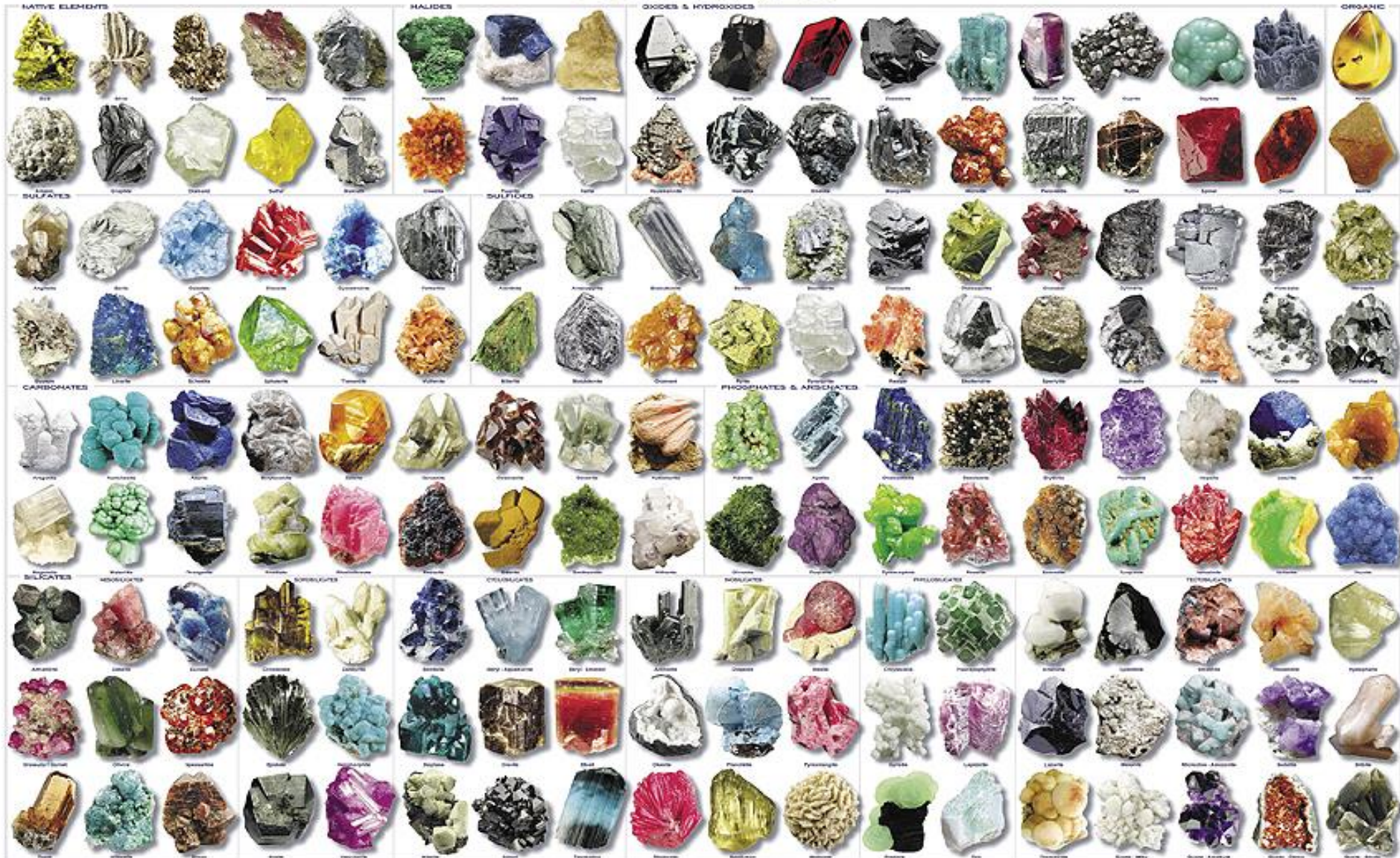


# 2.3 notes: MINERALS

## MINERALS



# Objective

Be able to identify the  
5 characteristics that  
all minerals are  
defined by



Be able to define how  
we classify and  
identify minerals

# 5 characteristics that DEFINE a mineral

1. Minerals are naturally occurring



1. Minerals are solid

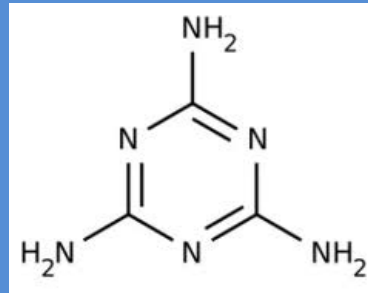


2. Orderly crystal structure



# 5 characteristics that DEFINE a mineral

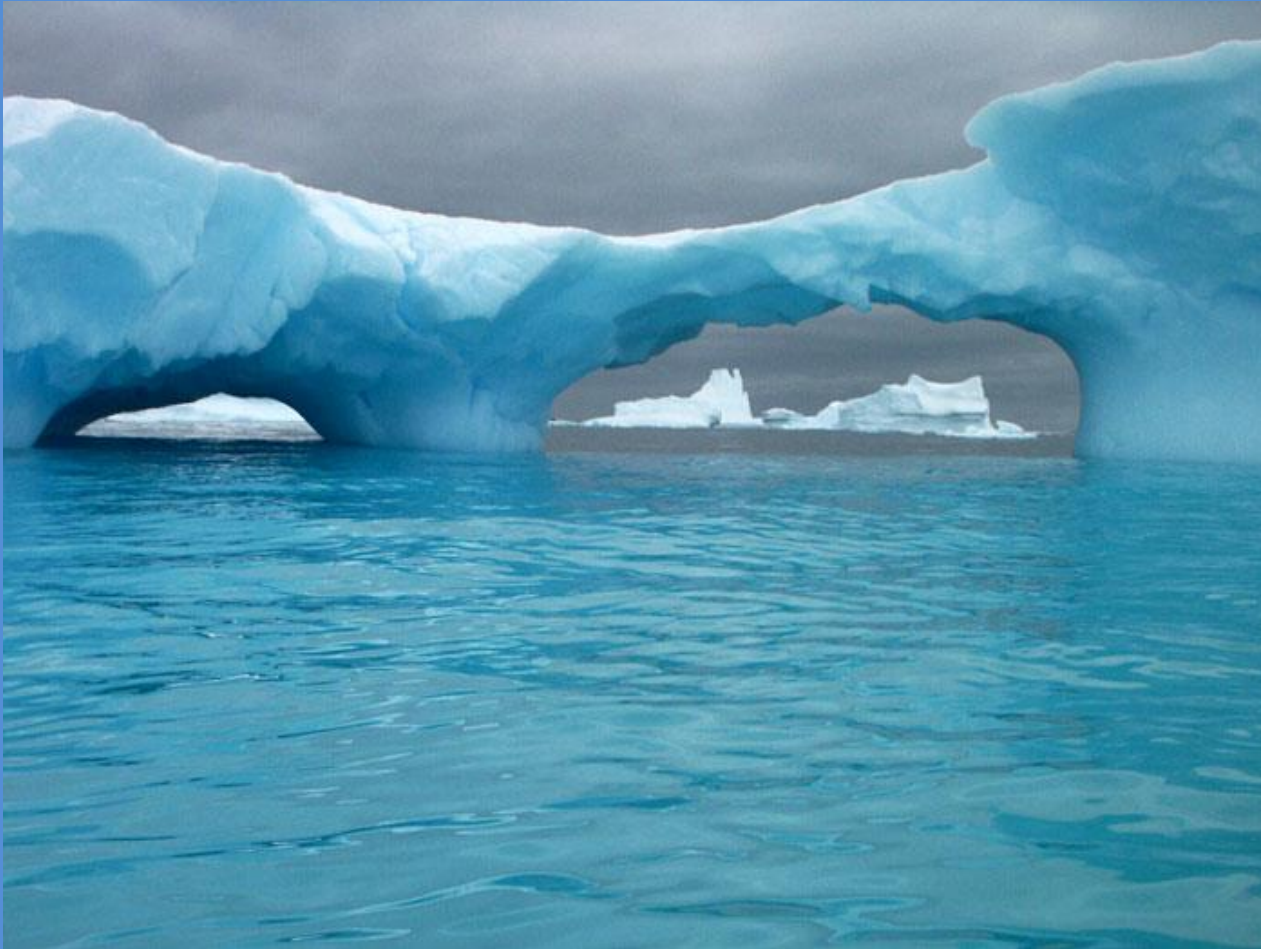
4. Minerals have a definite chemical composition



5. Minerals are inorganic (least important)



# Is ice a mineral?



YES!

It is naturally occurring  
Solid  
Definite chemical comp  
 $H_2O$   
Crystalline structure  
Inorganic

# How do we identify minerals?

- There are roughly 3,000 minerals that have been discovered on earth.
- Many of them look the same and have similar properties
- How do we identify which one is which?

Calcite



Halite



# How do we identify Minerals?

- We must use a series of tests and observations in order to identify the our minerals



# How do we identify minerals?

- **Color:** The color of the mineral

Not a good identifier of minerals because

- two different minerals could have exact same color
- one mineral might exhibit many colors





Beryl

Both minerals are the same color



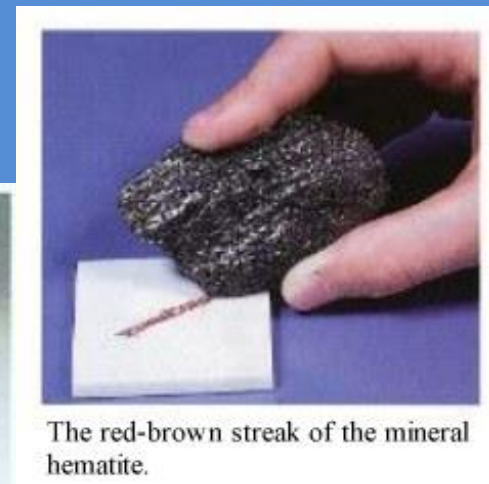
Tourmaline

Quartz comes in many colors



# How do we identify minerals?

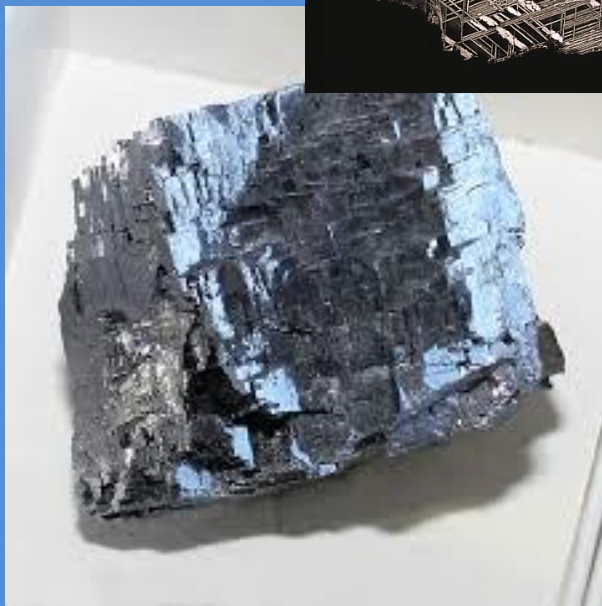
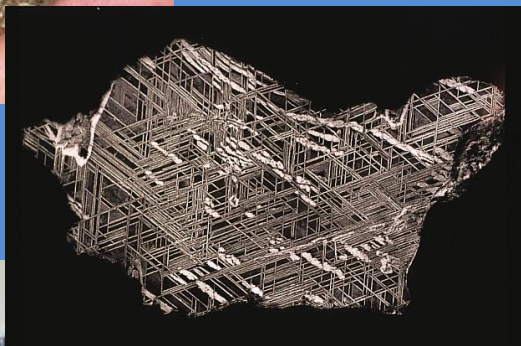
- **Streak:** the color of the mineral when it is powdered
- Obtained by rubbing mineral across a plate of unglazed porcelain



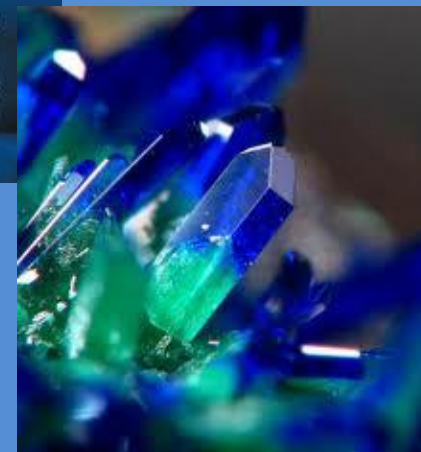
# How do we identify minerals?

- **Luster:** describes how light is reflected off of the mineral
- Two ways to describe luster:
  - Metallic- has a metal appearance, very shiny
  - Non-metallic- does not appear like a metal, but can still shine

# Metallic

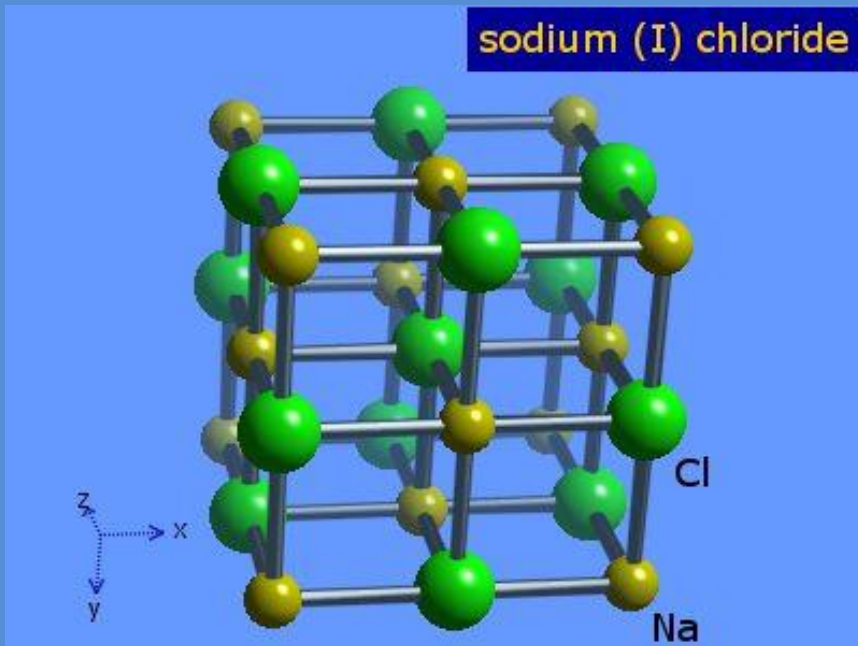


# Non-metallic



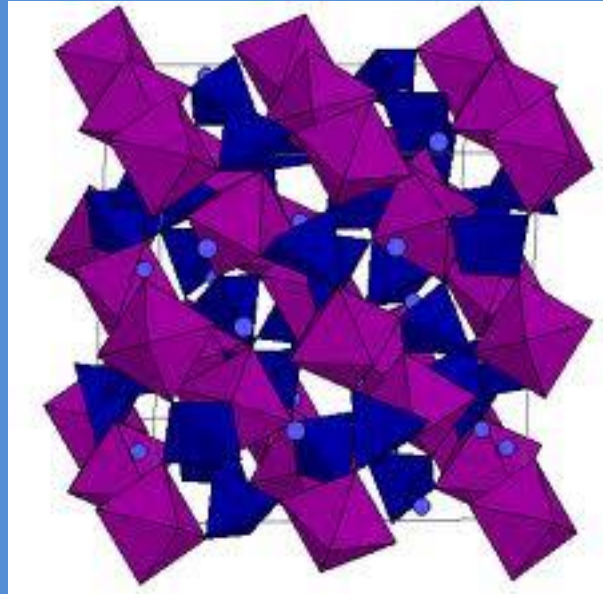
# How do we identify minerals?

- **Crystal form:** The visible expression of a mineral's arrangement of molecules

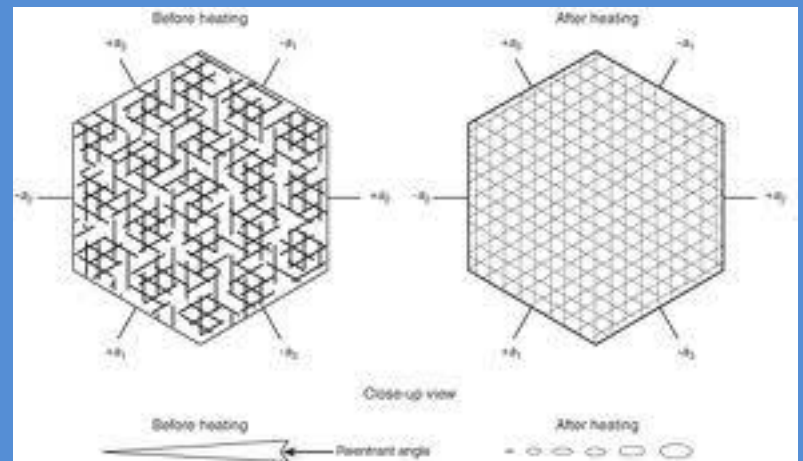


HALITE: cubic

# Garnet



# Corundum



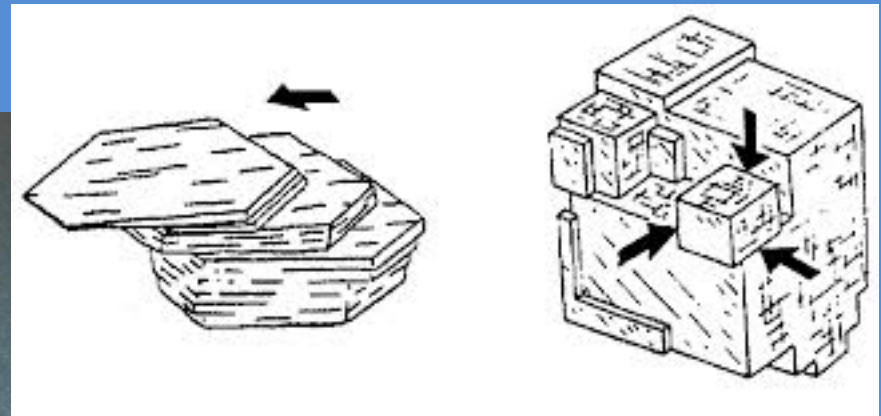
# How do we identify minerals?

- Hardness: the measure of the resistance of a mineral to being scratched.
- Measure hardness using **Moh's Hardness scale**
  - Is a scale from 1-10, 10 being the hardest mineral, 1 being the softest.

Mineral	Mohs relative Hardness	Scratch Test
Talc	1	scrapeable with fingernail
Gypsum	2	scracheable with fingern.
Calcite	3	scr. with copper coin
Fluorite	4	easily scr. with knife
Apatite	5	still scr. with knife
Orthoclase	6	scr. with steel file
Quartz	7	scratches window glass
Topaz	8	scratches quartz
Corundum	9	scratches topaz
Diamond	10	scratches corundum

# How do we identify minerals?

- **Cleavage:** the tendency of a mineral to break along a flat surface



# How do we identify minerals?

- **Fracture:** Breaking of mineral on uneven, jagged surfaces.
- If minerals do not have cleavage, exhibit fracture.



# How do we identify minerals?

- **Density:** the comparison of a mineral's mass to its volume.
- $\text{Density} = \text{Mass}/\text{Volume}$

Hematite 5.25 g/cm<sup>3</sup>



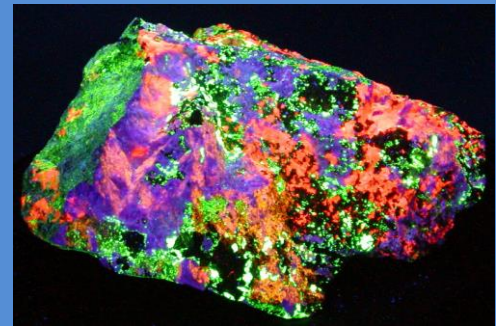
Galena 7.6 g/cm<sup>3</sup>



# Other Mineral Properties

## Other Mineral Properties:

- **Fluorescence:** When exposed to UV light, some minerals glow.
- **Magnetic**
- **Smell**
- **Feel**



# Illinois State Mineral



- Fluorite

Can come in colors like  
purple, green, and yellow  
Many different crystal forms  
Non-metallic luster  
Hardness of 4  
Has no cleavage but exhibits  
fracture  
Density: 3.1 g/cm<sup>2</sup>

