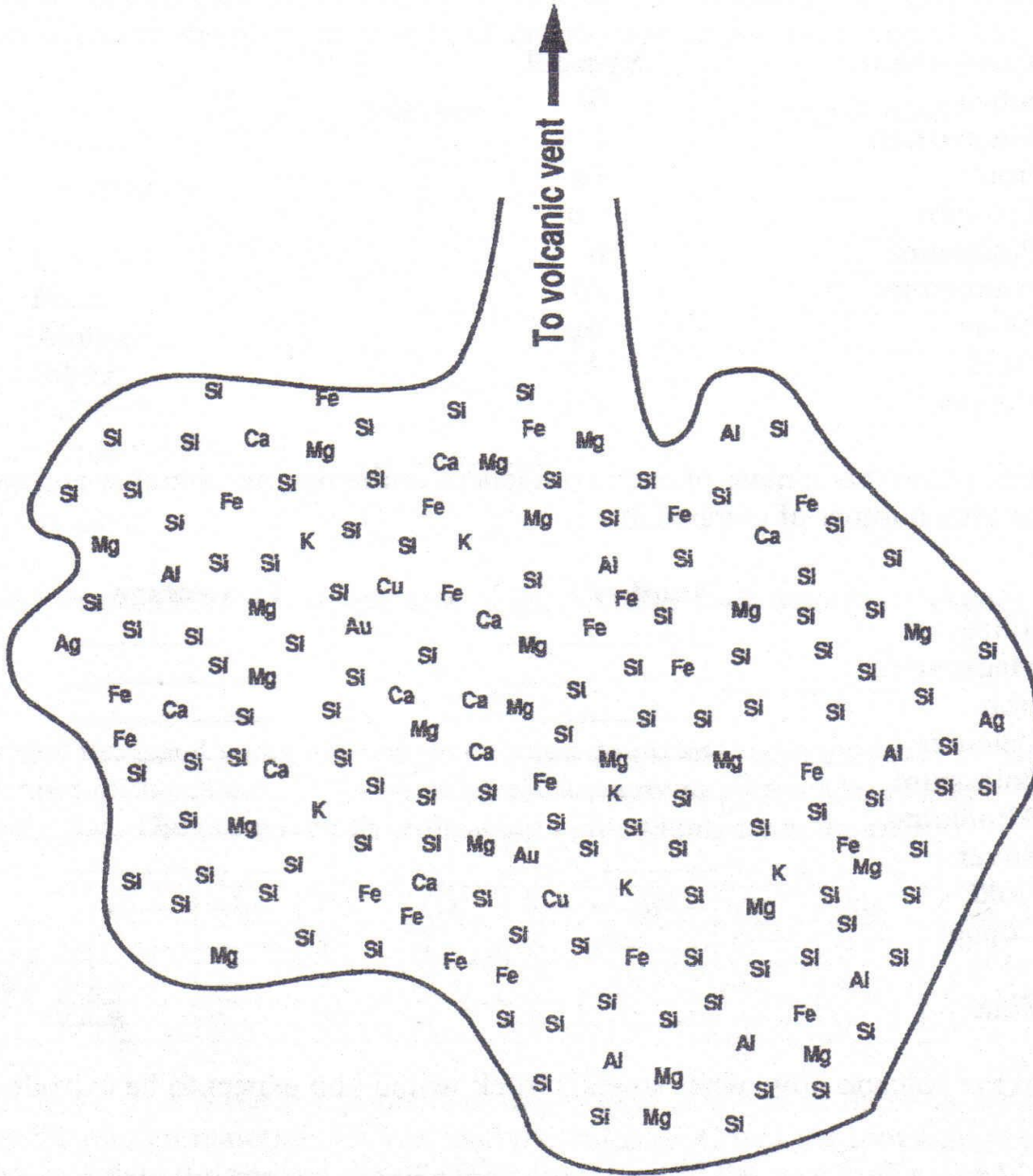


Magma Chamber Activity

A magma chamber full of molten rock has formed below the surface of the Earth. Over time it will slowly cool and some minerals will crystallize out of the magma and fall to the bottom of the chamber, leaving a residual pool of magma on the top. Every now and then this residual pool feeds a volcano on the earth's surface.



Your task is to work out what rock type will be extruded from this volcano over time as the magma chamber cools by using the silica content data in the table below

NAME:

DATE:

PD:

<i>Silica Content Table after TOTAL</i>	Volcanic rock Found
45-54%	basalt
54-62%	andesite
62-70%	dacite
70-78%	rhyolite

The original magma is made up from the following:

Component	Symbol
Silica	Si (looks like Sl on the sheet)
Magnesium	Mg
Iron	Fe
Calcium	Ca
Potassium	K
Aluminum	Al
Silver	Ag
Gold	Au
Copper	Cu

Directions: Using the diagram on the FIRST page, count the number of each component in the magma chamber and calculate its percentage of the total number of components.

element	Number	Percentage
Silica		
Magnesium		
Iron		
Calcium		
Potassium		
Aluminum		
Silver		
Gold		
Copper		
Total		100

$$\frac{\text{\# of element}}{\text{Total \# of elements}} = \frac{x}{100}$$

To find percentage, use the formula provided

If the magma fed the volcano now, what volcanic rock would you expect to be extruded?
CIRCLE the BEST answer: HINT: look at **silica content** percent and compare it to the **table**

Basalt

Andesite

Dacite

Rhyolite

NAME:

DATE:

PD:

After a few thousand years, the magma cooled and three different minerals crystallized and sunk to the bottom of the chamber. These minerals were olivine, pyroxene and amphibole and they removed the following components from the melt:

	Si	Mg	Fe	Ca	K	Al	Ag	Au	Cu
Olivine	5	5	5	0	0	0	0	0	0
Pyroxene	5	3	3	2	0	0	0	0	0
Amphibole	5	2	2	2	0	0	0	0	0

Directions: Using a writing utensil, color over these components in the magma chamber as these have now been removed from the molten material that can feed the volcano. Count the remaining components left in the melt and calculate the percentage of each component to the new total number of components.

element	Number	Percentage
Silica		
Magnesium		
Iron		
Calcium		
Potassium		
Aluminum		
Silver		
Gold		
Copper		
Total		

Show work here for calculation:

If the magma fed the volcano now, what volcanic rock would you expect to be extruded?
CIRCLE the BEST answer:

Basalt

Andesite

Dacite

Rhyolite

NAME:

DATE:

PD:

After another few thousand years, the magma cooled down and more minerals crystallized and sank to the bottom of the chamber. These minerals were more pyroxene and amphibole with a new mineral, biotite mica. They removed the following components from the melt:

	Si	Mg	Fe	Ca	K	Al	Ag	Au	Cu
Pyroxene	5	3	3	2	0	0	0	0	0
Amphibole	5	2	2	2	0	0	0	0	0
Biotite	5	2	2	0	2	2	0	0	0

Using a pencil, color over these components in the magma chamber as these have now been removed from the molten material that can feed the volcano. Count the remaining components left in the melt and calculate the percentage of each component to the new total number of components.

element	Number	Percentage
Silica		
Magnesium		
Iron		
Calcium		
Potassium		
Aluminum		
Silver		
Gold		
Copper		
Total		

Show work here for calculation:

If the remaining magma fed the volcano now, what volcanic rock would you expect to be extruded?

CIRCLE the BEST answer:

Basalt

Andesite

Dacite

Rhyolite

NAME:

DATE:

PD:

Another few thousand years pass and the magma cools. More amphibole and biotite crystallize as well as the mineral orthoclase feldspar. They removed the following components from the melt:

	Si	Mg	Fe	Ca	K	Al	Ag	Au	Cu
Amphibole	5	2	2	2	0	0	0	0	0
Biotite	5	2	2	0	2	2	0	0	0
Orthoclase	4	0	0	0	2	2	0	0	0

Using a pencil, color over these components in the magma chamber as these have now been removed from the molten material that can feed the volcano. Count the remaining components left in the melt and calculate the percentage of each component to the new total number of components.

element	Number	Percentage
Silica		
Magnesium		
Iron		
Calcium		
Potassium		
Aluminum		
Silver		
Gold		
Copper		
Total		

Show work here for calculation:

If the magma fed the volcano now, what volcanic rock would you expect to be extruded?
CIRCLE the BEST answer:

Basalt

Andesite

Dacite

Rhyolite

NAME:

DATE:

PD:

OPTIONAL

By this stage, the material in the volcanic vent has solidified and plugged the magma chamber so no more material can escape to the surface. The remaining magma gets squeezed into cracks in the surrounding rocks where it forms veins. What percentage of these veins is gold?

Gold is mined in Australia at around at 1 gram /ton. What is this as a percentage _____%

1000Kg = 1 Ton

1000g = 1 Kg

$$\frac{\text{— gram}}{\text{— Ton}} \times \text{—} = \text{—} =$$