RESOURCES GEOGRAPHY

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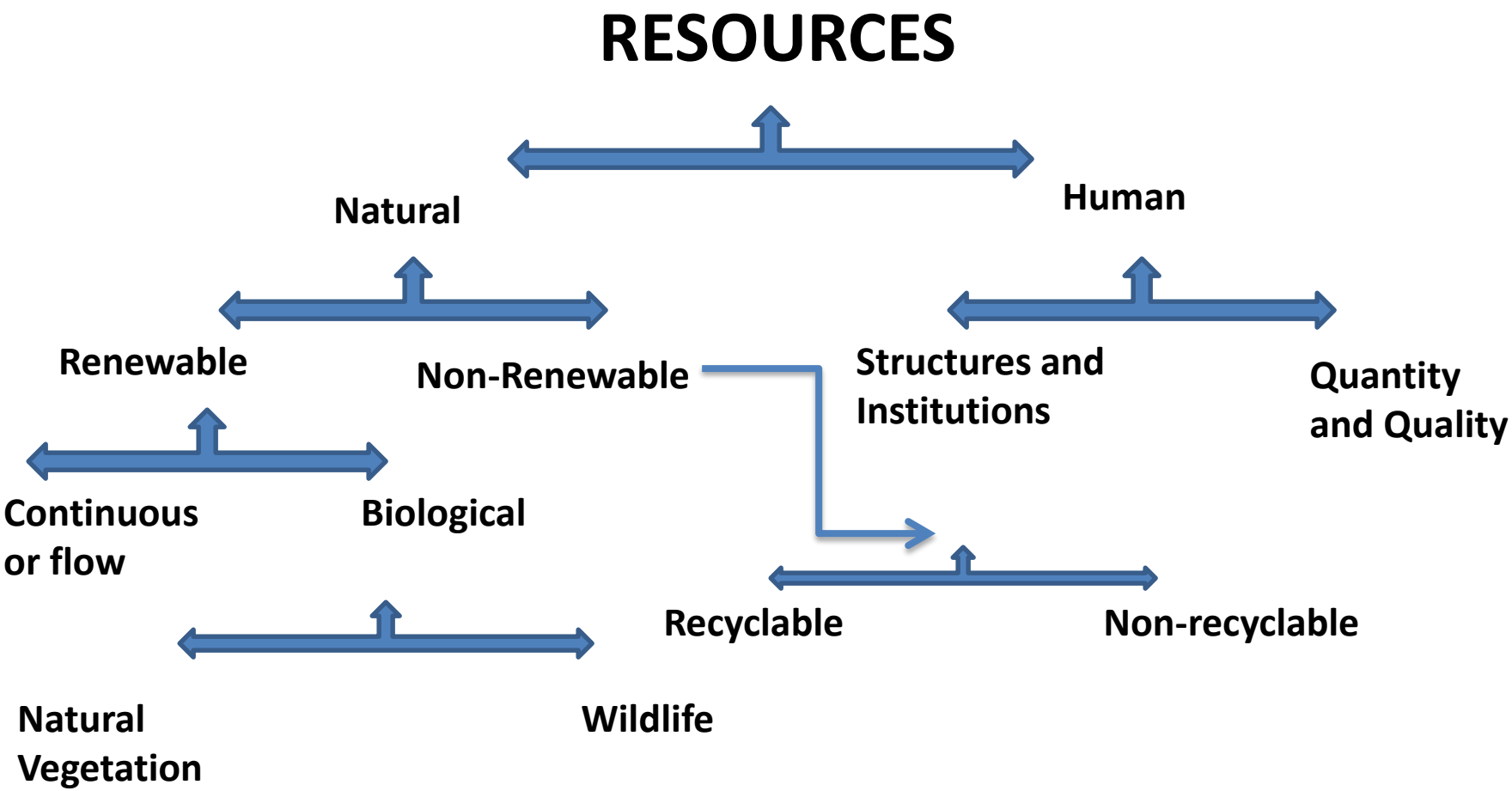
RESOURCE

Definition of a Resource

“Something which can be used to satisfy our needs, is technologically accessible, economically feasible and culturally acceptable is referred as a Resource”.

CLASSIFICATION OF RESOURCES



NATURAL RESOURCES

Are those resources which are created by the nature.

Example: land, water, wildlife, atmosphere etc.







Resources have been classified on various basis

1) On the basis of exhaustibility

Renewable resources:

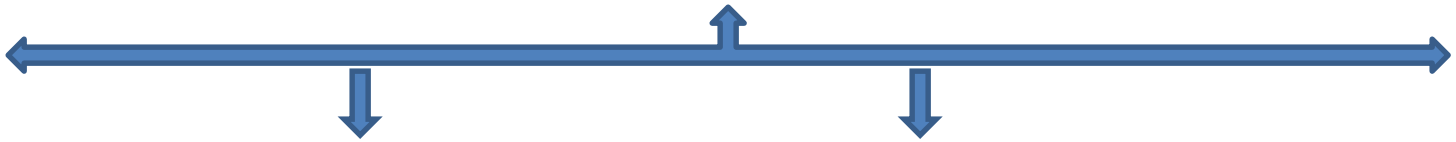
Non-Renewable resources:

2) On the basis of origin

Biotic

A biotic resources

3) On the basis of ownership



<u>Individual resources:</u>

<u>Community resources:</u>

<u>National resources:</u>

<u>International resources:</u>

RENEWABLE RESOURCES

Are those resources which can be renewed or recycled or reproduced by physical or chemical processes are known as renewable resources
Example: Forests, Solar energy, Wind energy etc

NON – RENEWABLE RESOURCES

Are those resources which take millions of years in their formation and can not be renewed or reproduced are known as renewable resources

Example: Coal, petroleum and natural gas.

BIOTIC RESOURCES:

These are obtained from biosphere and have life such as human beings, flora and fauna, fisheries, livestock etc.

ABIOTIC RESOURCES:

- All those things which are composed of non-living things are called a biotic resources. For example, rocks and metals.

INDIVIDUAL RESOURCES

Are those resources which are operated by an individual or group of individual.

Example: land, pastures, ponds, water in wells etc.

COMMUNITY OWNED RESOURCES

Are those resources which are managed by the all members of the community.

Example: Grazing grounds, burial grounds, public parks, picnic spots etc.

NATIONAL RESOURCES




Are those resources which are related to a particular nation. Land resource are within the political boundaries and oceanic resource up to 12 nautical miles

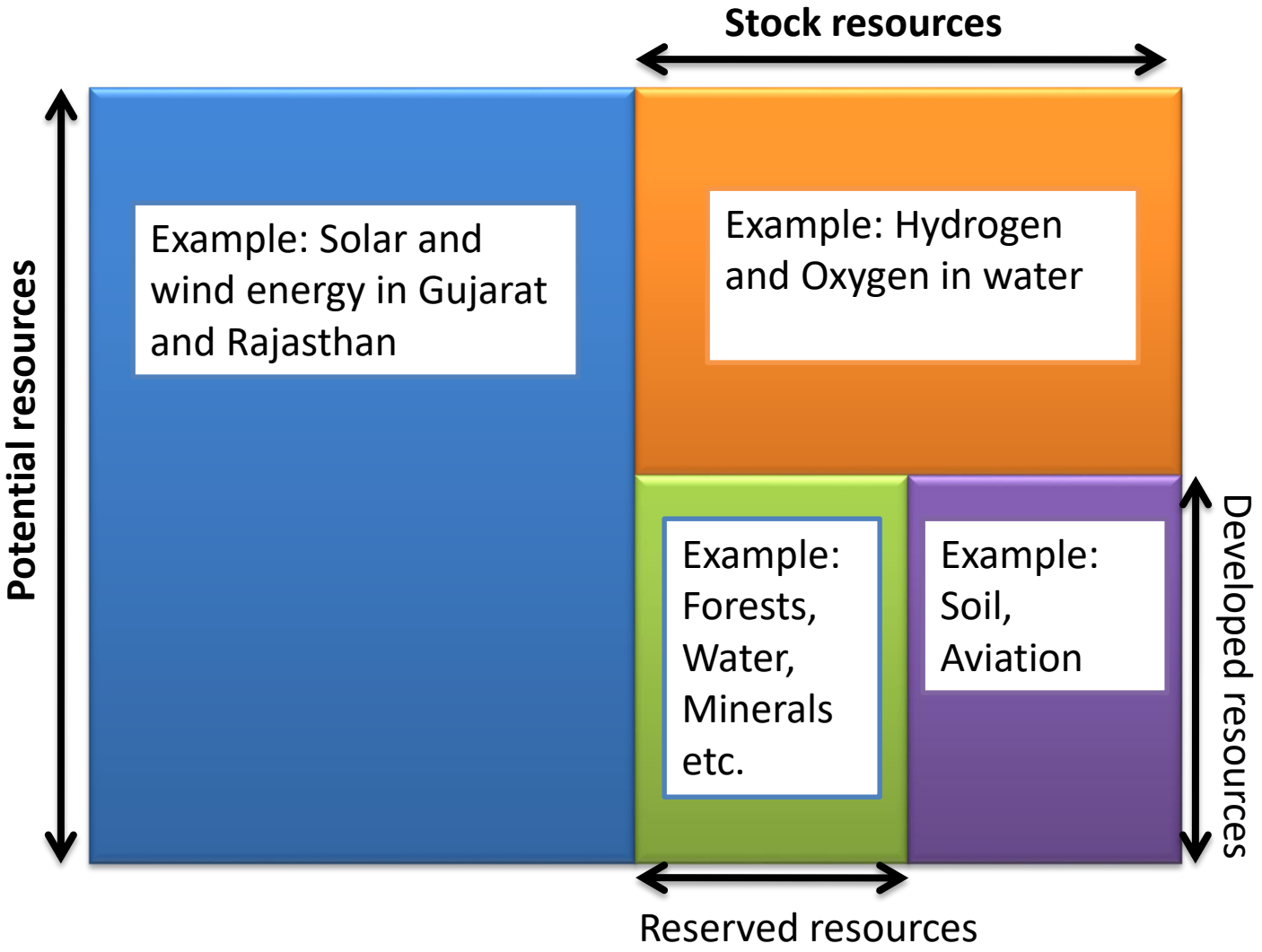
Example: Minerals, forests, wildlife, oceanic resources etc.

INTERNATIONAL RESOURCES

Are those resources which are managed by international institutions. They belong to various nations of the world.

Example: oceanic resources, petroleum etc.

On the basis of Status of development



Potential Resources: Are those resources whose quality and quantity is unknown because of the lack of technology.
Stock resources: Materials in the environment which have the potential to satisfy human needs but human beings do not have the appropriate technology to access these.

Stock resources: Resources which are surveyed and their quality and quantity have been determined for utilization. The development of resources depends on technology and level of their feasibility.

Stock resources: are the subset of the stock, which can be put into use with the help of existing technical 'know-how' but their use has not been started. These can be used for meeting future requirements.

PROBLEMS CREATED BY INDISCRIMINATE USE OF RESOURCE BY MAN

a. Many resources got depleted. Ex: Forest

b. Resources got accumulated in the hands of few people. The society is divided into rich and poor.

c. Global warming, ozone layer depletion, environmental degradation are other problems.

SUSTAINABLE ECONOMIC DEVELOPMENT

- The economic development which does not damage the environment and at the same time takes care of the needs of the future generations is called sustainable development
- Sustainable Development is important because:

1) Many of the resources are non-renewable and exhaustible. Over exploitation of these resources will affect the needs of our future generations.

2) Environmental pollution has become a major threat to the survival of human beings

RESOURCE PLANNING

- Resource planning is a technique or skill of proper utilization of resources.

STAGES OF RESOURCE PLANNING

a) IDENTIFICATION AND LISTING OF RESOURCES

Surveying, mapping and the measurement of the qualities and the quantities of the resources are the important activities undertaken at this stage.

b) PLANNING FOR EXPLOITATION

Develop a planning structure with suitable technology, skill and institutional setup.

c) MATCH RESOURCE DEVELOPMENT PLANS WITH NATIONAL DEVELOPMENT PLANS.

IMPORTANCE OF RESOURCE PLANNING

It is necessary for the balanced development of India.

1) Some regions of India are rich in certain resources and poor in some other resources.

Ex: Rajasthan is poor in water resources but rich in solar and wind energy.

2) Some regions are self sufficient while other regions are very poor in important resources. Ex: Madhya Pradesh is rich in many resources but Ladakh is poor in resources.

3) Wastage of resources can be avoided by planning.

4) Environmental pollution can be reduced.

5) Over exploitation of resources can be avoided.

RESOURCE CONSERVATION

- Planned use of resources in order to meet the present needs and to store a part for the future generations is called resource conservation.

It is necessary because

1) Many resources are non-renewable and exhaustible. If we conserve them we can use them for a longer period of time.

2) Conservation of resources helps us to reduce wastage. It will help in economic progress.

3) Resource conservation helps us to protect the environment.

IDEAS OF GANDHIJI ABOUT THE CONSERVATION OF RESOURCES.

- According to Gandhiji, “There is enough for everybody’s need and not for anybody’s greed.
- Greedy and selfish individuals and the exploitative nature of modern technology are the root cause for resource depletion.
- He was against mass production and wanted to replace it with production by masses.

Minerals: Types & Characteristics

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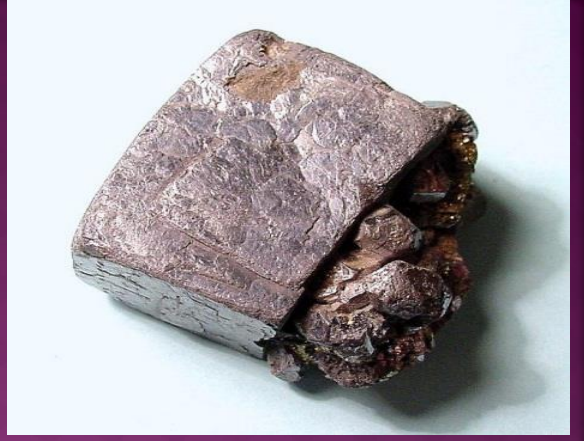
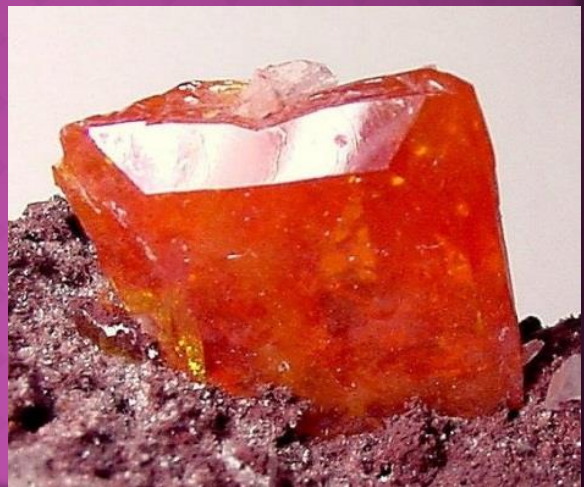


MINERALS



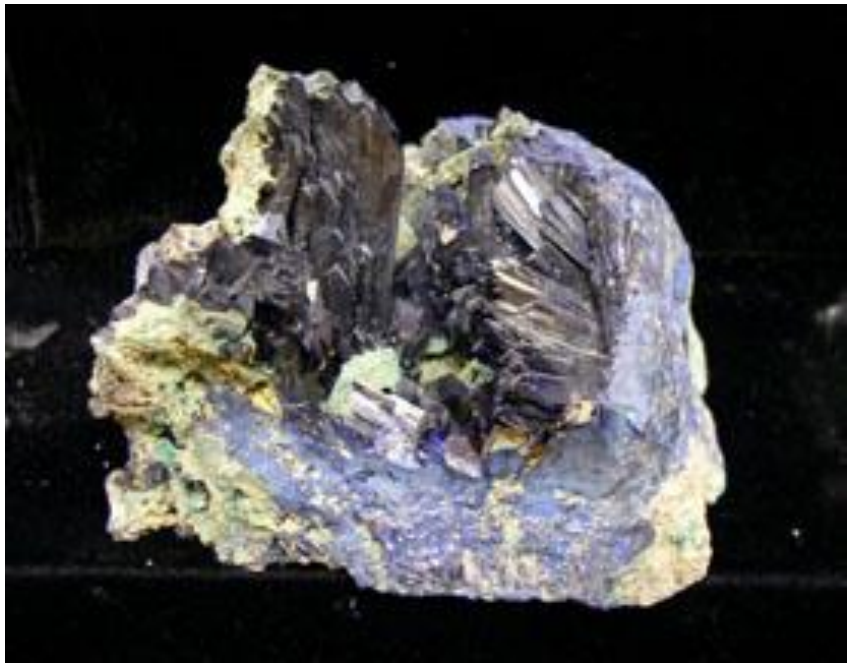
A. Definition – four part definition

→ Naturally occurring

→ Inorganic substance (non-living)

→ Crystalline solid

→ Definite chemical composition



- There are substances that meet 3 of the 4 criteria, and are called mineralloids

→ Example: Opal – does not have an orderly arrangement of atoms

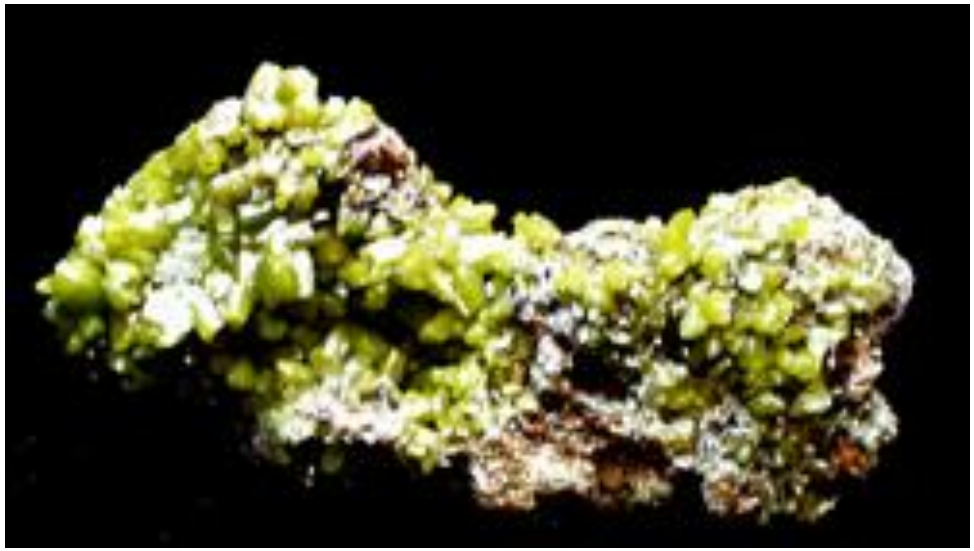
B. How many minerals are there?

- 3500 known minerals in the Earth's crust
- Minerals combine to form all rocks on Earth

  → Rock type depends on mineral composition
- 20 minerals combine to form 95% of all rocks on Earth.

C. Physical Properties

- All minerals have at least 9 physical properties that can be used to define, describe, and identify them as unique minerals.

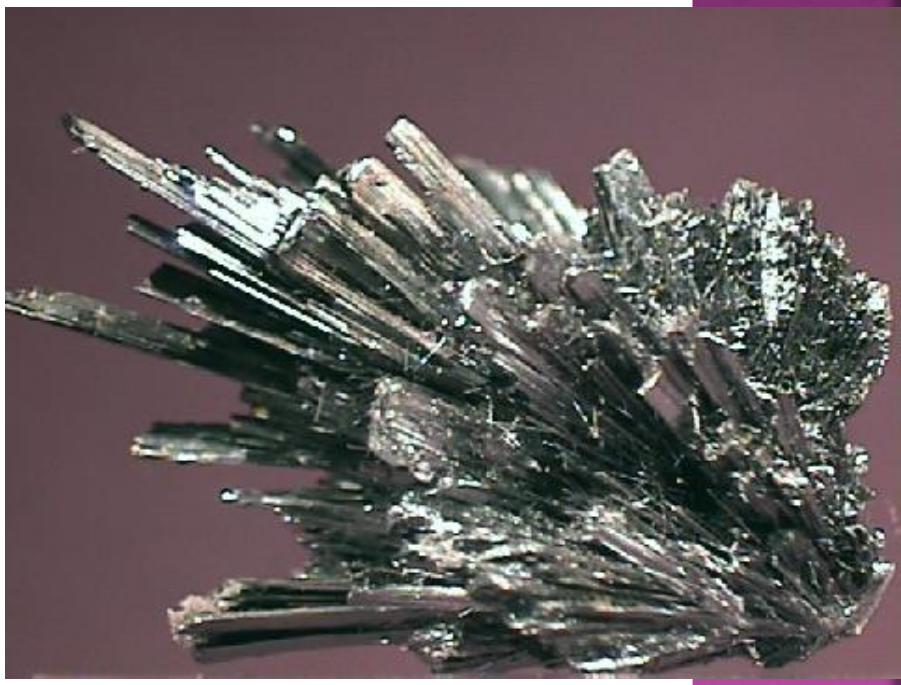


- 1. Color – every mineral is some color and some are found in multiple colors
- → could be very helpful and distinctive, or could be very ambiguous

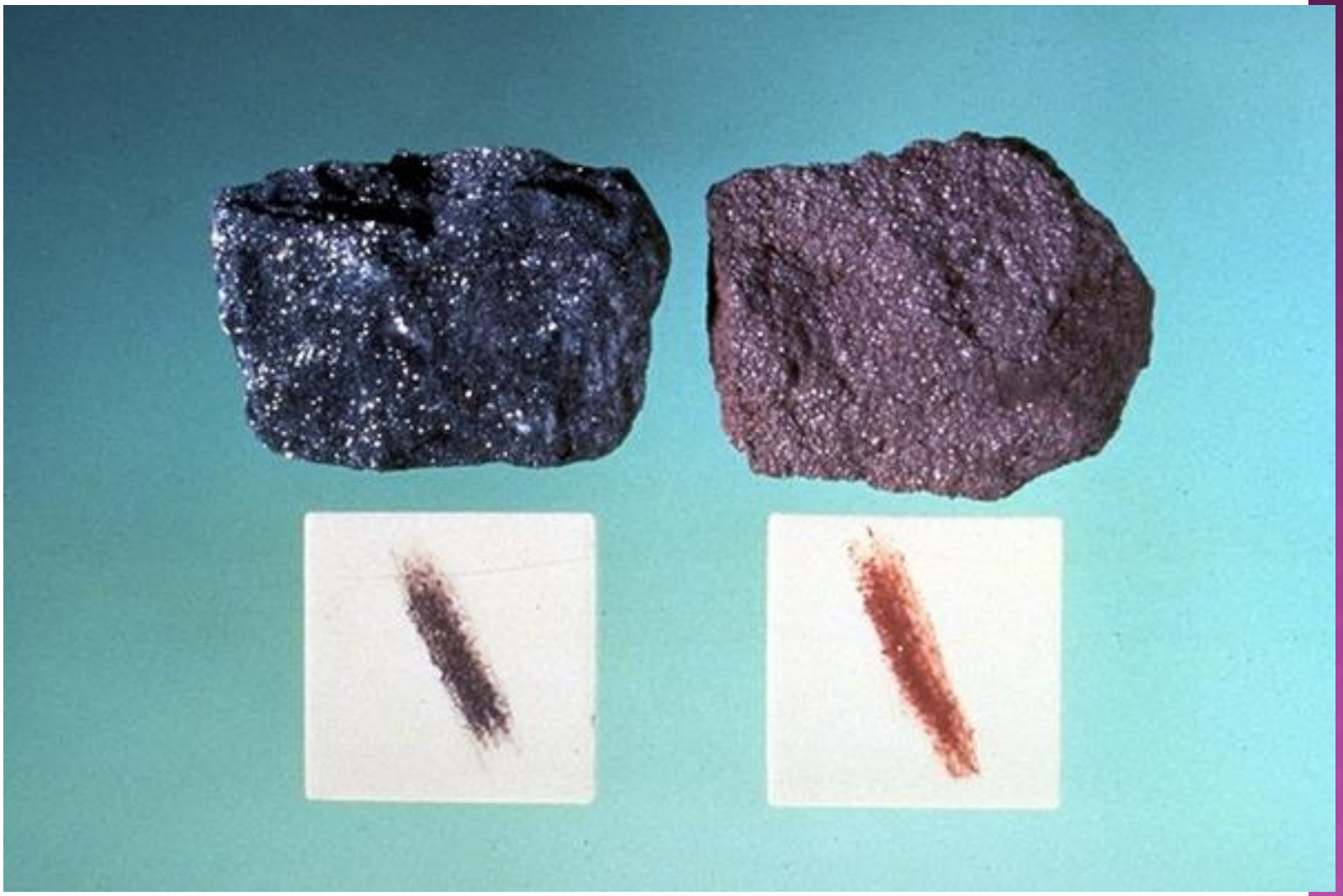
2. Luster – the manner in which a mineral reflects light

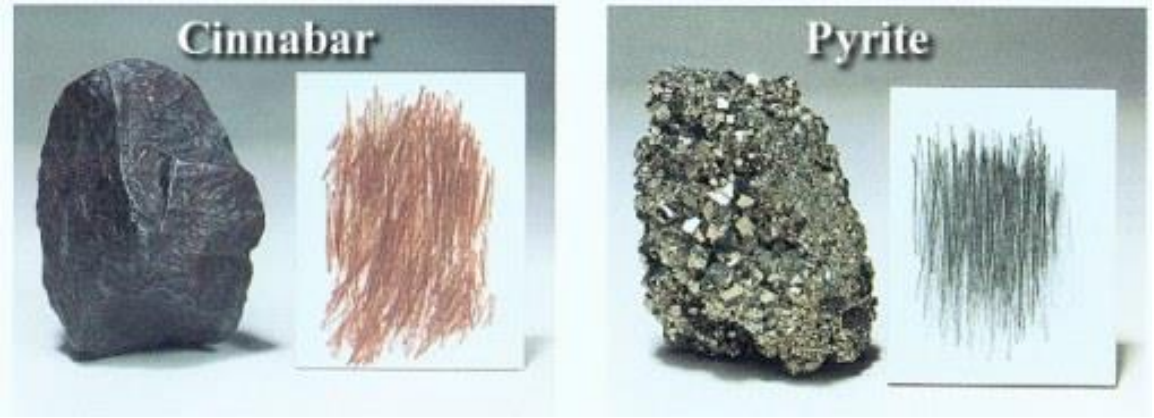
→ Glassy – reflects light like a piece of glass does

→ Metallic – reflects light like a piece of metal does



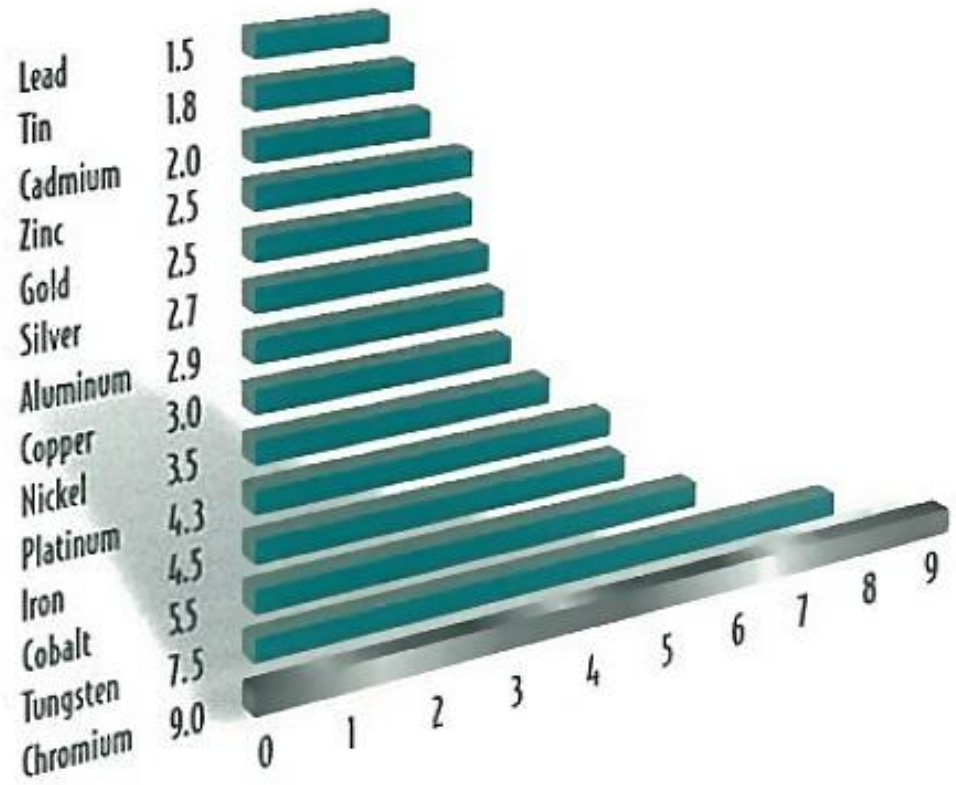
3. Streak – the color of the pulverized powder of a mineral





The color could be different from the crystal's color, and is always distinctive

- 4. Hardness – the scratchability of a mineral, or a mineral's durability
- → Uses the Moh's Hardness scale with a rating system of 1-10



*1 = very soft

*10 = hardest substance known to man

*A streak plate has a hardness of 7

MOH'S HARDNESS SCALE

SCALE OF HARDNESS

MOHS HARDNESS SCALE

1	Talc
2	Gypsum
3	Calcite
4	Fluorite
5	Apatite
6	Orthoclase
7	Quartz
8	Topaz or Beryl
9	Corundum
10	Diamond

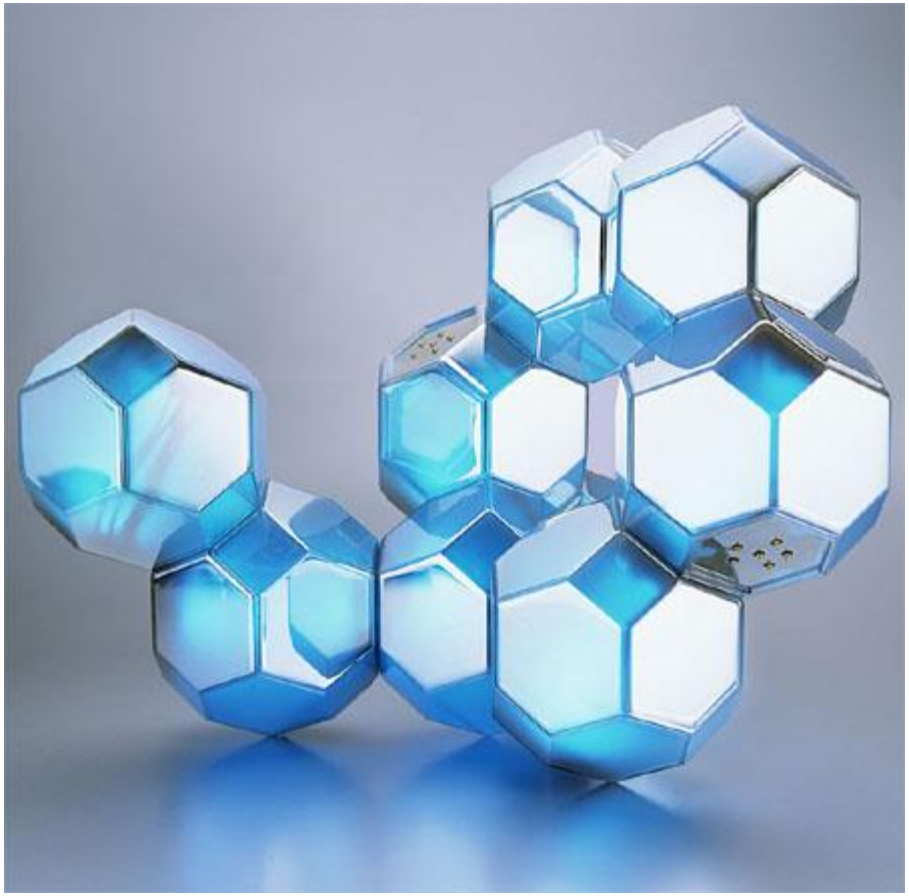
MOHS HARDNESS OF COMMON ITEMS

Fingernail	2 to 2.5
Copper coin	3.5
Steel knife	5 to 6
Glass	5 to 5.5
Streak plate	6.5 to 7

(Adapted from Jones, 2001: Laboratory Manual for Physical Geology, 3rd edition.)

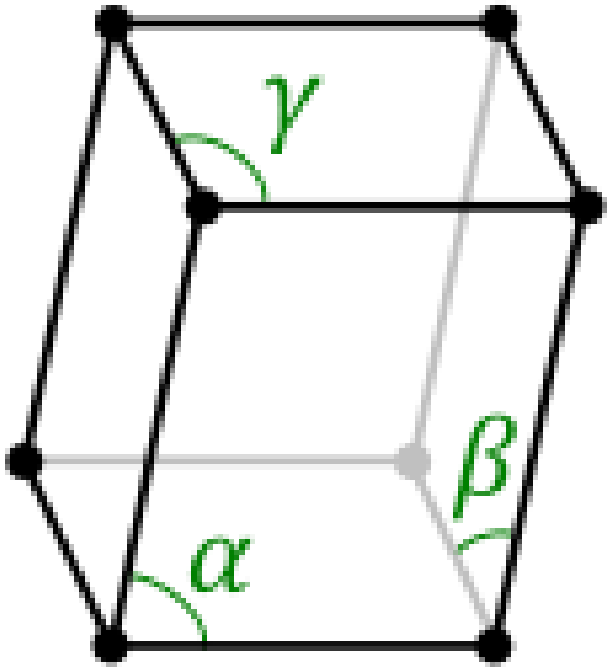
5. CRYSTAL SHAPE / EXTERNAL CRYSTAL FORM / CRYSTAL SYSTEMS

→ a set of faces that have a definite geometric relationship to each other



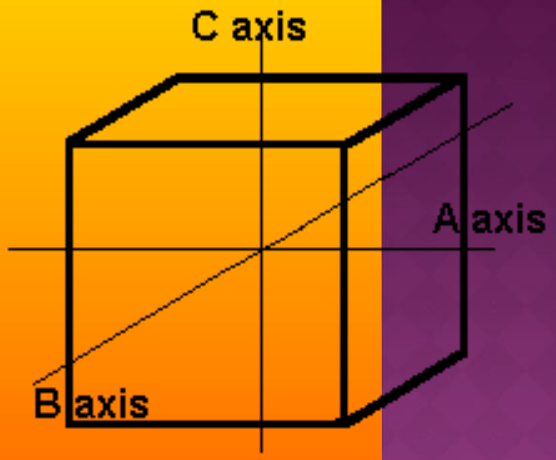
- This is not always shown clearly when crystals are growing and competing for space with other minerals

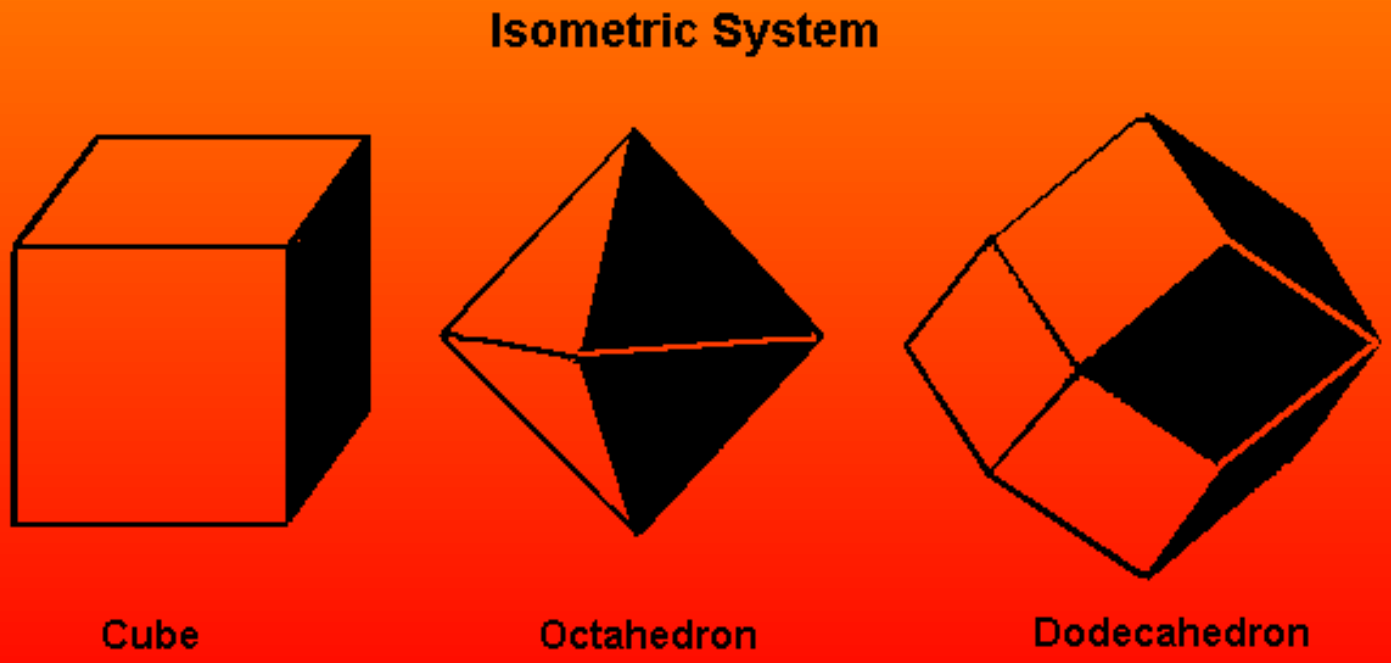
$\alpha, \beta, \gamma \neq 90°$



COMMON FACE ARRANGEMENTS AND ANGLES

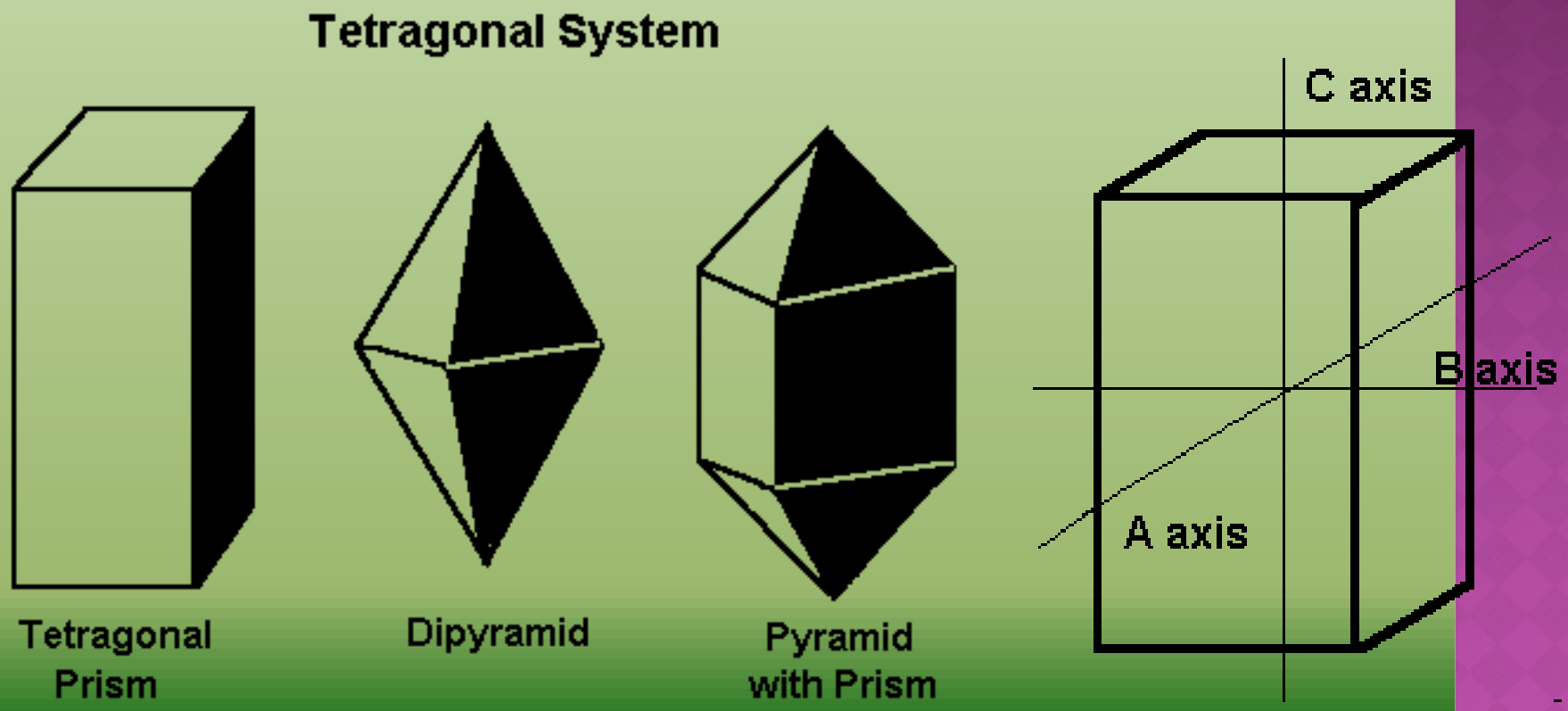
- A. Isometric – most symmetrical
  - Three axes of equal length
  - All axes at right angles to each other





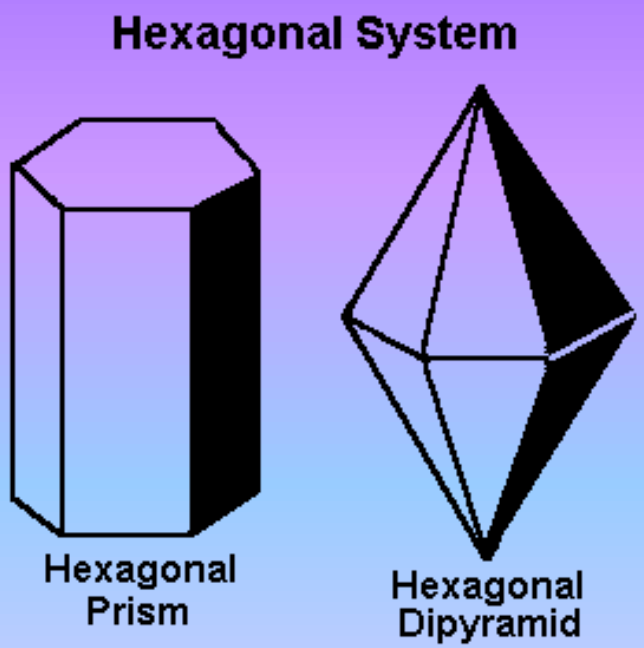
COMMON FACE ARRANGEMENTS AND ANGLES

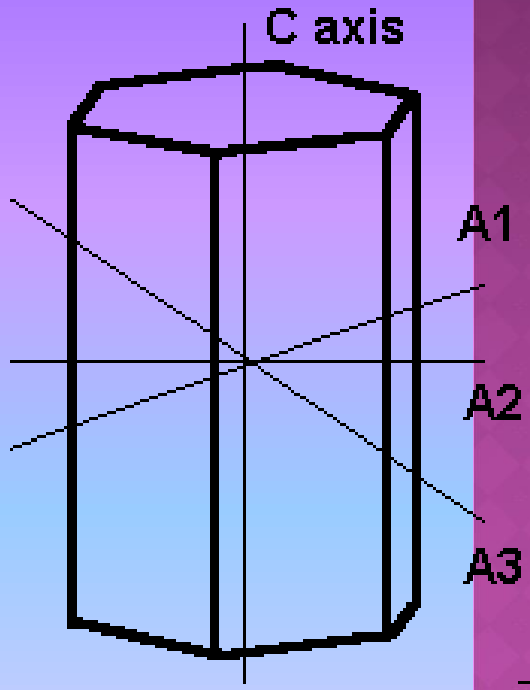
- B. Tetragonal – similar to isometric
  - Three axes, two equal length, the third is longer
  - All axes at right angles to each other



COMMON FACE ARRANGEMENTS AND ANGLES

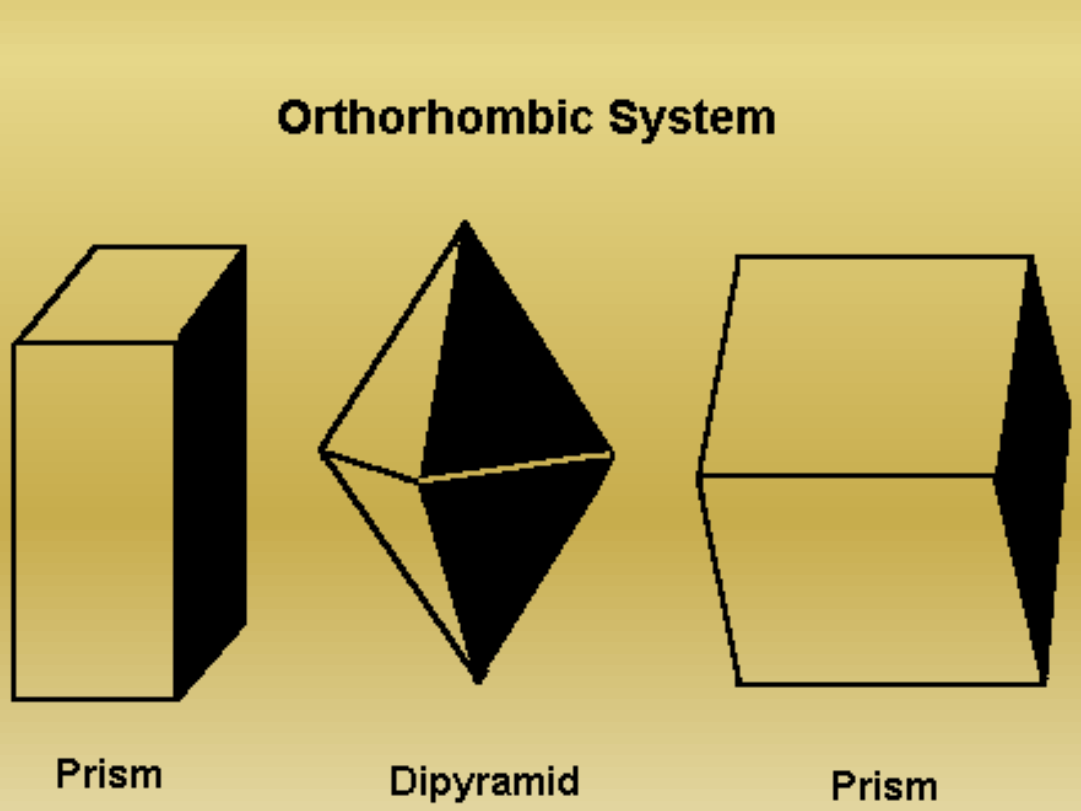
- C. Hexagonal
  - Three equal axes in the same plane
  - Intersect at angles of 60 degrees
  - A fourth axis is at a right angle to the other three

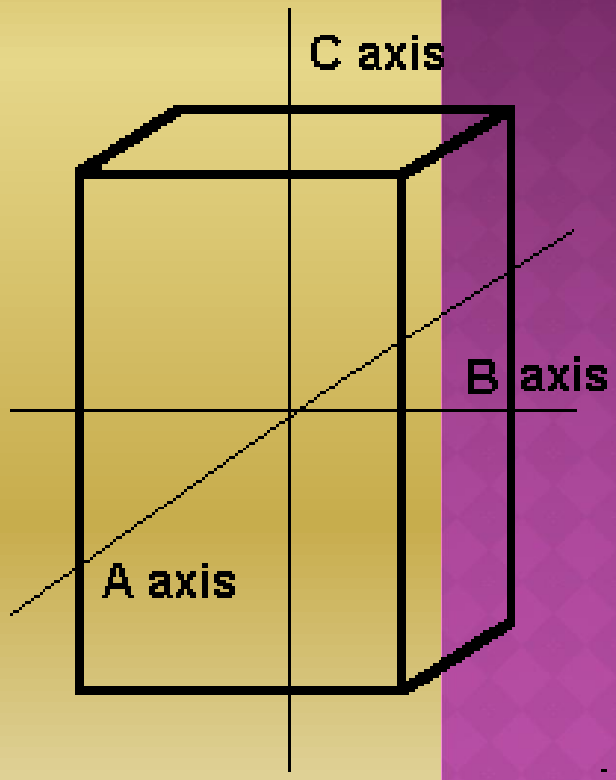




COMMON FACE ARRANGEMENTS AND ANGLES

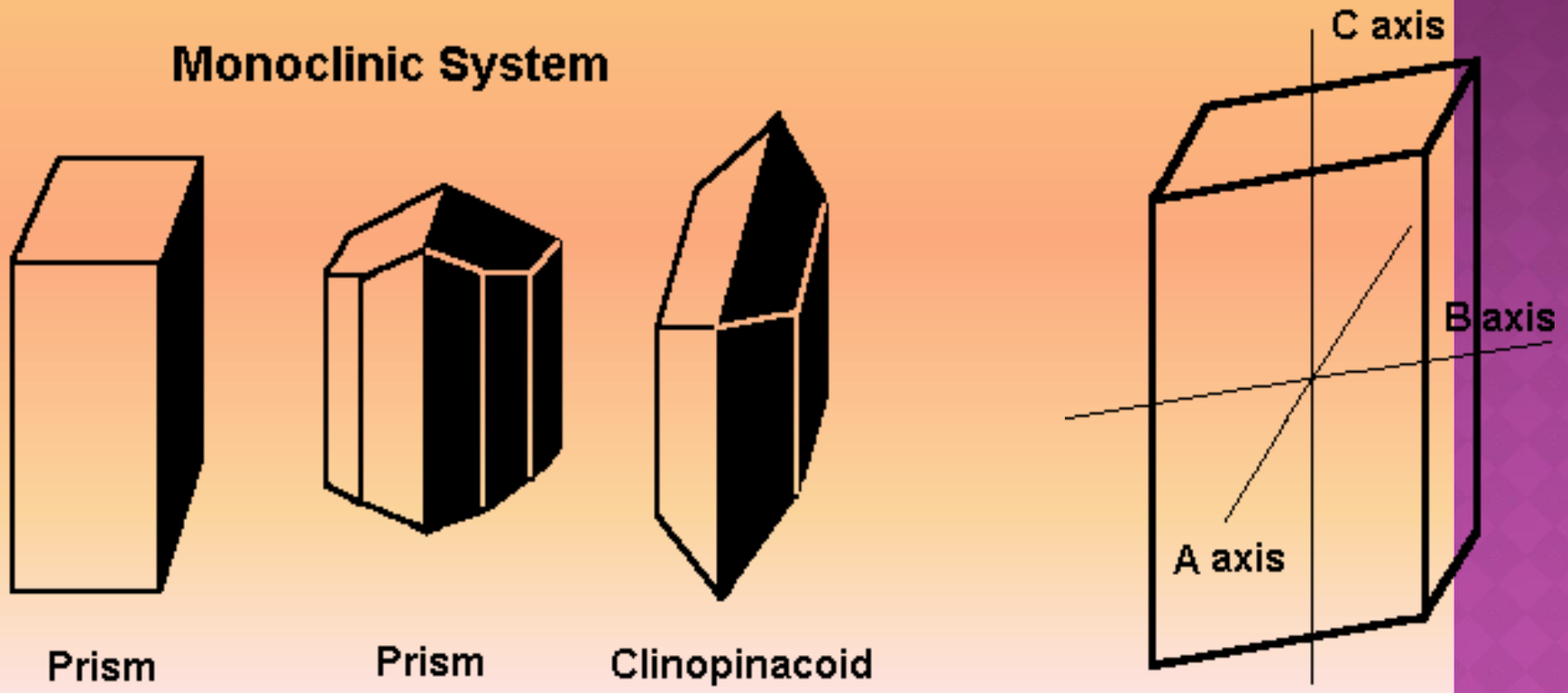
- D. Orthorhombic
  - Three axes all unequal to each other
  - All axes intersect at right angles





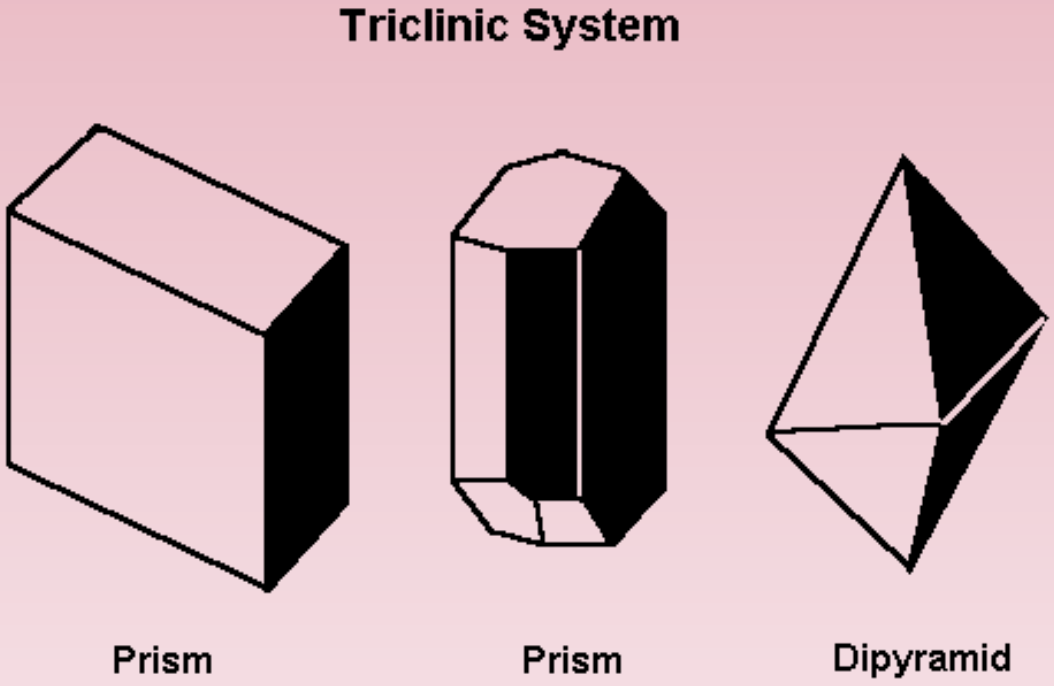
COMMON FACE ARRANGEMENTS AND ANGLES

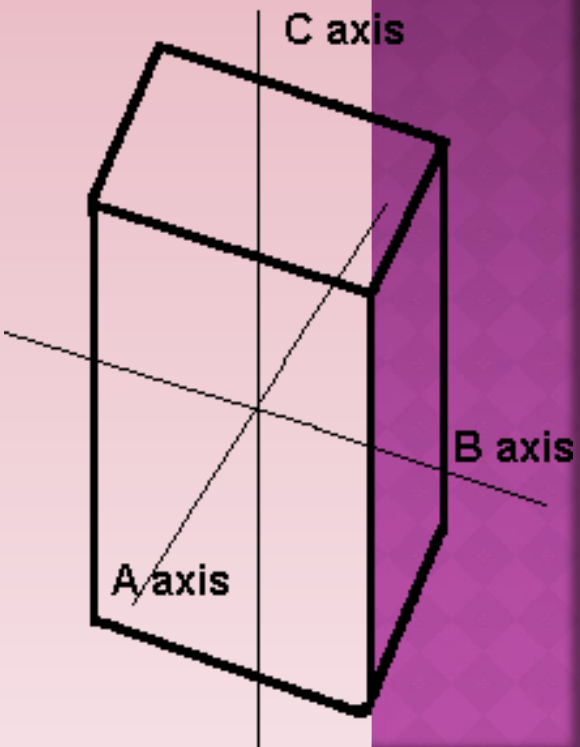
- E. Monoclinic
  - Two non-equal axes at right angles to each other
  - A third axis is inclined to one of the first two



COMMON FACE ARRANGEMENTS AND ANGLES

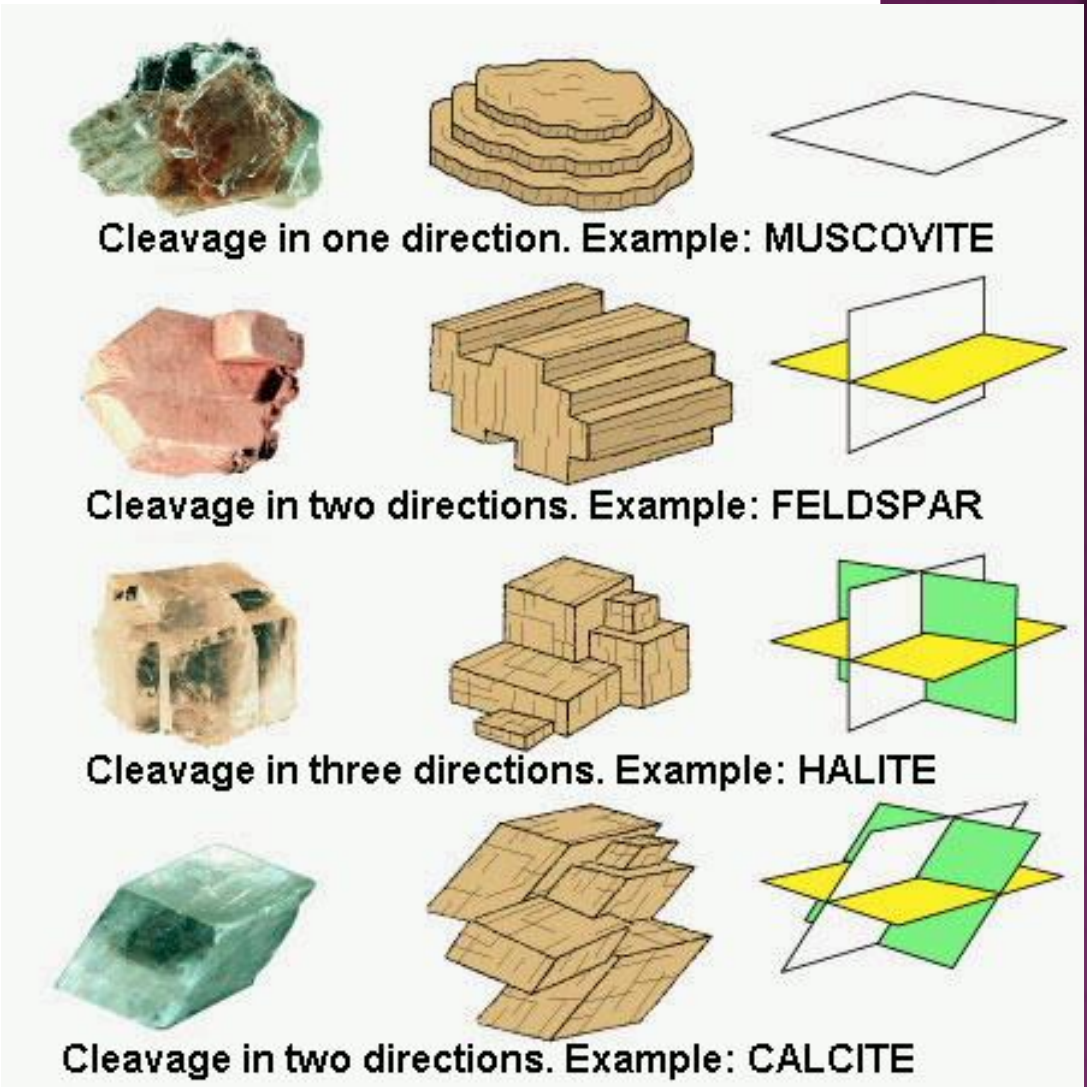
- F. Triclinic
  - Three axes
  - All axes are inclined with respect to each other





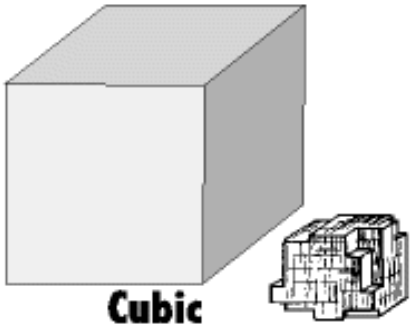
6. Mineral Cleavage – the ability of a mineral to break, when struck along specific planes

- → Based on the bonding between atoms
- → Where the bonds are weakest = breakage plane



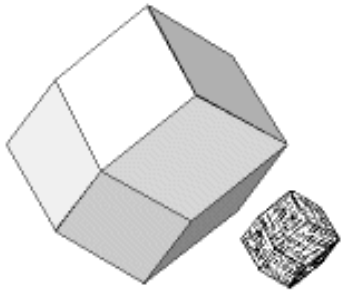
MINERAL CLEAVAGE

Mineral Cleavage and Crystal Form

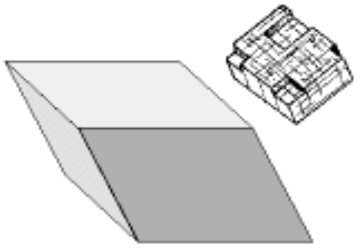


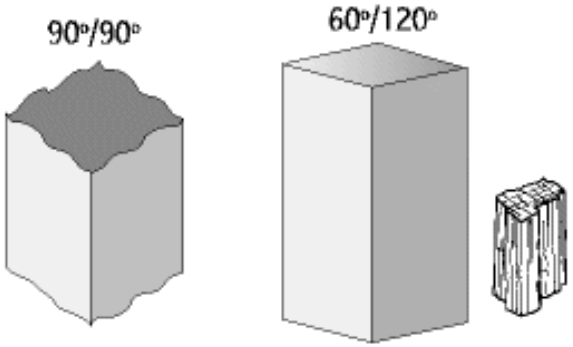
Cubic
(3 cleavages, 6 faces at right angles; e.g. halite)

Octahedral
(4 cleavages, 8 faces; e.g. fluorite)

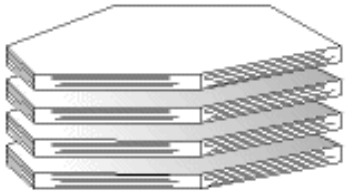


Dodecahedral
(6 cleavages, 12 faces; e.g. sphalerite)





(2 cleavages, 4 faces of many possible angles; third side fractures irregularly; e.g. pyroxene, amphibole, feldspar)



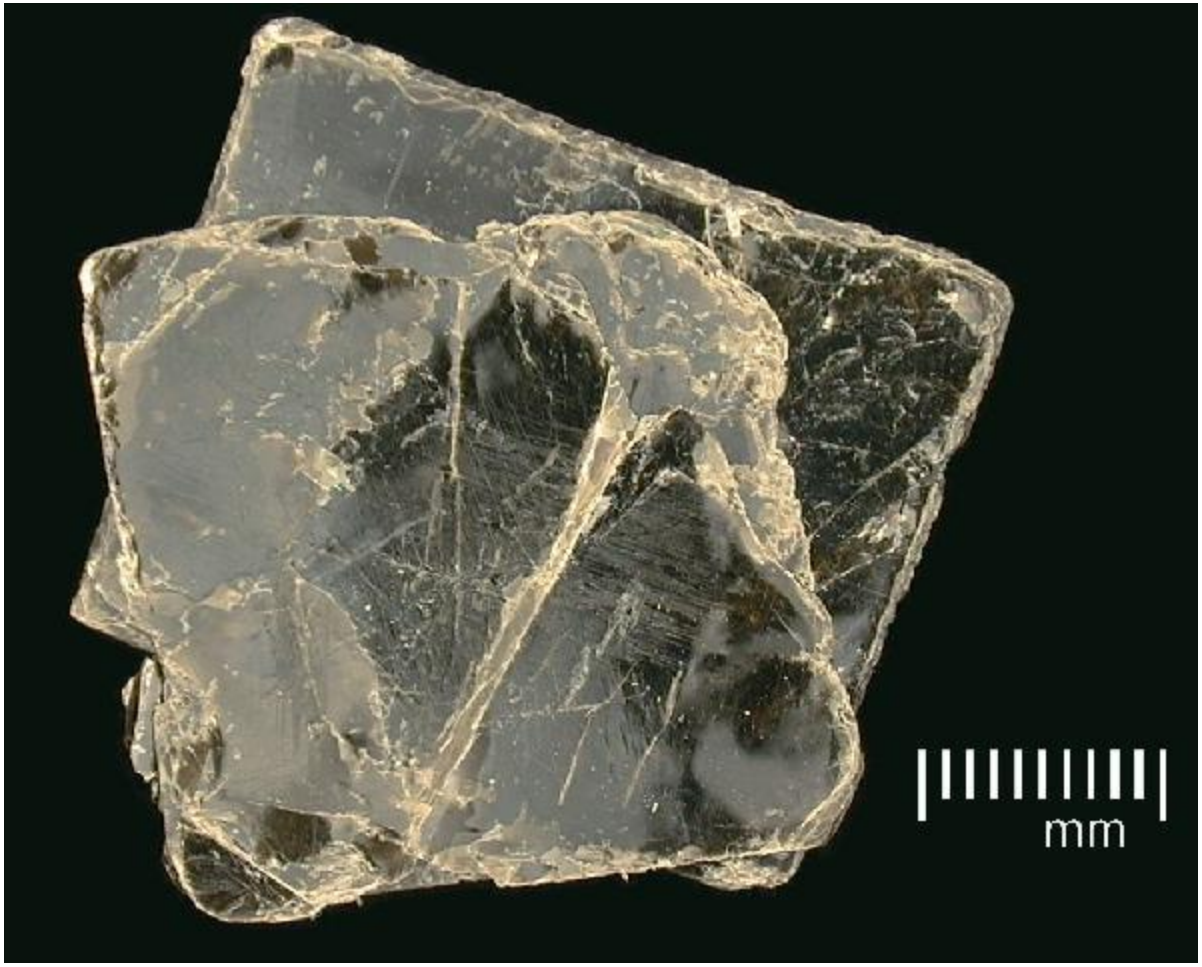
Basal
(1 cleavage, 2 faces; e.g. biotite, muscovite, chlorite)

MINERAL CLEAVAGE

→ Can have no cleavage (example = quartz)

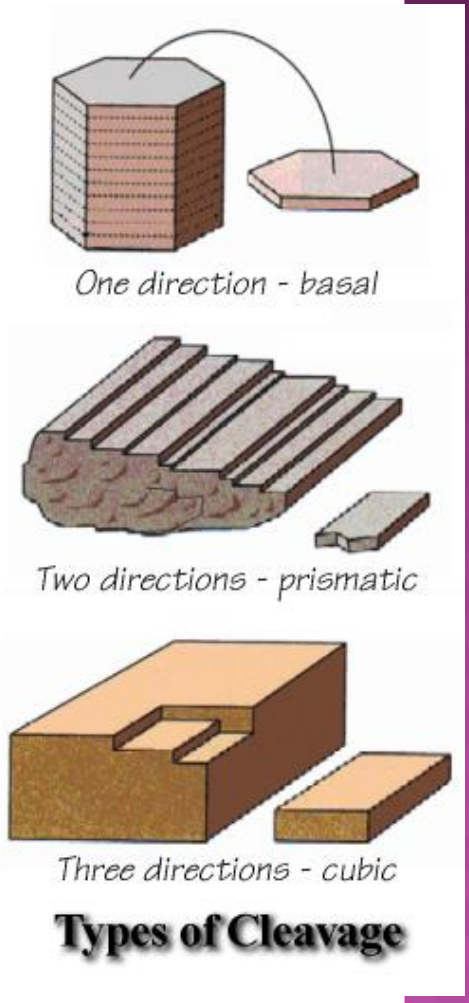
MINERAL CLEAVAGE

→ Can have 1 plane of cleavage (ex. = Biotite)



MINERAL CLEAVAGE

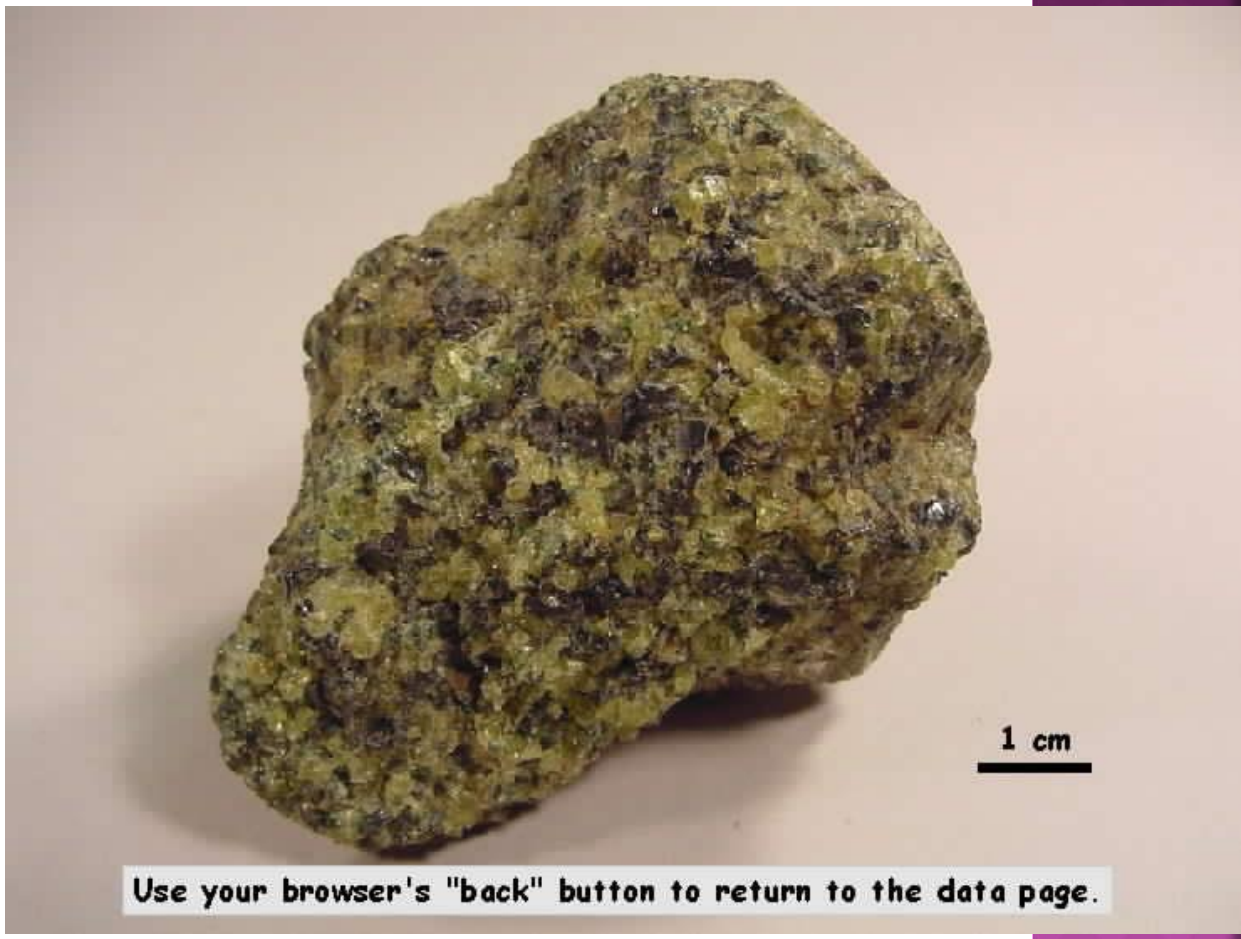
→ Can have multiple planes of cleavage



7. FRACTURE

The way a substance breaks where not controlled by cleavage

→ Minerals with no cleavage generally break with irregular fracture



FRACTURE

→ If minerals break with curved fracture surfaces, it is called concoidal fracture

- This is seen in glass, the igneous rock Obsidian,

and the mineral Quartz

8. Specific Gravity – the density of a mineral

- Density = mass of an object / volume of the object
- The ratio of the mass of an object to the mass of an equal volume of water
- The density of pure water = 1 g / mL
- If the density of the object is < 1 = lighter than water, and will float to some degree
- If the density of the object is > 1 = heavier than water, and will sink
    - Examples:
        - → Quartz = 2.65 g / mL
        - → Galena = 7.5 g / mL
        - → Gold = 19.3 g / mL

9. OTHER SPECIAL PROPERTIES

a. Taste – a few minerals have a characteristic taste

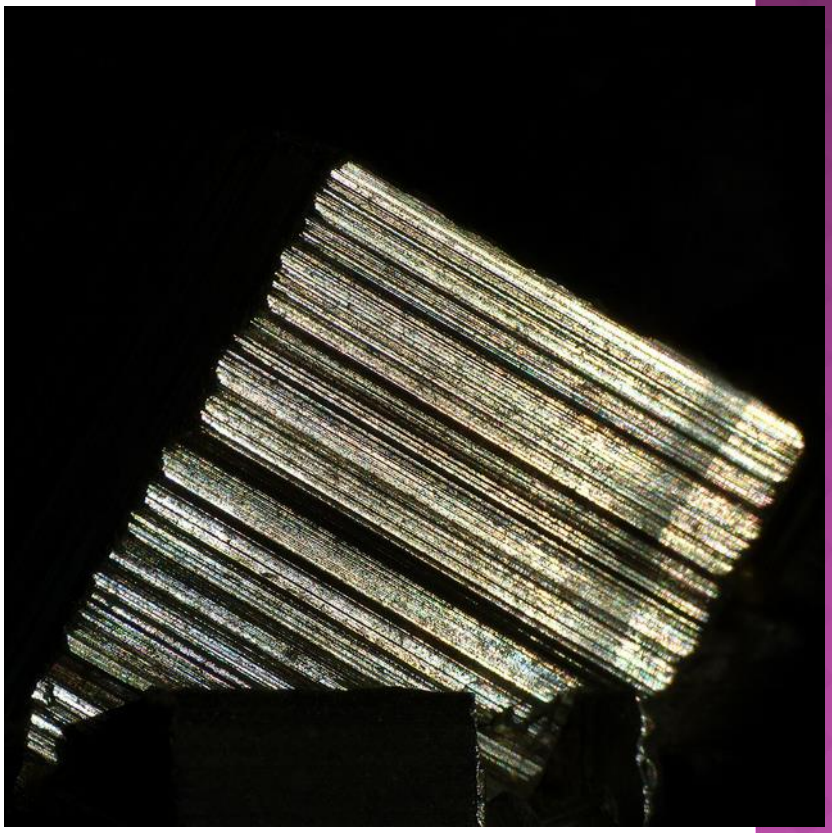
Halite tastes like salt

b. Odor – a few minerals have a characteristic odor

Clay minerals have an “earthy” smell

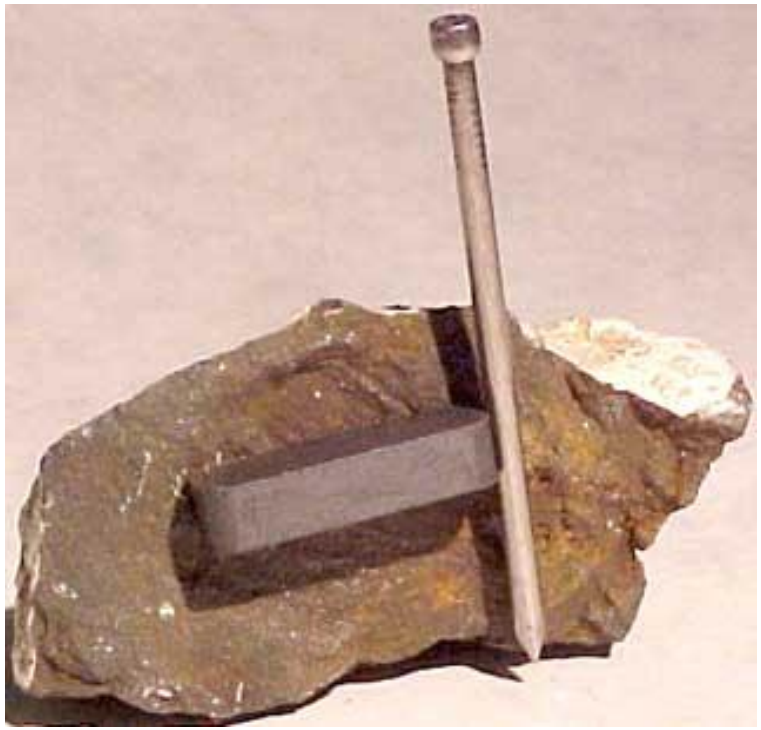
9. OTHER SPECIAL PROPERTIES

- c. Striations – straight parallel lines on the flat surface of the cleavage directions



9. OTHER SPECIAL PROPERTIES

- d. Magnetism – some minerals with large amounts of iron oxide are attracted to magnets



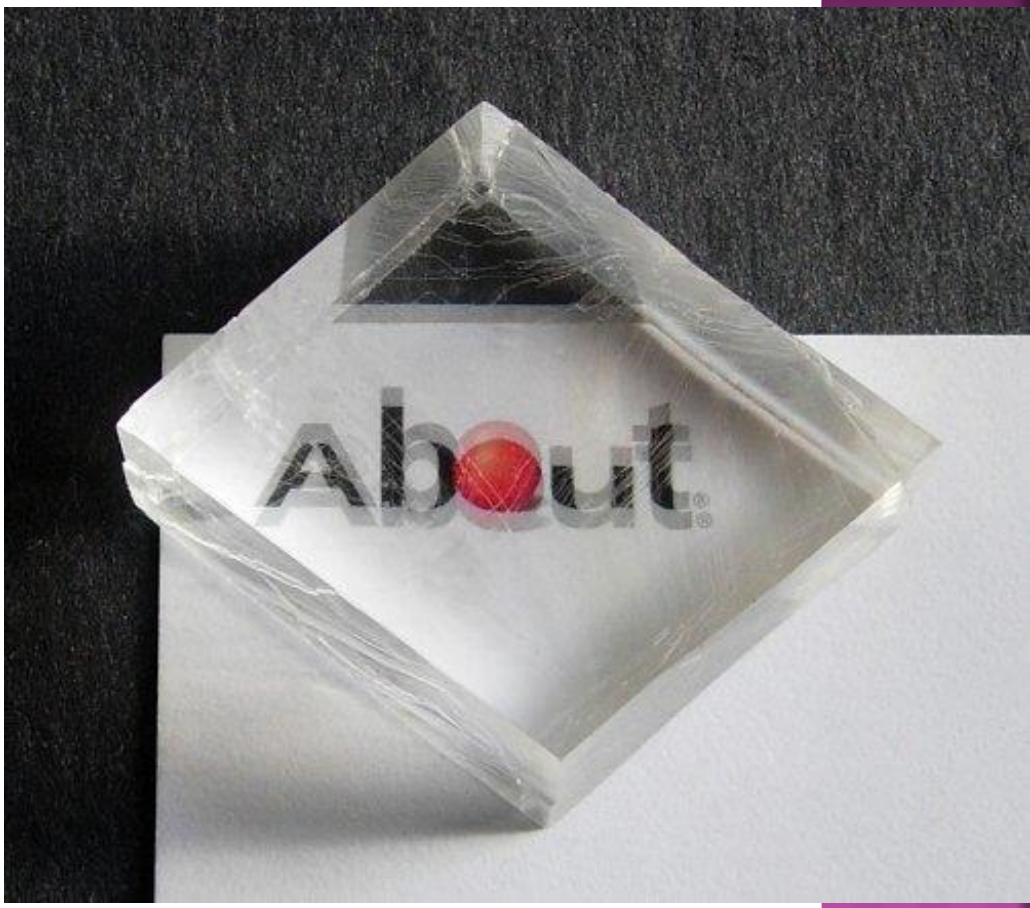
9. OTHER SPECIAL PROPERTIES

- e. Double Refraction – a clear mineral placed over an image will show 2 images by the light being split as it

  enters some

  crystalline minerals

→ Example - Calcite



9. OTHER SPECIAL PROPERTIES

- f. X-ray fingerprints – when x-rays are directed through minerals, the x-rays are deflected out at specific angles

→ Each mineral has a specific pattern

9. OTHER SPECIAL PROPERTIES

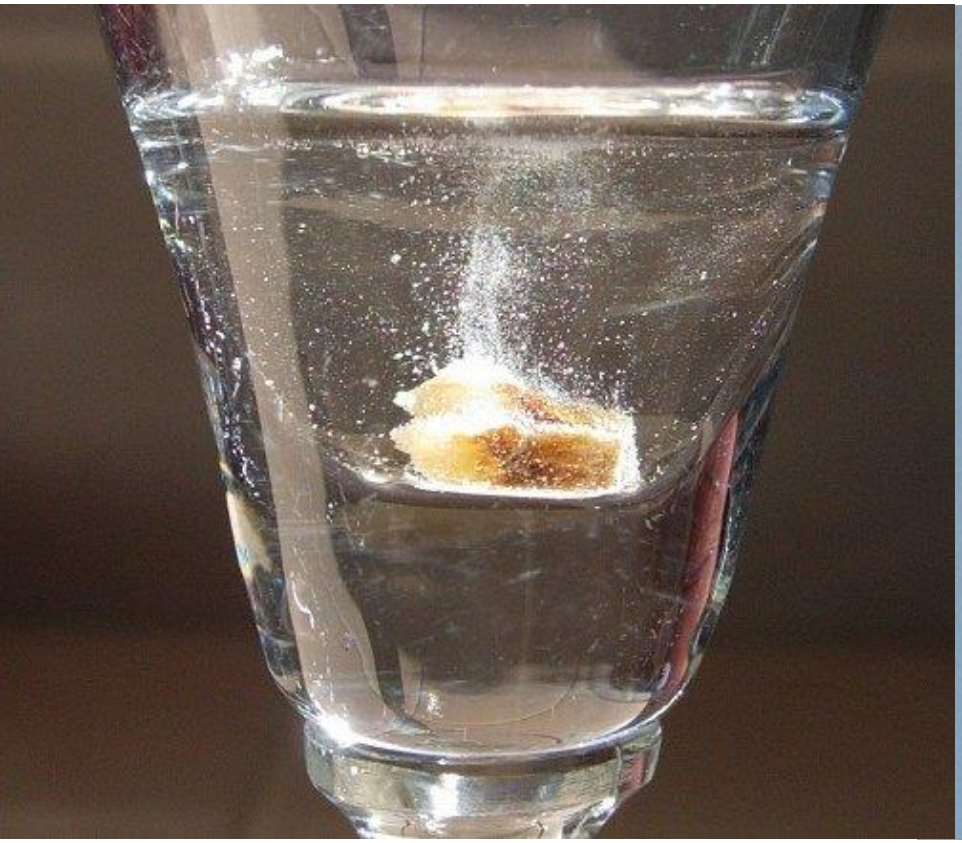
- g. Chemical tests – how do minerals react to specific chemicals

→ Example –

Carbonate minerals (calcite) will react to

weak hydrochloric acid, they will fizz to produce carbon dioxide (CO_2) gas

→ Generally this is the only field chemical test



ROCKS

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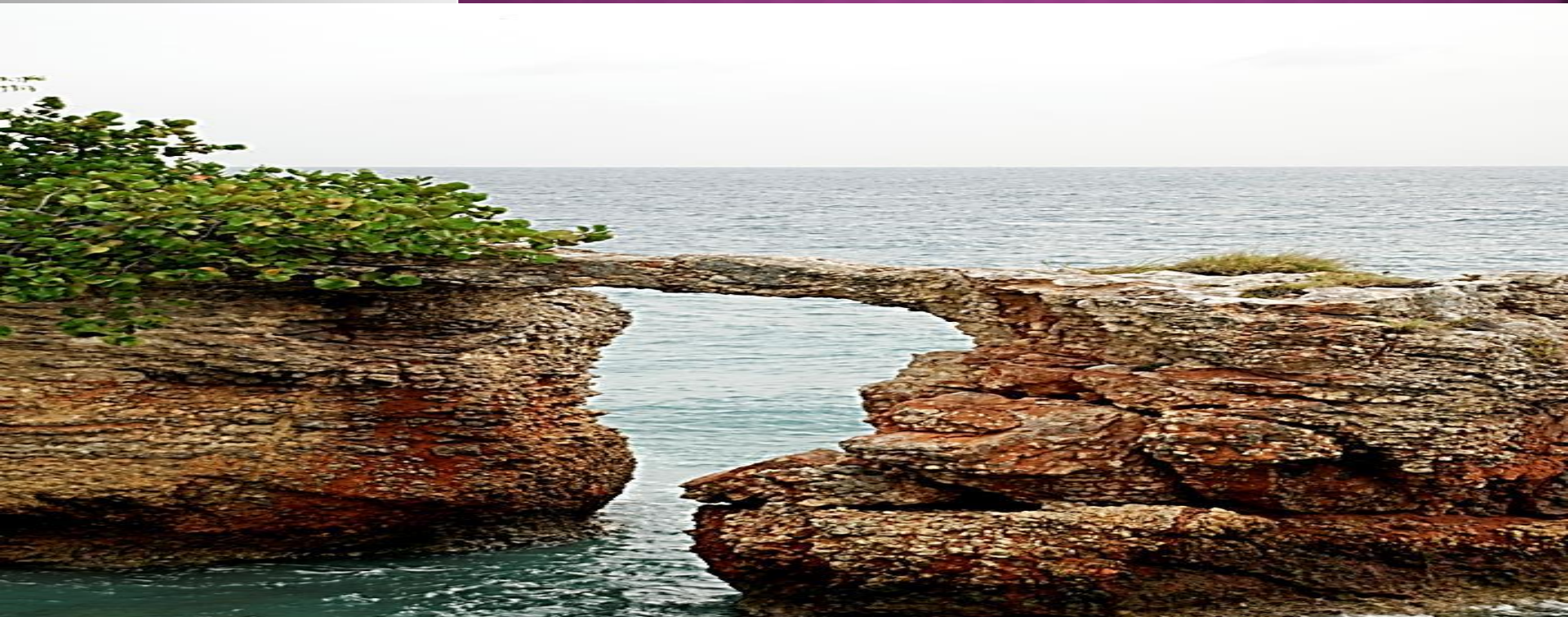


WHAT ARE ROCKS?

- A rock is a naturally occurring solid mixture of one or more minerals.
- Rocks are classified by how they are formed, their composition, and texture
- Rocks change over time through the rock cycle

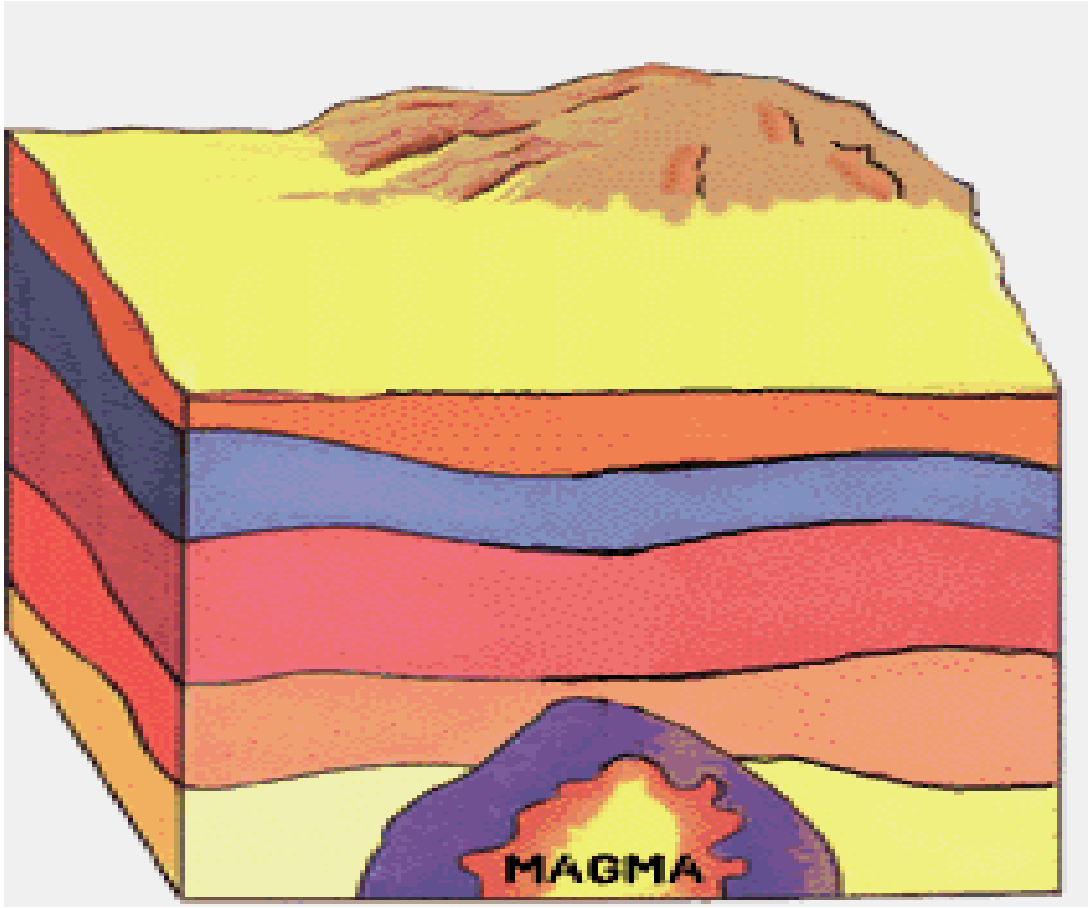
TYPES OF ROCKS

- ROCKS ARE DIVIDED INTO THREE GROUPS BASED ON HOW THE ROCKS FORMED

1. IGNEOUS
2. SEDIMENTARY
3. METAMORPHIC

IGNEOUS ROCKS

- Igneous rocks are formed by the cooling and hardening of molten rocks



TYPES OF IGNEOUS ROCKS

1. EXTRUSIVE/VOLCANIC ROCKS

Forms at the surface.

When magma reaches the surface it is called Lava. LAVA cools and hardens to form EXTRUSIVE rocks. When the cooling is very fast (almost instant) it will form rocks without crystals (GLASSY TEXTURE) e.g. Obsidian, while if it is not that fast it will form tiny crystals (FINE-GRAINED) e.g. Basalt

A. Obsidian

B. Basalt

2. INTRUSIVE/PLUTONC ROCKS

Magma does not always reach the surface but may solidify below the Earth's surface. In this case it forms intrusive igneous rocks.

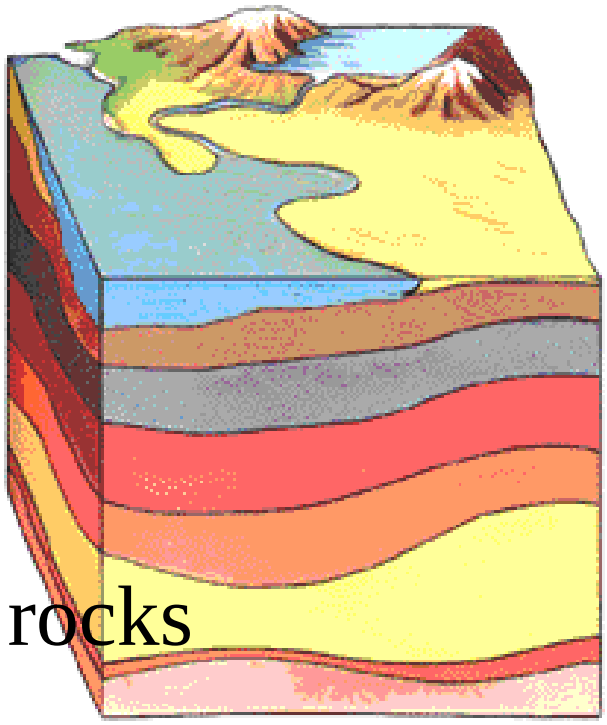
Since the magma takes a longer time to solidify below the surface, the rocks formed has bigger crystals e.g. Granite

CHARACTERISTICS OF IGNEOUS ROCKS

1. Has crystals except those that solidify very fast
2. Are not stratified
3. Do not contain fossils

SEDIMENTARY ROCKS

- Sedimentary rocks are formed by erosion
- Sediments are moved from one place to another
- Sediments are deposited in layers, with the older ones on the bottom
- The layers become compacted and cemented together to form rocks



http://www.fi.edu/fellows/payton/rocks/create/sediment.htm

- Sedimentary Rocks are formed at or near the Earth's surface
- No heat and pressure is involved
- Usually occur in layers (Strata)
- Stratification – the process in which sedimentary rocks are arranged in layers

TYPES OF SEDIMENTARY ROCKS

1. CLASTIC ROCKS

made of fragments of rock cemented together e.g. Breccia

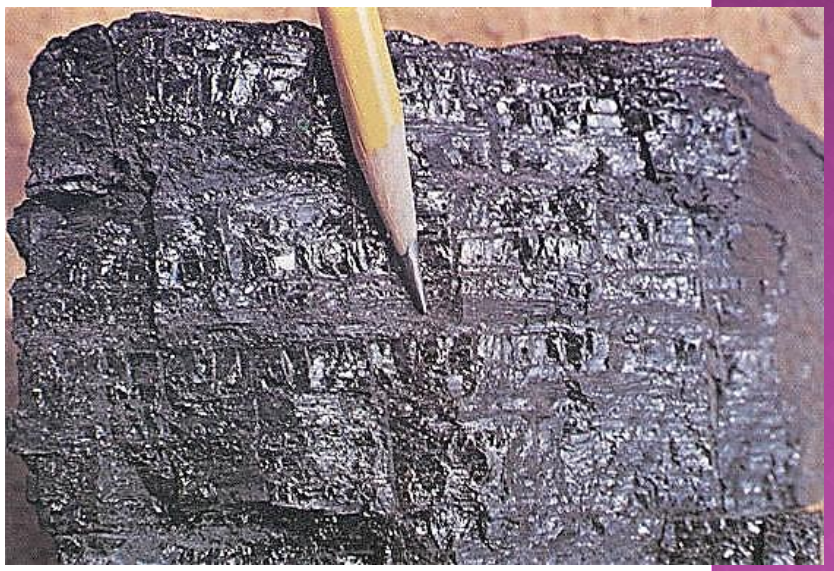
2. NON-CLASTIC

Minerals crystallize out of solution to become rock e.g. limestone

Or are formed from remains of plants and animals (also referred to as biogenic rocks) e.g. coal

A. Limestone

B. Coal



CHARACTERISTICS OF SEDIMENTARY ROCKS

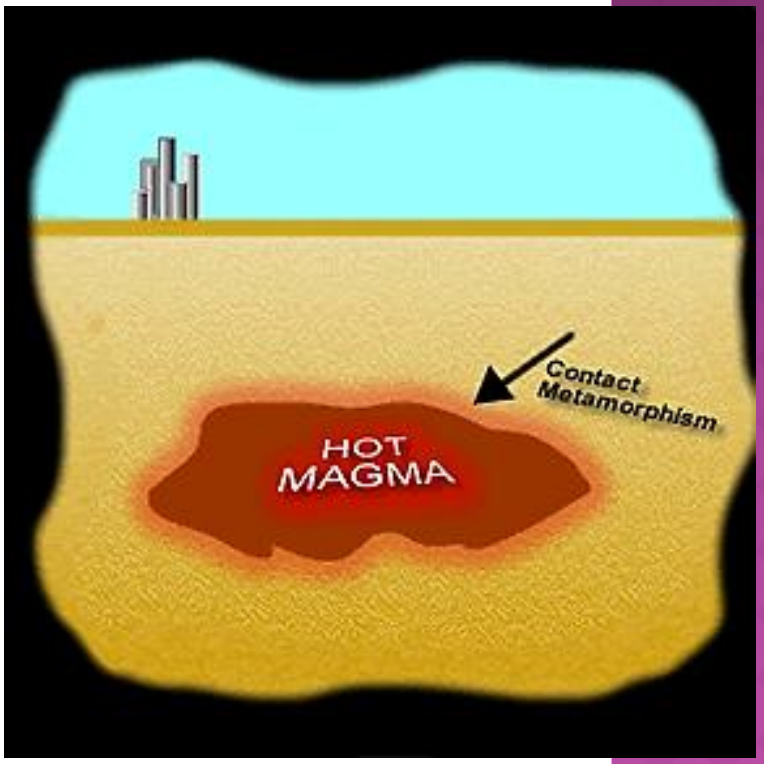
1. May contain fossils
2. Are stratified
3. They are not banded

METAMORPHIC ROCKS

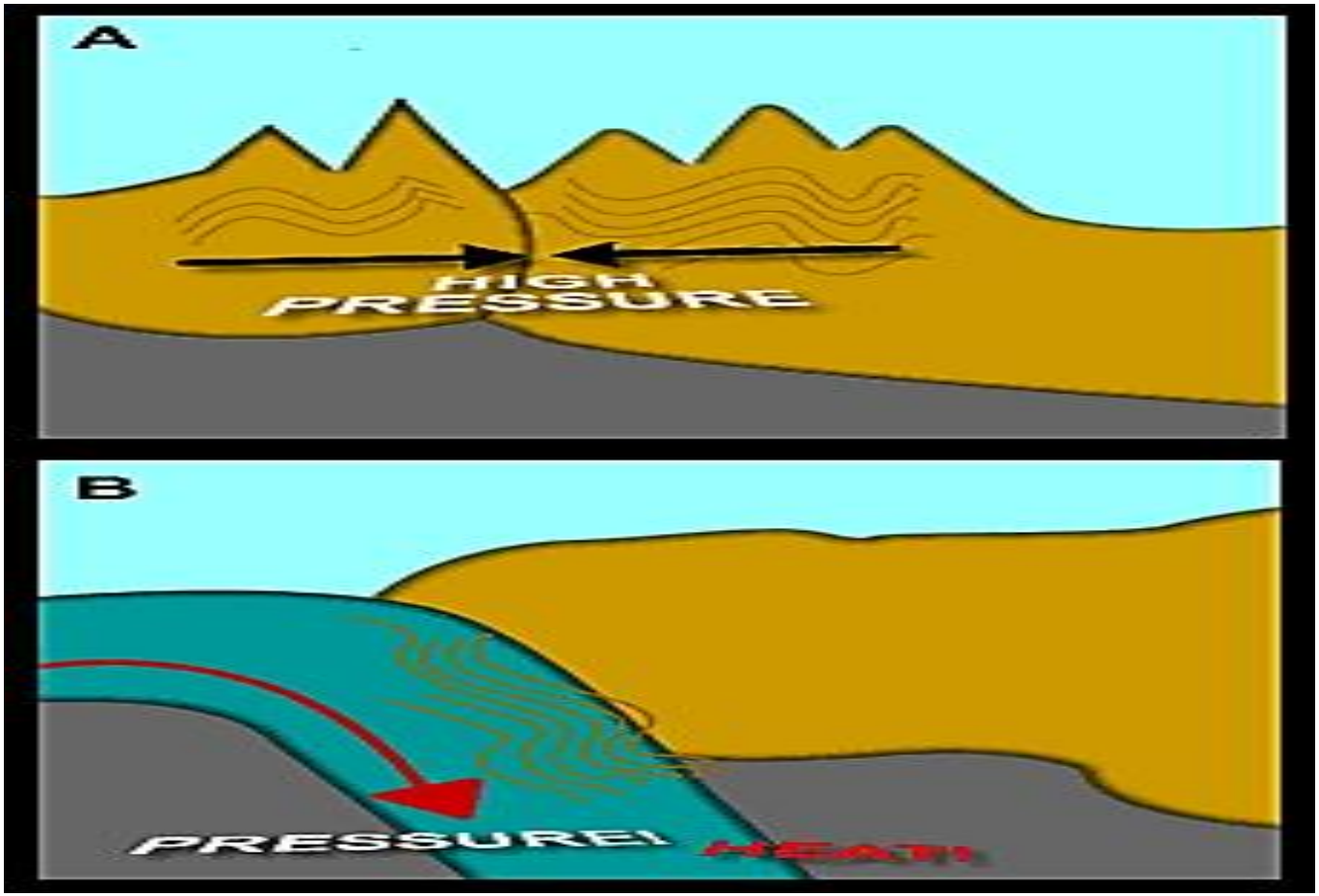
- Metamorphism means to change.
- Rocks change with temperature and pressure.
- Usually takes place deep in the Earth

- Contact Metamorphism– Rocks are heated by nearby magma (affects a small scale)
- Increased temperature changes the composition of the rock, old minerals are changed into new ones

Hornfel is a fine-grained non-foliated metamorphic rock produced by contact metamorphism



- Regional metamorphism: affects a large area and results from plate tectonics
- Rocks are changed due to pressure



- Metamorphic rocks can be foliated, i.e. showing layers/bands of minerals e.g. Gneiss or non- foliated e.g. Marble

A. Gneiss

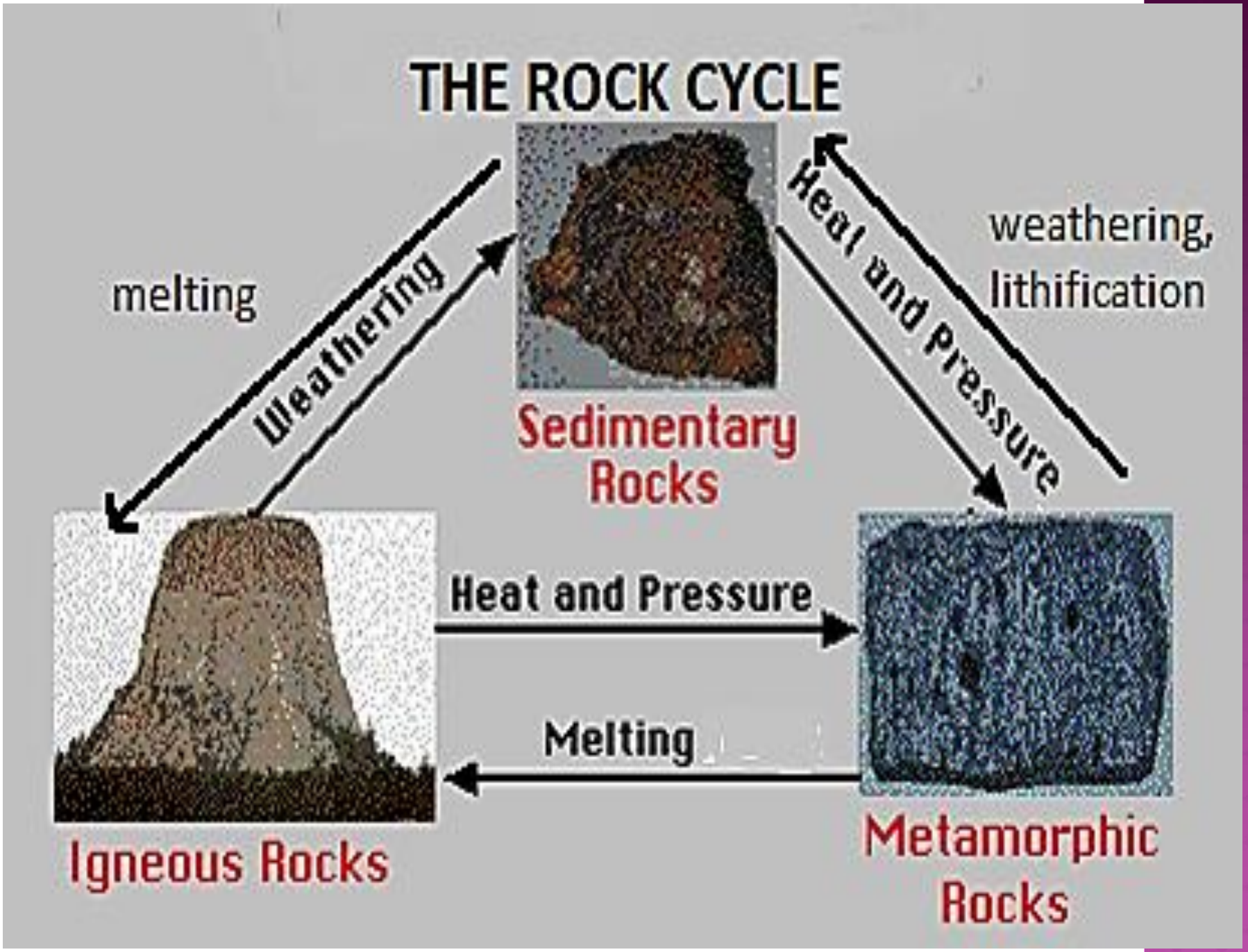
B. Marble

CHARACTERISTICS OF METAMORPHIC ROCKS

1. May be foliated/banded
2. Rarely contain fossils
3. React with acids

THE ROCK CYCLE

Rocks change from one form to another, any type of rock can change into another type, for instance, an igneous rock into sedimentary or metamorphic and vice versa.


THE ROCK CYCLE
melting
Weathering
weathering,
lithification
Heat and Pressure
Sedimentary
Rocks
Heat and Pressure
Melting
Igneous Rocks
Metamorphic
Rocks