

Mineral Identification

Mrs. Weimer

Standards

- 3.3.8.A2: Describe renewable and nonrenewable energy resources
- 3.3.8.A3: Explain how matter on earth is conserved throughout the geological processes over time.
- 3.3.8.A1: Distinguish between physical and chemical weathering. Compare and contrast the types of energy that drive Earth's systems.

YOU AND A PARTNER @ YOUR TABLE

Come up with 3 ways you would identify a mineral

End

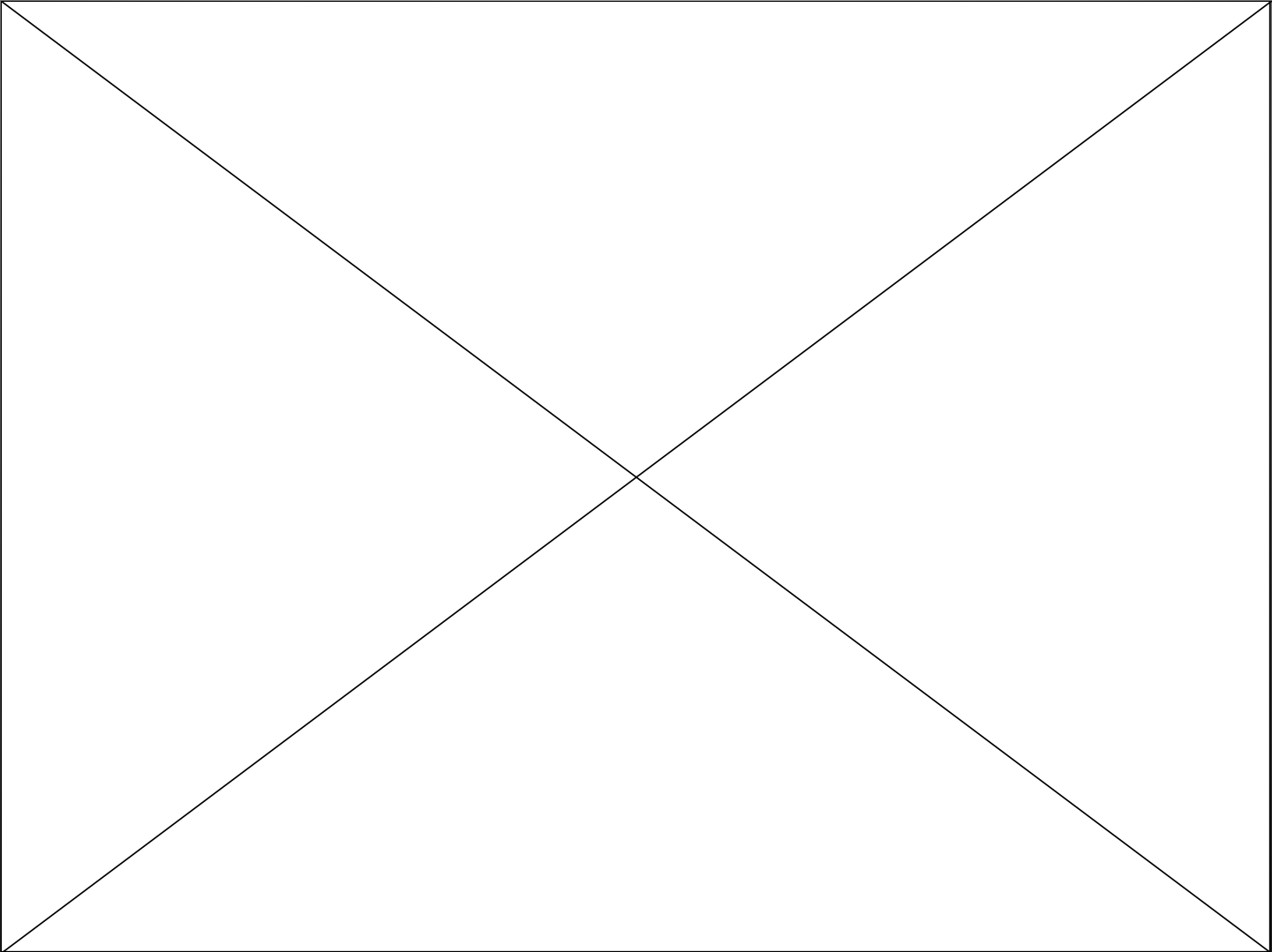


Can you answer these questions?

- Bob found this mineral and he wants to know what it is and if it is valuable..
 - How does Bob figure out how geologists identify minerals?
 - What properties can Bob use to determine what a mineral is?

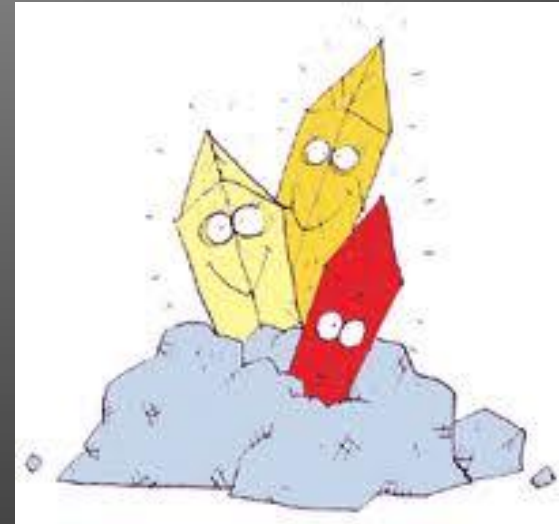


<https://www.youtube.com/watch?v=-F0IA21bgmM>



A MINERAL'S APPEARANCE HELPS IDENTIFY IT

- In order to identify a mineral you need to observe its properties—the things that identify it.
- There are 5 main properties that we use to identify. There are many minor properties that can also help identify a mineral.





Pet Minerals



- On your desk are TWO pet minerals (I want them back)
- As we go through the notes you will be making observations about your pets
- You will have a chance at the end to name your mineral
 - No, not Ernesto or Dylan, but the actual scientific name
- The more specific and detailed the observations, the better chance you have of finding the mineral's family name





Mineral Property #1 Color and Streak



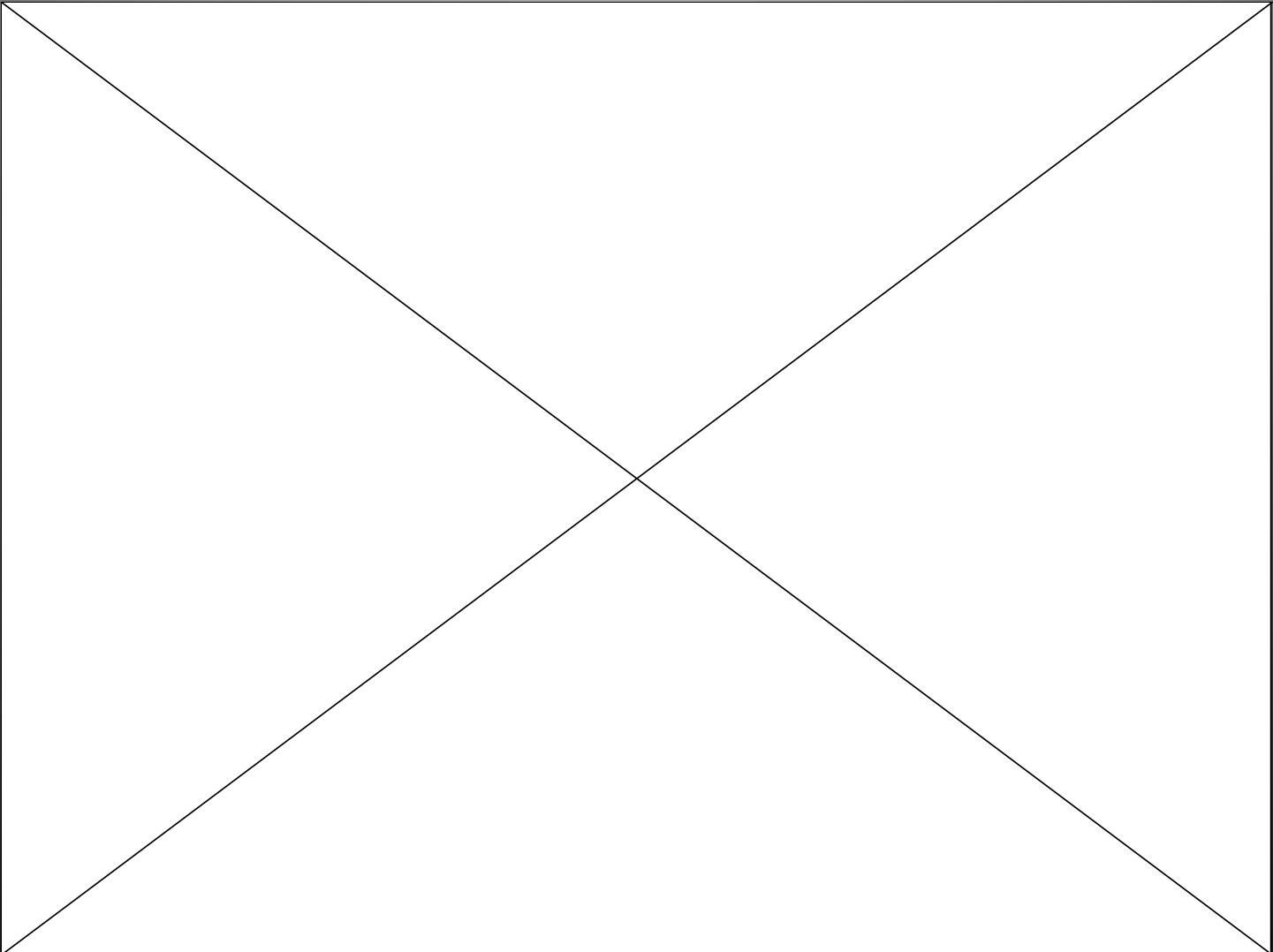
- The first thing we notice about a mineral is color
 - Many people collect minerals based on appearance and color
- Color **is NOT** a good indicator of the type of mineral
 - Many minerals have different colors
 - Color will send you along the right path to identify minerals, though 😊

- Since color isn't a reliable source, geologists use **STREAK**
- Streak is the color of the **powder** of a mineral.
 - To test a mineral's streak (powder color), you rub or drag a mineral over a tile of unglazed porcelain (white or black).



- Hematite's streak is **blood-red**
- Galena's streak is **lead gray**
- Pyrite (Fool's Gold) is always **brassy yellow** when found in crystal form, but when powdered produces a black streak
 - Gold's streak is **yellow**

<https://www.youtube.com/watch?v=rtc7XJdFiE4>



Pet Mineral Observation #1

- What is the color of your mineral?
 - WRITE YOUR COLOR ON YOUR NOTESHEET
- What is the streak of your mineral?
 - WRITE YOUR STREAK ON YOUR NOTESHEET



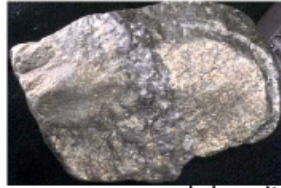
Mineral Property #2-Luster

- Luster is the way in which **light reflects** from the surface
- The two types of luster are:
 - **Metallic**
 - **Non-metallic**



Mineral Luster

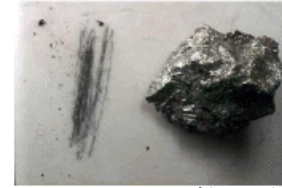
Metallic



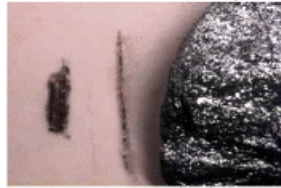
chalcopyrite



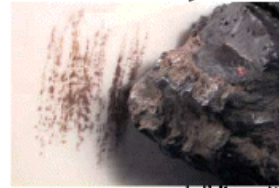
earthy hematite



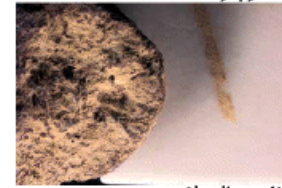
shiny pyrite



specular hematite



dull limonite



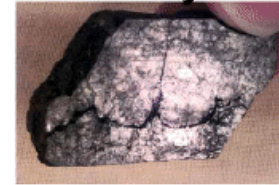
earthy limonite

BELOW all NON-METALLIC

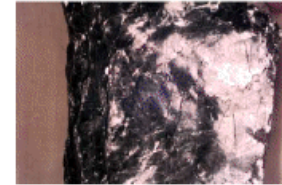
Shiney



apatite



calcium plagioclase

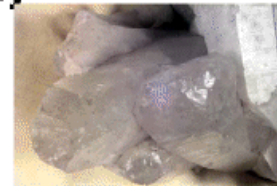


biotite

Glassy



quartz

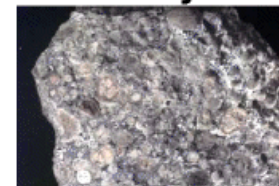


quartz

Earthy



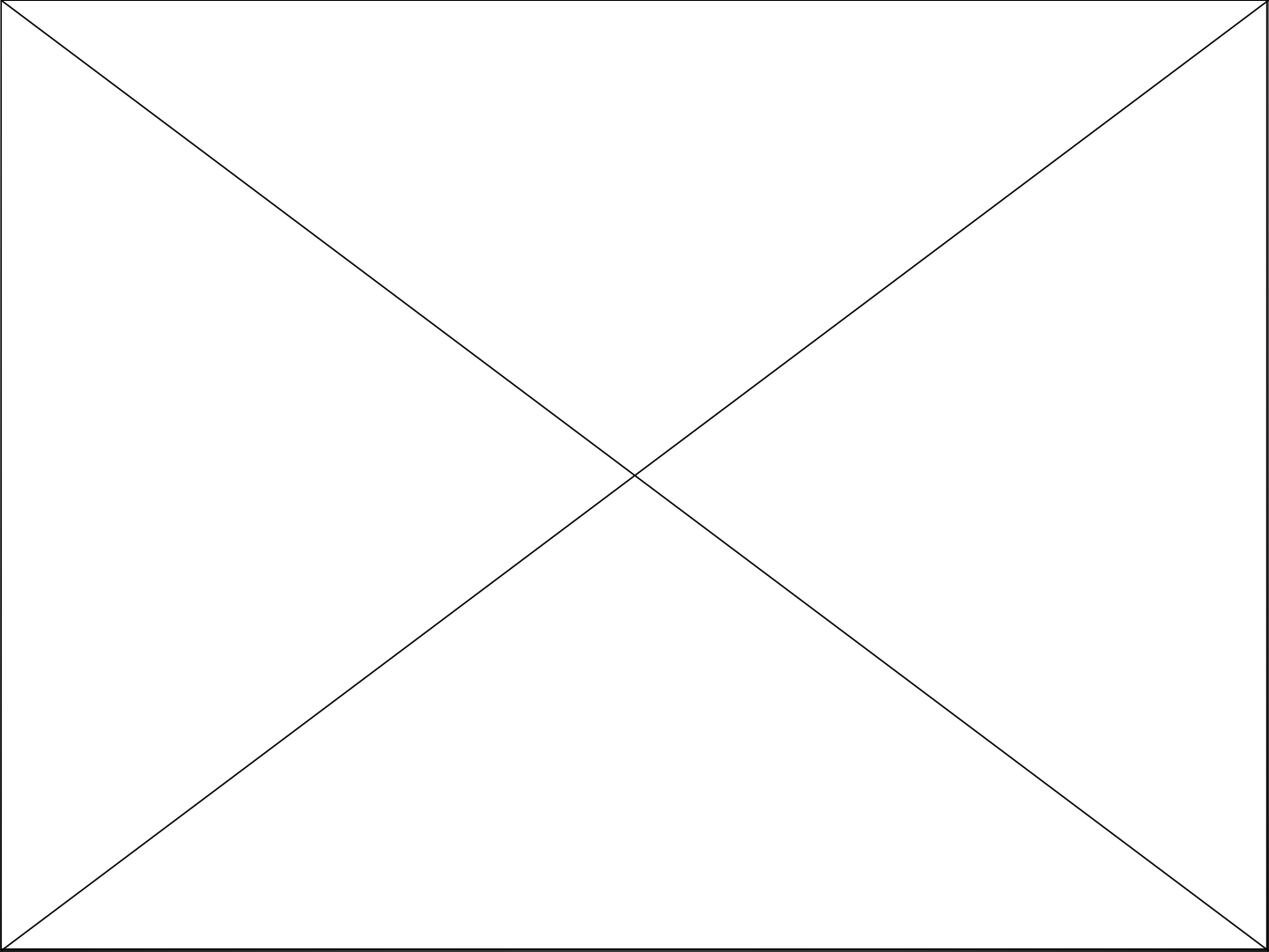
kaolinite



bauxite



gypsum



Pet Mineral Observation #2-Luster

- What is the luster of your pet?



Quick Check

- With your partner on a white marker board..
 - What is the first thing someone notices about a mineral?
 - What do we call the color of the powdered mineral?
 - Which is more reliable: streak or color?
 - What are the two types of luster?



Mineral Property #3-How a mineral breaks

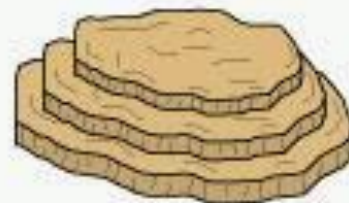
- When a mineral breaks it does so either by **fracturing** or by **cleaving**.
- **Cleavage**-the tendency of a mineral to **break along a flat surface**
 - Crystal cleavage is a smooth break producing what appears to be a flat face
- **Fracture** is the tendency of a mineral to break into **irregular pieces**



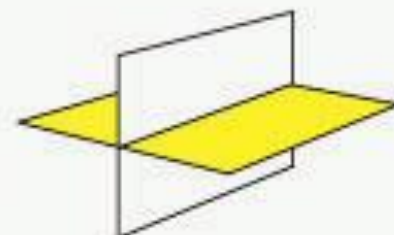
“Cleav” = to split



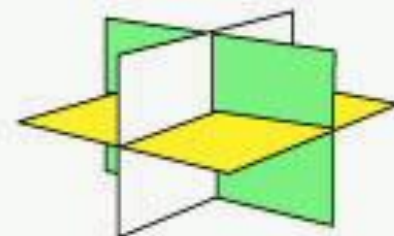
Cleaver



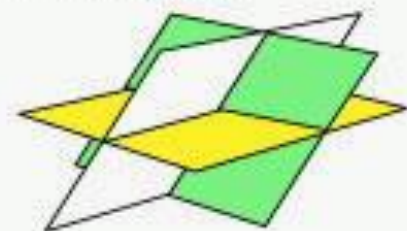
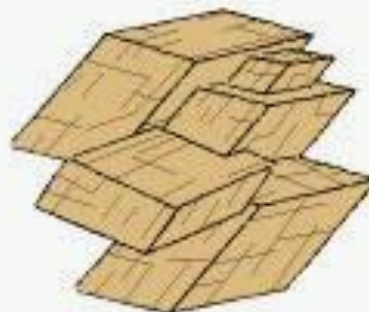
Cleavage in one direction. Example: MUSCOVITE



Cleavage in two directions. Example: FELDSPAR



Cleavage in three directions. Example: HALITE



Cleavage in two directions. Example: CALCITE

Fracture



Pet Mineral Observation #3-Breaks

- Does your pet mineral exhibit
 - Cleavage-a smooth, flat breaks
 - Fracture-an uneven, random break

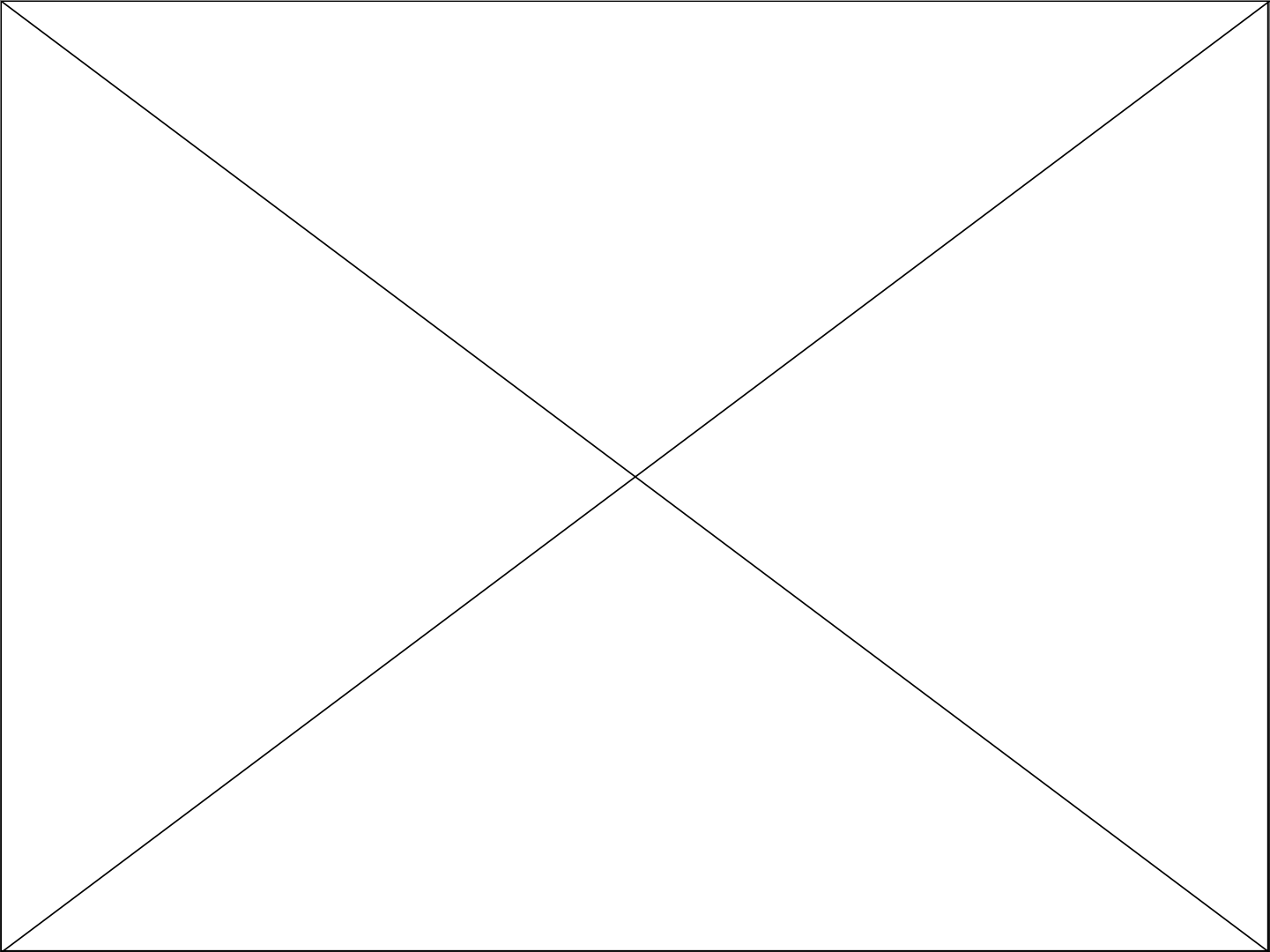


Mineral Property #4-Hardness

- A mineral's hardness is its **resistance** to being scratched.
- A scale known as the Moh's scale is often used.

Mineral	Mohs relative Hardness	Scratch Test	Rosiwal absolute Hardness	Vickers kp / mm^2
Talc	1	scrapeable with fingernail	0.03	2,4
Gypsum	2	scracheable with fingern.	1.25	36
Calcite	3	scr. with copper coin	4.5	109
Fluorite	4	easily scr. with knife	5	189
Apatite	5	still scr. with knife	6.5	536
Orthoclase	6	scr. with steel file	37	795
Quartz	7	scratches window glass	120	1,120
Topaz	8	scratches quartz	175	1,427
Corundum	9	scratches topaz	1,000	2,060
Diamond	10	scratches corundum	140,000	10,060

https://www.youtube.com/watch?v=R-bw7_u3gSQ



Pet Mineral Observation #4

- Where on Moh's Hardness Scale is your mineral?
 - Scratch it with your fingernail. (1-2)
 - Scratch it with the penny.(3)
 - Scratch it with the nail. (4-5)
 - Scratch the glass (6)
 - Scratch the streak plate. (7)



Brain Bender

Find A Partner one person face the windows, one face the smartboard 😊

Brain Bender



luster



geologist



Fruit loops



fracture

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Calcite	3	scr. with copper coin	4.5	109
Fluorite	4	easily scr. with knife	5	189
Apatite	5	still scr. with knife	6.5	336
Orthoclase	6	scr. with steel file	37	795
Quartz	7	scratches window glass	120	1,120
Topaz	8	scratches quartz	175	1,427
Corundum	9	scratches topaz	1,000	2,860
Diamond	10	scratches corundum	140,000	10,060

Hardness Scale



Mineral Property #5-Density

- Each mineral has a **specific density**.
- Density is the mass of a given space or in. Scientific terms mass per unit of volume
 - Geologists go even more in depth. They measure **SPECIFIC GRAVITY**.
 - The specific gravity of a mineral is its mass divided by the mass of an equal volume of water.

- Geologists measure density by the following:
 - First they use a balance to determine the mass of a sample
 - Second, they place the mineral in water to see how much water it displaces.
 - The volume of displaced water = the volume of the sample
 - Third they use the following formula:
Density = Mass/Volume

Some Minerals Have Specific Properties

○ Fluorescence

- ∞ some minerals glow when exposed to ultraviolet light

○ Magnetic

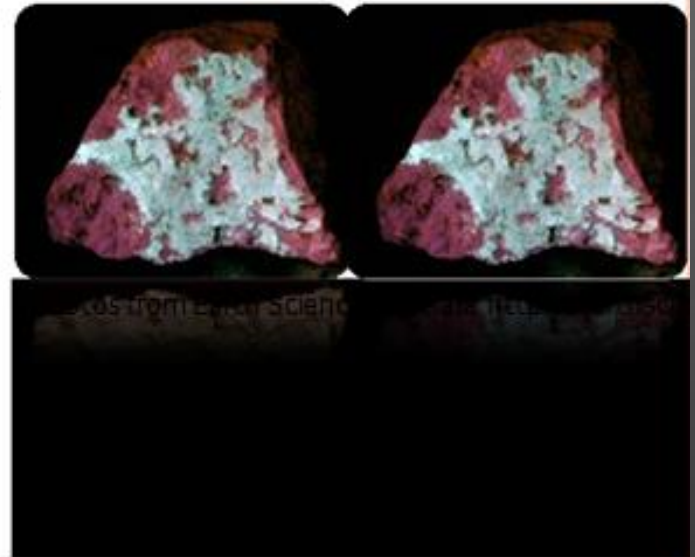
- ∞ Some minerals are attracted to magnets

○ Acid

- ∞ Some minerals react with acid by bubbling
- ∞ Carbonate minerals react with dilute hydrochloric acid.

○ Double refraction

- ∞ these minerals split the light into two different rays which gives the illusion of double vision in this Iceland Spar Calcite.



FIND YOUR MINERAL'S NAME



Luster

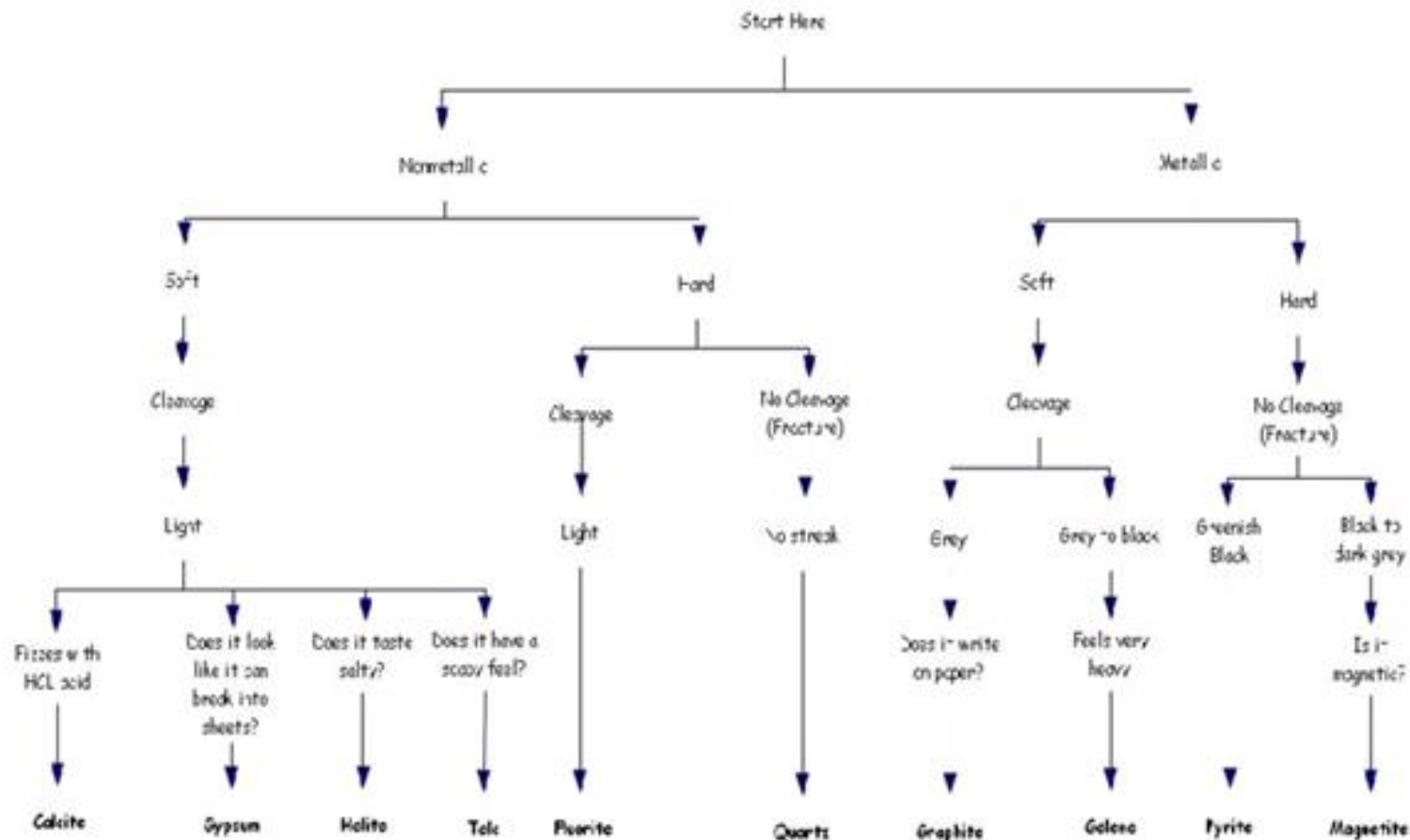
Hardness

Cleavage

Streak

Special Properties

Mineral Name



Minerals



Magnetite



Galena



pyrite



talc



calcite



Quartz



Fluorite

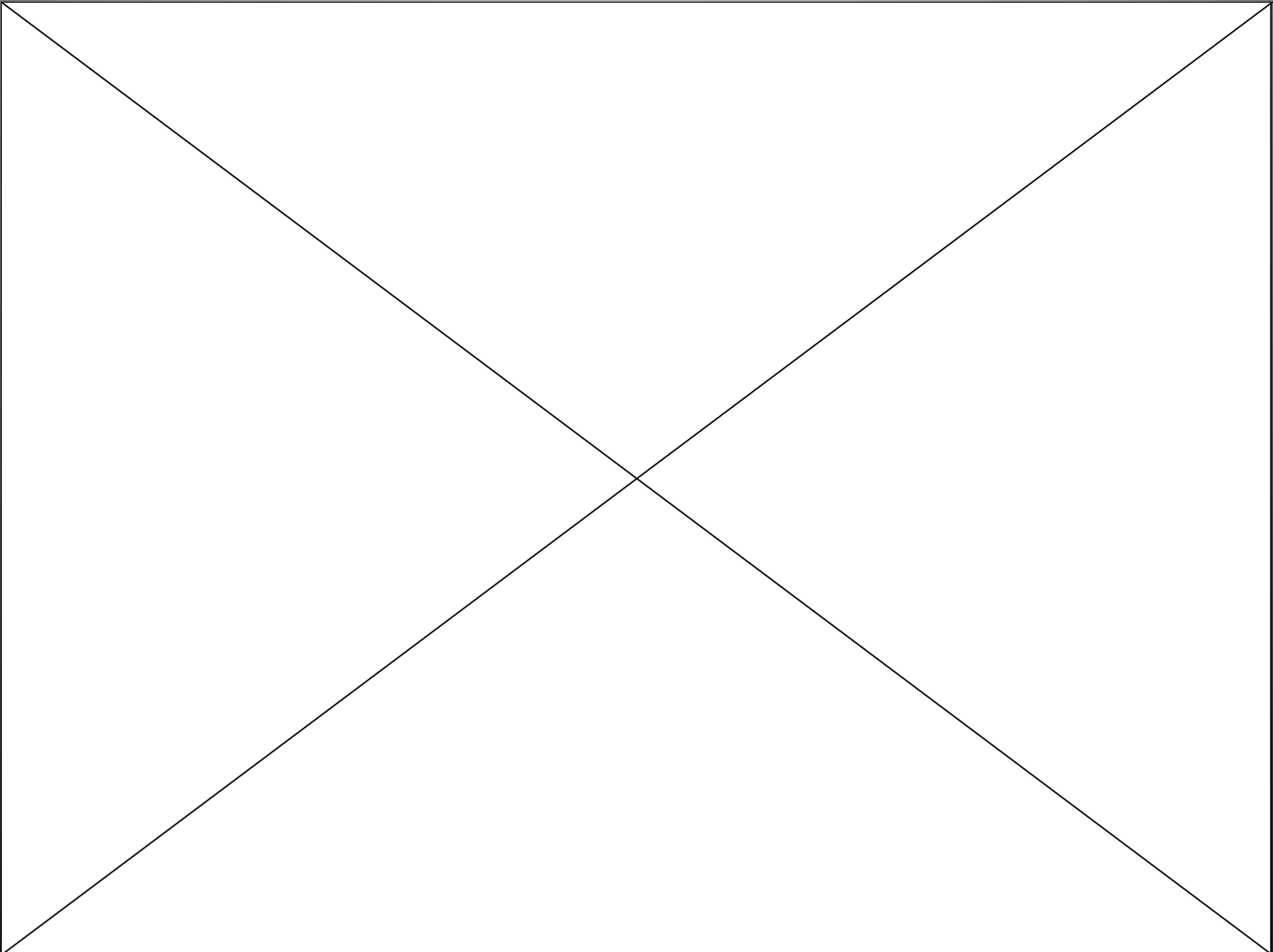


halite



Gypsum

<https://www.youtube.com/watch?v=bruJ5e3-zZ8>

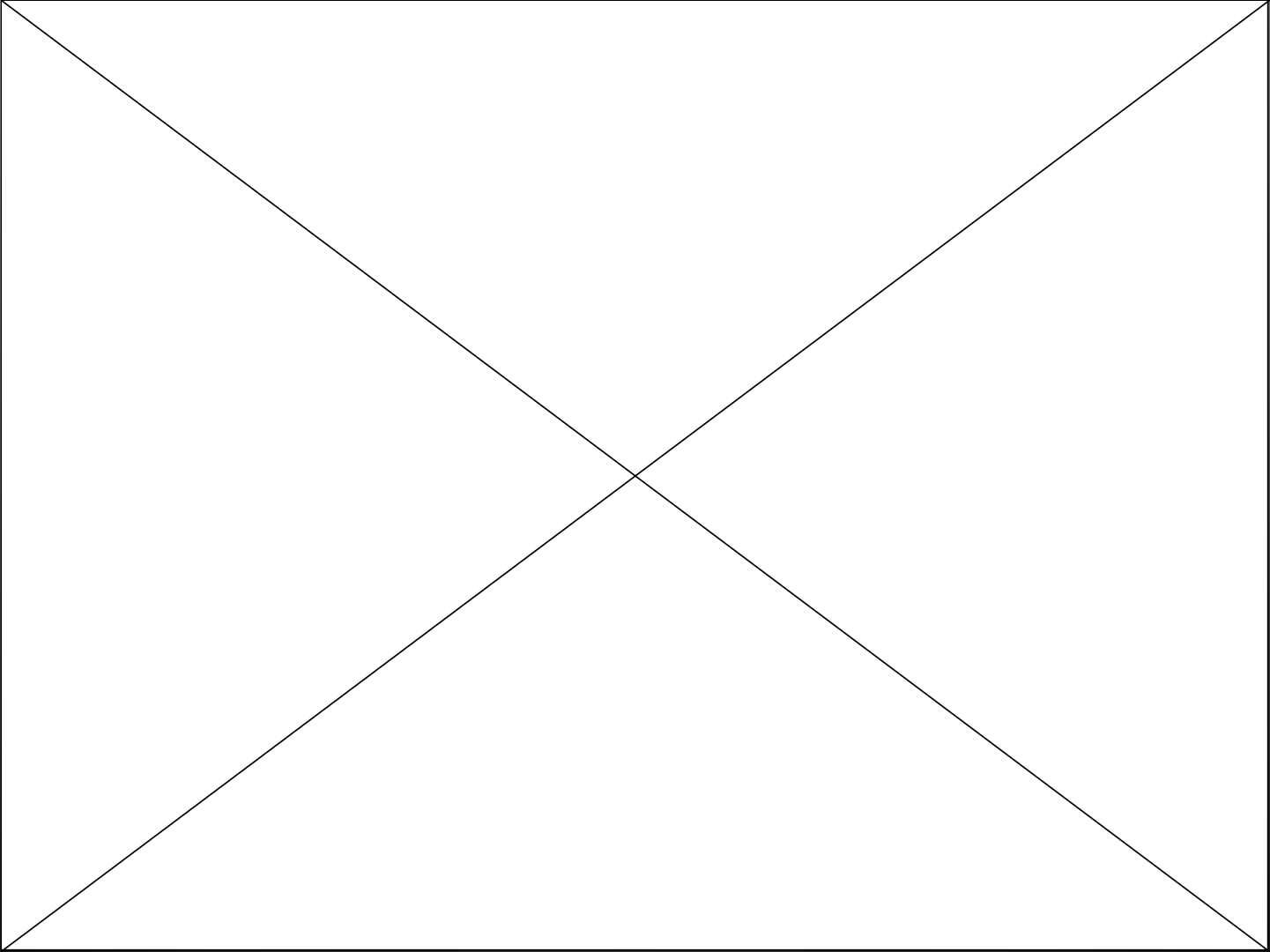


Answer these questions...

- Bob found this mineral. He wants to know what it is and if it is valuable.
 - What properties can Bob use to determine what this mineral is?



<https://www.youtube.com/watch?v=XBhY347jmgI>



SLCDFH

SOME LLAMAS CLIMB DOWN FUNNY HILLS

- Streak-
 - Powdered color
- Luster
 - How Shiny?
- Cleavage
 - Breaks in sheets or blocks
- Density
 - How much mass in a given volume
- Fracture
 - Just crumbles or breaks
- Hardness
 - Can be scratched by

NOW for TIM & MOBY... 😊

- <http://glencoe.mcgraw-hill.com/sites/dl/free/0078778026/164213/00044674.html>