

Do Now / Bell Ringer:

You have three minutes after the bell to complete

Carbon

Carbon may be the most important element on our planet because it is the chemical building block of all living things. The element carbon is formed in dying stars and scattered when the stars explode. Our solar system formed from such star remnants. Pure carbon comes in several forms, which include the minerals graphite and diamond (hardness = 10), and the fossil fuels bituminous coal and anthracite coal. Almost all diamonds are mined from igneous rocks that originate at an approximate depth of 150 kilometers under immense pressure. Most graphite is formed through the metamorphism of organic material in rocks closer to Earth's surface.

4. Complete the table below to show the properties of the minerals diamond and graphite.

Property	Diamond	Graphite
color	variable	
luster	nonmetallic	
hardness		

5. Explain why graphite and diamond have different properties.

6. Identify *two* uses for the mineral graphite.

If you do not complete this in three minutes, it's a zero!

Mineral Test Friday (tomorrow)

Do Now / Bell Ringer:

You have three minutes after the bell to complete

Carbon

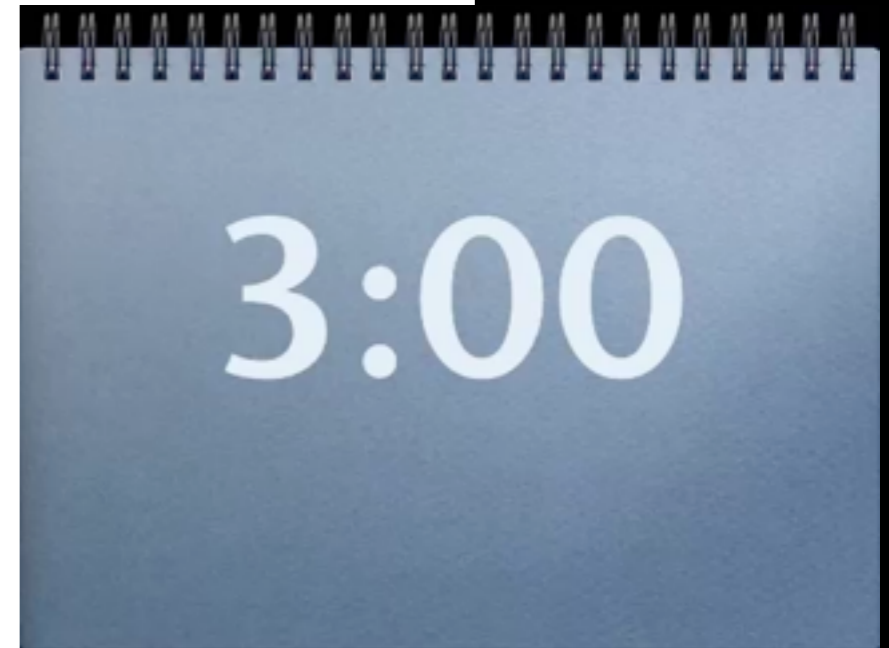
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Mineral Test Friday (tomorrow)

Minerals

What are minerals and how do we identify them?

Minerals

- Minerals are the ingredients needed to form the different types of rocks
- Rock – is any naturally formed solid that is part of Earth or any other celestial object

Minerals

- Mineral - naturally occurring, inorganic solid with a definite structure and composition where atoms are arranged in a repeating pattern
- Inorganic - not made by or composed of life forms
- Crystalline - a solid in which the atoms are arranged in a repeating pattern

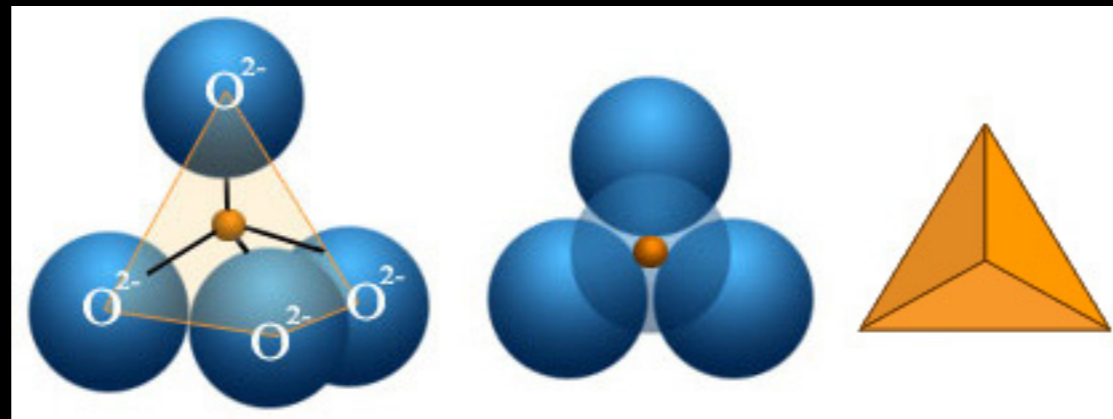
Minerals

form by three methods:

1. Crystallization - a process of organizing atoms to form crystalline solids
2. Recrystallization - the cooling and hardening of lava or magma into mineral
3. Rearrangement - the realignment of atoms in minerals under high temperature and pressure

Minerals

- Most rock forming minerals are silicates that result in a tetrahedron shape
- Four-sided units of 4 oxygens and 1 silicon



Minerals

Chemical classification	Mineral	Elements
Silicates	Orthoclase	K, Al, Si, O
	Plagioclase	Al, Si, O, Ca, Na
	Amphiboles	Mg, Fe, Ca, Na, Al, Si, O
	Pyroxenes	Al, Si, O, F, Mg, Ca, Na
	Olivine	Mg, Fe, Si, O
	Micas	K, Al, Si, O, (OH), Mg, Fe
	Clay minerals	Al, Si, O, (OH)
	Quartz	Si, O
Carbonates	Calcite	Ca, (CO ₃)
	Dolomite	Ca, Mg, (CO ₃)
Oxides	Hematite	Fe, O
Sulfates	Gypsum Anhydrite	Ca, (SO ₄), H ₂ O
Halides	Rock salt	Na, Cl

Minerals

- Crystal structure or “internal arrangement of atoms” are responsible for the physical and chemical properties a mineral possesses

Minerals

- Each mineral has a set of physical and chemical properties that can be used to identify the sample
- The methods we use to classify minerals are:

Minerals

Color

- Color – a visual attribute of an object based on perception
- One of the most obvious, but not the most reliable
- Many of the 4000 known minerals share similar colors



Minerals

Color



Smokey
Quartz



Quartz



Rose
Quartz

Minerals

Streak

- Streak – the color of finely crushed powder when a mineral is dragged across a streak plate
- Weathering changes the outside color, but streak gives the true color



Minerals

Luster

- Luster - the shine of an unweathered mineral or the way it looks in reflected light
- Two types of luster:
 1. Metallic Luster - shines like stainless steel
 2. Nonmetallic Luster - earthy or dull shine



Metallic

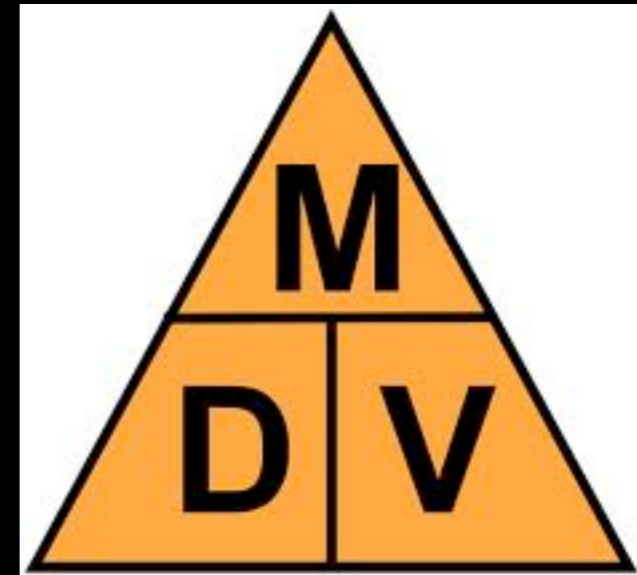


Non
Metallic

Minerals

Density

1. Density - the ratio of mass and volume of an object



Minerals

Density

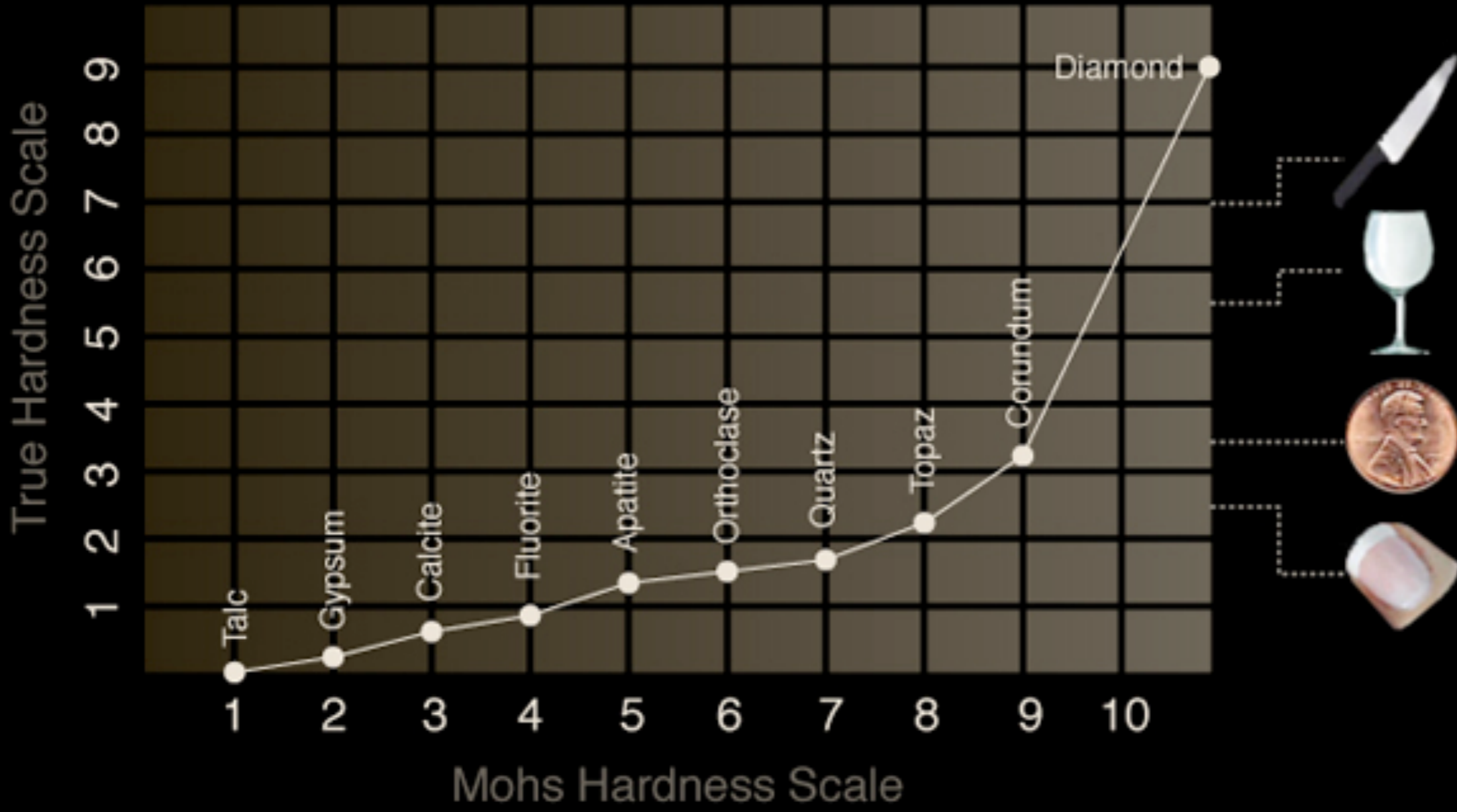
- Sample Problem: a student measures the mass of a mineral to be 350 g and calculates the volume to be 35 mL. What is the density?

Minerals

Hardness

- Hardness – resistance of a mineral to be scratched
- **Mohs Hardness Scale** is used to classify hardness





Minerals

Cleavage

- Cleavage - the tendency of a mineral to break along zones of weakness and form semi-smooth or parallel surfaces



Minerals

Cleavage



**One
Direction**



**Three
Directions at
90 degrees**

Minerals

Fracture

- Fracture - an irregular or uneven break
- Tends to lack preferred zones of weakness



Minerals

Fracture



Fibrous



Conchoidal

Minerals

Acid Test

- Acid Test – when dilute acid (HCl) is placed on a mineral it can bubble
- Calcite and Dolomite both react with acid



Minerals

Special
Properties

Magnetic
Test



Minerals

Double
Refraction

