



## METHOD 1

# Lunar Geology

Scientists can use the amount of mineral abundance to identify a lunar rock. The beads in the bottle are classified and then the amount of each mineral is determined. A rock is then identified by the percent of each mineral found in the sample. The minerals and the elements that compose the minerals in lunar rock are listed along with their appearance in the table below:

Mineral	Elements	Appearance
Plagioclase Feldspar	Calcium, aluminum, silicon, oxygen	White
Pyroxene	Iron, magnesium, calcium, silicon, oxygen	Brown
Olivine	Iron, magnesium, silicon, oxygen	Greenish
Ilmenite	Iron, titanium, oxygen	Black

Use the following procedure and the attached tables to identify each rock sample.

1. Review the mineral abundance table (Table 1). Look at the percent of each type of mineral and their colors.
2. Identify the colors (minerals) that exist in each sample.
3. Estimate the number/percentage of each type of mineral (beads) in the bottle and record the estimated percentage on the data sheet.
4. Using Table 1 and your data sheet, identify the type of rock and record on the data sheet.
5. Repeat steps 2-4 for all samples.

**Table 1 - Mineral Abundance (percent) in Moon Rocks**

Type of Moon Rock	Plagioclase Feldspar (white)	Pyroxene (brown)	Olivine (green)	Ilmenite (black)
<b>Highland Rocks</b>				
Anorthosite	90%	5%	5%	0%
Norite	60%	35%	5%	0%
Troctolite	60%	5%	35%	0%
<b>Mare Basalts</b>				
High Titanium	28%	51%	3%	18%
Low Titanium	30%	60%	5%	5%
Very Low Titanium	35%	55%	8%	2%



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**Data Table – Estimated Mineral Abundance (%) in Moon Rocks from Bottle samples**

Sample ID	Plagioclase Feldspar (white)	Pyroxene (brown)	Olivine (green)	Ilmenite (black)	Type of Moon Rock
A					
B					
C					
D					
E					
F					



## METHOD 2

# Lunar Geology

### Identifying Lunar Samples by Percentage of Minerals

Scientists can use the amount of mineral abundance to identify a lunar rock. The beads in the sample are classified and then the amount of each mineral is determined. A rock is then identified by the percent of each mineral found in the sample. The minerals and the elements that compose the minerals in lunar rock are listed along with their appearance in the table below:

Mineral	Elements	Appearance
Plagioclase Feldspar	Calcium, aluminum, silicon, oxygen	White
Pyroxene	Iron, magnesium, calcium, silicon, oxygen	Brown
Olivine	Iron, magnesium, silicon, oxygen	Greenish
Ilmenite	Iron, titanium, oxygen	Black

Use the following procedure and the attached tables to identify each rock sample.

1. Review the mineral abundance table (Table 1). Look at the percent of each type of mineral and their colors.
2. Identify the colors (minerals) that exist in each sample.
3. Count the number of each type of mineral (beads) on the top surface of the sample and record on the data sheet.
4. Repeat step 3 for the bottom surface.
5. Calculate the Total beads/minerals present by adding the number of all the colored beads/minerals found in the sample.
6. Calculate the percentage of each bead/mineral present using the following formula:

$$\text{number of beads (of a particular color)} \div \text{total number of beads in sample} \times 100 = \text{Percent}$$

7. Using Table 1 and your data sheet, identify the type of rock and record on the data sheet.
8. Repeat steps 3-7 for all samples.





**Table 1 - Mineral Abundance (percent) in Moon Rocks**

Type of Moon Rock	Plagioclase Feldspar (white)	Pyroxene (brown)	Olivine (green)	Ilmenite (black)
<b>Highland Rocks</b>				
Anorthosite	90%	5%	5%	0%
Norite	60%	35%	5%	0%
Troctolite	60%	5%	35%	0%
<b>Mare Basalts</b>				
High Titanium	28%	51%	3%	18%
Low Titanium	30%	60%	5%	5%
Very Low Titanium	35%	55%	8%	2%

**Data Table – Sample Determination**

Type of Moon Rock	Sample
<b>Highland Rocks</b>	
Anorthosite	
Norite	
Troctolite	
<b>Mare Basalts</b>	
High Titanium	
Low Titanium	
Very Low Titanium	





