Sample 12B:
 - c. Sample 12C:
2. Identify the type of each sample (i.e. rock type, mineral class)
 - a. Sample 12A:
 - b. Sample 12B:
 - c. Sample 12C:
3. Describe the angularity and clast size of each. If not sedimentary, indicate as such.
 - a. Sample 12A:
 - b. Sample 12B:
 - c. Sample 12C:

Station 13

- 1.
- 2.
- 3.
- 4.
- 5.

Station 14:

1. Give the name of each specimen.
 - a. Sample 14A:
 - b. Sample 14B:
 - c. Sample 14C:
 - d. Sample 14D:
2. Each of the samples are of the same type: foliated metamorphic rock. List the processes during which foliation takes place.
3. What are the three main types of metamorphism, and in which type does foliation take place?

4. Give the metamorphic grade for each sample.
 - a. Sample 14A:
 - b. Sample 14B:
 - c. Sample 14C:
 - d. Sample 14D:
5. List the samples in order of metamorphism.

Station 15 (Tie-breaker #1)

1.

2.

3.