## SI Geology - Full Discipline Demo

#### **Minerals**

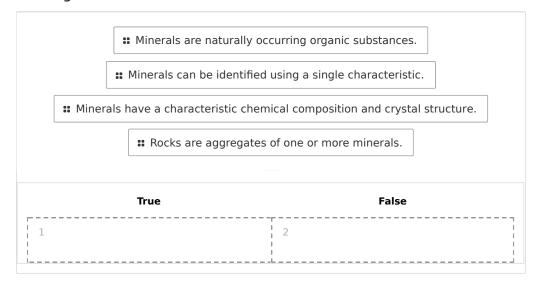
#### Final Report - Answer Guide

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**Instructor** Sales SI Demo

#### Test Your Knowledge

1. Categorize each statement as true or false.



#### Correct answers:

 ${\mathbb 1}$  Minerals have a characteristic chemical composition and crystal structure.

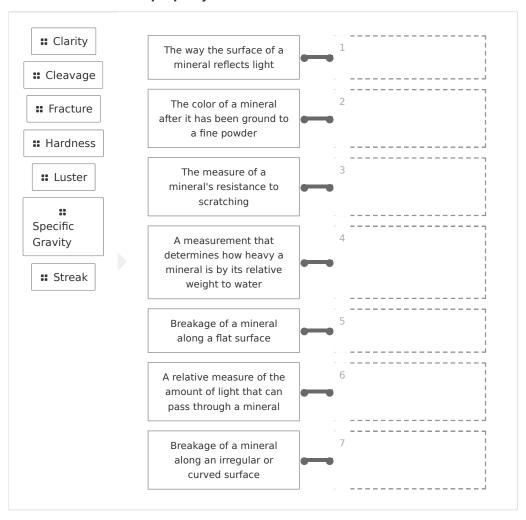
Rocks are aggregates of one or more minerals.

2 Minerals are naturally occurring organic substances.

Minerals can be identified using a single characteristic.



#### 2. Match the mineral property to its definition.



#### Correct answers:

- 1 Luster 2 Streak 3 Hardness 4 Specific Gravity 5 Cleavage
- <sup>6</sup> Clarity <sup>7</sup> Fracture

## Exploration

structure.	
<ul><li>crystalline</li></ul>	~
organic	
effervescent	
translucent	
2. What is the luster of a nonmetallic mineral that is described as iridescent?	
<ul><li>vitreous</li></ul>	
o pearly	~
adamantine	
silky	
<ul><li>True</li><li>False</li></ul>	<b>~</b>
4 occur as a result of parallel planes of weakness between reparallel layers of atoms in a crystal.	eating,
Cleavage planes	
Cleavage directions	
Cleavage surfaces	<b>~</b>
Conchoidal fractures	
5. Specific gravity is a unitless measurement that determines how he	eavy a
mineral is by its relative weight to water.	
○ True	~
False	



## Exercise 1

			What does thi	s tell you about the
pful to know the	specific gravi	ty of an unkno	own mineral?	
				ained impurities (i.e
			would each s	ource or error
	Ipful to know the	Ipful to know the specific gravity be a so not normally part of a mineral part of a	Ipful to know the specific gravity of an unknown a mineral's specific gravity be affected if the s not normally part of a mineral's atomic structure.	Ipful to know the specific gravity of an unknown mineral?  a mineral's specific gravity be affected if the mineral contains not normally part of a mineral's atomic structure)?

Data Table 1: Specific Gravity of the Mineral Samples  $({\sf SAMPLE}\ {\sf ANSWER}\ {\sf BELOW})$ 

Sample	Dry Mass (g)	Total Volume (mL)	Mineral Volume (mL)	Specific Gravity
1	33.1	209	9	3.5-6.0
2	7.5	204	4	1.9-2.5



3	3.0	209	9	2.5-4.0
4				
5				
6	45.7	211	11	4.0-5.3
7	26.8	210	10	2.5-2.9
8	36.9	212	12	2.0-3.5
9	22.6	210	10	2.0-3.5
10				
11	23.9	209	9	2.5-3.4
12	34.8	212	12	1.5-3.2

### Exercise 2

<ol> <li>What physical property or combination of properties were the most helpful in helping you</li> <li>identify the minerals? Why?</li> </ol>						

2. Examine the properties of gold listed in the table below and compare them to properties of Mineral Sample 1 listed in Data Table 2. What properties of Mineral Sample 1 could be used to distinguish it from gold?

Property	Native Gold
Luster	Metallic
Color/Clarity	Yellow/opaque
Streak	Yellow
Hardness	2.5-3.0
Cleavage	Absent (ductile and malleable)
Specific Gravity	19.3



3. What is the common nickname for Mineral Sample 1? Based on your answer to Question 2, do you think the common nickname for Mineral Sample 1 is accurate? Why or why not?						

Data Table 2: Mineral Properties

(SAMPLE ANSWER BELOW)							
Sample	Luster	Color/Clarity	Streak	Hardness	Cleavage	Specific Gravity	Magnetic (Y,
1	Metallic	Brassy yellow/opaque	Dark gray or black	6.0 or 6.5	Uneven fracture	3.5-6.0	No
2	Vitreous	Colorless or white/transparent or translucent	White	2.5	3 at 90°		No
3	Vitreous	Dark brown/translucent to opaque	Gray- brown	2.5 or 3.0	One excellent	2.5-4.0	No
4	Dull/earthy	White or tan/opaque	White	1.0-2.0	Absent		No
5	Metallic	Silver, gray, or black/opaque	Red- brown	6.0	Uneven fracture		No
6	Metallic	Silver, gray, or black/opaque	Dark gray	6.0	Uneven fracture		Yes
7	Vitreous or pearly	Colorless, white, or gray/opaque	White	6.0	2 at 90°		No
8	Vitreous	Pink or orange- brown/opaque	White	6.0	2 at 90°	2.0-3.5	No
9	Vitreous or iridescent	Colorless or white/transparent or translucent	White	3.0	3 not at 90°	2.0-3.5	No
10	Vitreous	Red or brown/opaque to translucent	White	7.0	Uneven fracture		No
11	Vitreous	Dark green or black/opaque	White or pale gray	5.5	2 not at 90°		No
12	Vitreous or greasy	White, pink, gray/transparent or translucent	None	7.0	Conchoidal fracture	1.5-3.5	No

Data Table 3: Mineral Identification



(SAMPLE ANSWER BELOW)

(SAMPLE ANSWER BLLOW)	
Sample	Mineral Name
1	Pyrite
2	Hailte
3	Biotite
4	Kaolinite
5	Hematite
6	Magnetite
7	Plagioclase
8	Potassium Feldspar
9	Calcite
10	Garnet
11	Amphibole
12	Quartz

# Photo 1: Mineral Samples (SAMPLE ANSWER BELOW) No sample answer provided

ompetency Review	
1. A mineral is described as being opaque. What mineral cha being evaluated?	racteristic is
Color	
<ul><li>Luster</li></ul>	
<ul><li>Clarity</li></ul>	<b>~</b>
<ul><li>Hardness</li></ul>	
2. Which characteristic does not describe a mineral?	
Characteristic chemical compound	
<ul><li>Organic</li></ul>	<b>~</b>
<ul> <li>Crystalline structure</li> </ul>	
<ul> <li>Naturally occurring</li> </ul>	



3. The color and Streak of a mineral are always the same.	
○ True	
False	<b>✓</b>
4. A mineral that splits into parallel sheets would exhibit what type of cleavage?	
Rhombohedral cleavage	
Cubic cleavage	
Prismatic cleavage	
Basal cleavage	<b>✓</b>
5. A mineral has a dry mass of 30.1 g and a volume of 7.30 mL. What is a specific gravity of the mineral?	the
4.12	<b>~</b>
7.30	
5.77	
○ 3.48	
6. If a mineral scratches a copper penny, but not an iron nail, it has a hardness	
between 5.5 and 6.5	
<ul><li>less than 2.5</li></ul>	
<ul><li>between 3.5 and 4.5</li></ul>	<b>✓</b>
greater than 7	

7. Minerals containing	_ will effervesce when exposed to acid.
o sodium chloride	
calcium carbonate	<b>~</b>
<ul><li>calcium chloride</li></ul>	
iron	
8 is a metallic minera and a dark gray streak.	Il that is magnetic and exhibits uneven fracture
<ul><li>Pyrite</li></ul>	
<ul><li>Hematite</li></ul>	
<ul><li>Amphibole</li></ul>	
<ul><li>Magnetite</li></ul>	<b>✓</b>
9. A mineral displays a dull < 2.5. What is the identity	/earthy luster, a white streak and a hardness of of this mineral?
O Potassium Feldspar	
Plagioclase Feldspar	
Kaolinite	<b>✓</b>
Garnet	
10. Specific gravity has uni	its of g/mL.
O True	
False	<b>✓</b>

## **Extension Questions**

1. Marble is a rock that is composed primarily of the carbonate minerals calcite ( $CaCO_3$ ) and dolomite (Ca,Mg)( $CO_3$ )<sub>2</sub>). Why do you think people who care for outdoor monuments and sculptures made of marble are concerned about acid rain? (SAMPLE ANSWER BELOW)

Calcite effervesces (degrades) when exposed to acid. Therefore, acid rain will cause marble to weather or degrade over time. Long term, this may result in the destruction of the historic monuments/sculptures.



