Mineral Identification

3.2

I. Physical Properties

A. Mineral Appearance

- Mineral properties can help you recognize and distinguish minerals
- Color, appearance, hardness, color when crushed into a powder and how it breaks.
- All properties we observe is a clue to the identity of a minerals property

B. Hardness

- Hardness is the measure of how easily a mineral can be scratched

- Hardness does not mean the mineral can not break
  - A Diamond is extremely hard and can only be scratched by another diamond

  - however it can shatter if given a hard enough blow in the right direction along the crystal

C. Mohs Scale

- Mohs scale of hardness is a list of common minerals to compare their hardness

- The scale lists the hardness of 10 minerals
  - Talc (chalk) the softest mineral has a hardness value of 1

  - Diamond the hardest mineral has a value of 10

- We use this scale to determine the identity of unknown minerals

Moh's Scale

Index Mineral	Scale	Common Objects
Diamond	10	
Corundum	9	
Topaz	8	
Quartz	7	Steel file (6.5)
Orthoclase	6	
Apatite	5	Glass (5.5) Knife blade (5.1)
Fluorite	4	Wire Nail (4.5)
Calcite	3	Penney (3.5) Fingernail (2.5)
Gypsum	2	
Talc	1	

Hardness Test

1	Talc Graphite	Can be scratched with a fingernail and by any stone rated 2+
2	Gypsum Bismuth Lepidolite Chlorite	Can be scratched with a fingernail and any stone rated 3+
3	Calcite Celestite Barite	Can be scratched with a knife and any stone rated 4+
4	Flourite Malachite Platinum	Can be scratched with a knife and any stone rated 5+. Will scratch any stone rated 3-.
5	Apatite Dioptase	Can be scratched with a knife and any stone rated 6+. Will scratch any stone rated 4-
6	Feldspar Pyrite Amazonite Hematite	Can be scratched with a knife and any stone rated 7+. Will scratch any stone rated 5-.
7	Quartz Tourmaline	Will scratch glass and any stone rated 6-. Can be scratched by stones 8+.
8	Topaz Spinel	Will scratch glass and any stone rated 7-. Can be scratched by stones 9-10.
9	Corundum (ruby, sapphire)	Will scratch glass and any stone rated 8-. Can be scratched by diamond.
10	Diamond	Will scratch glass and all stones 1-9

D. Luster

- Luster is the way a mineral reflects light

- Luster can be metallic or nonmetallic
  - Minerals with a metallic luster shine like metal (example – metal belt buckle)

  - Minerals that do not shine like metal are said to have a nonmetallic luster
    - Terms used to describe them: dull, pearly, silky, and glassy

E. Specific Gravity

- The specific gravity of a mineral is the ratio of its weight compared with the weight of an equal volume of water

- This is expressed as a number

F. Streak

- Streak is the color of a mineral when it is in a powdered form

- The streak test only works for minerals that are softer than the streak plate

  - Gold and pyrite (fools gold) can be distinguished by a streak test
    - Gold has a yellow streak
    - Pyrite has a greenish-black or brownish-black streak

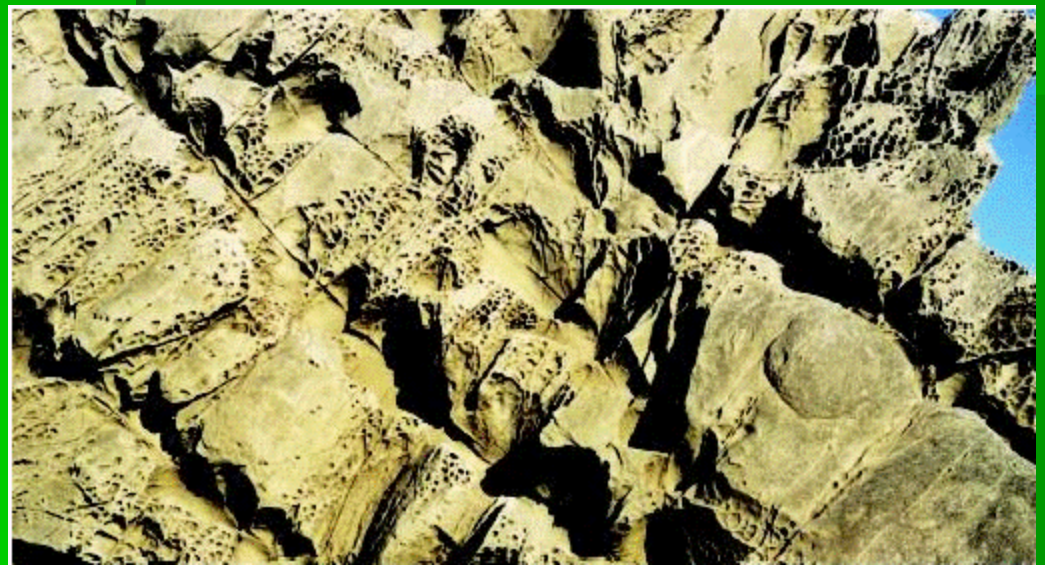
The red-brown streak of the mineral hematite.

G. Cleavage and Fracture

- The way a mineral breaks is another way to determine its identity

- Minerals that break along smooth flat surfaces have cleavage
  - ex – if you have a layer cake and you can peel away the layers = cleavage

- Minerals that break with uneven, rough, or jagged surfaces have fracture
  - Ex – if you grab a chunk out of the side of the cake it would be like breaking a mineral that has fracture



H. Other Properties

- Some minerals have unique properties:
  - Magnetite is attracted to magnets
  - Lodestone will pick up iron filings
  - In some calcite specimens light forms two separate rays causing you to see double images
  - Calcite fizzes when hydrochloric acid is put on it

- Although the appearance of a mineral may change from sample to sample, its physical properties remain the same