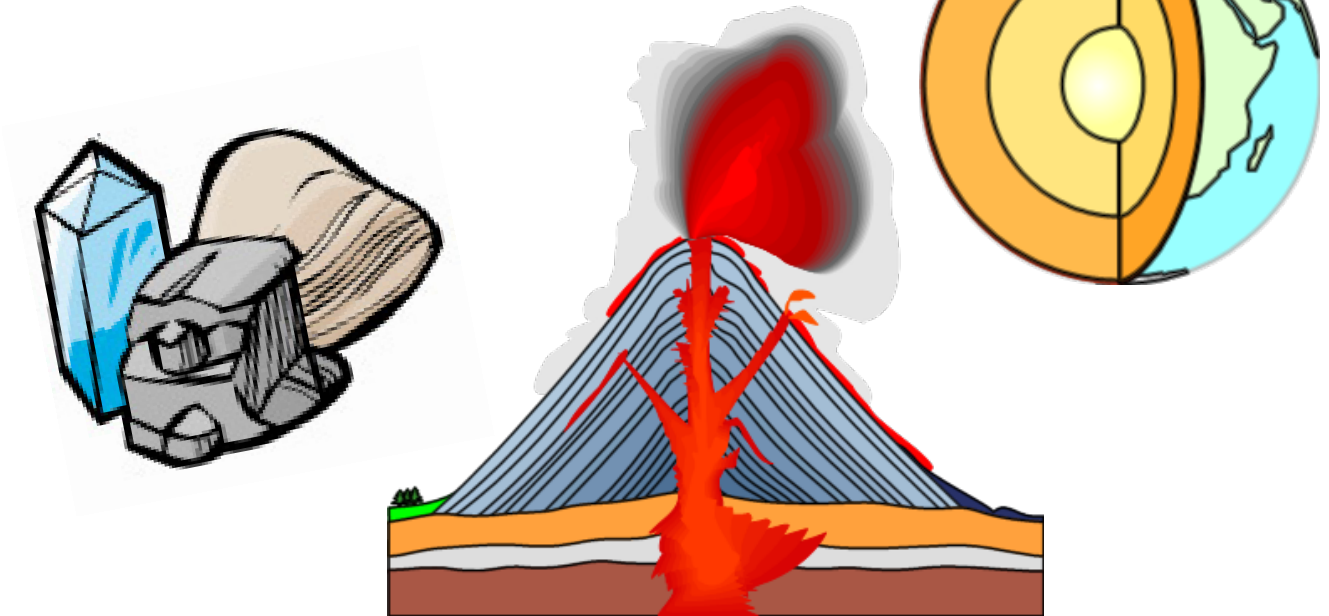


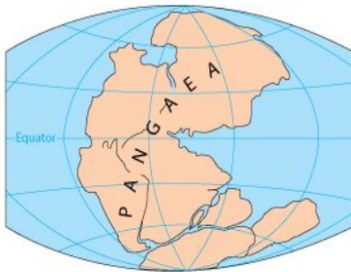
Earth Crust - (Part 1 Mineral identification)

Science 7
Unit 1 : Earth's Crust



Earth Crust - (Part 1 Mineral identification)

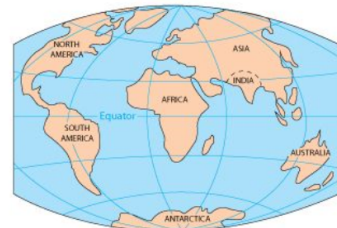
About 300 million years ago, Earth didn't have seven continents, but instead one massive supercontinent called Pangaea, which was surrounded by a single ocean called Panthalassa.



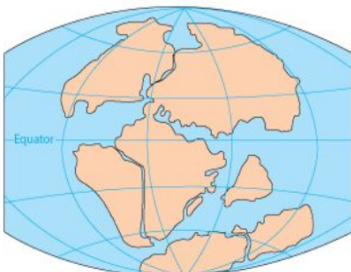
PERMIAN
250 million years ago



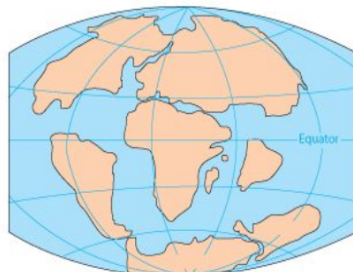
TRIASSIC
200 million years ago



PRESENT DAY



JURASSIC
145 million years ago



CRETACEOUS
65 million years ago

Earth Crust - (Part 1 Mineral identification)

Evidence of Pangea



More than a century ago, the scientist Alfred Wegener stated there must have been 1 supercontinent, which he named Pangaea (sometimes spelled Pangea), after putting together several lines of evidence.

#1) "continents fit together like a tongue and groove," something that was quite noticeable on any accurate map, Murphy said.

#2) Rocks and minerals are found on different continents. [Coal deposits](#) found in Pennsylvania have a similar composition to those spanning across Poland, Great Britain and Germany from the same time period. That indicates that North America and Europe must have once been a single landmass.

#3) In the fossil record, identical plants, such as the extinct seed fern & Glossopteris, are found on continents that are no longer attached. These could not swim the ocean so this indicated that the supercontinent must have split.

And mountain chains that now lie on different continents, such as the Appalachians in the United States and the Atlas Mountains in Morocco, were all part of the Central Pangaea Mountains, Because they are made up with the same types of rocks.



Earth Crust - (Part 1 Mineral identification)

CHAPTER 10 ROCKS, MINERALS AND SOILS

210-1 , 310-2A

What are rocks and minerals?



Rocks: a natural material composed of one or more materials.

Characteristics of a Rocks

A solid

Naturally occurring

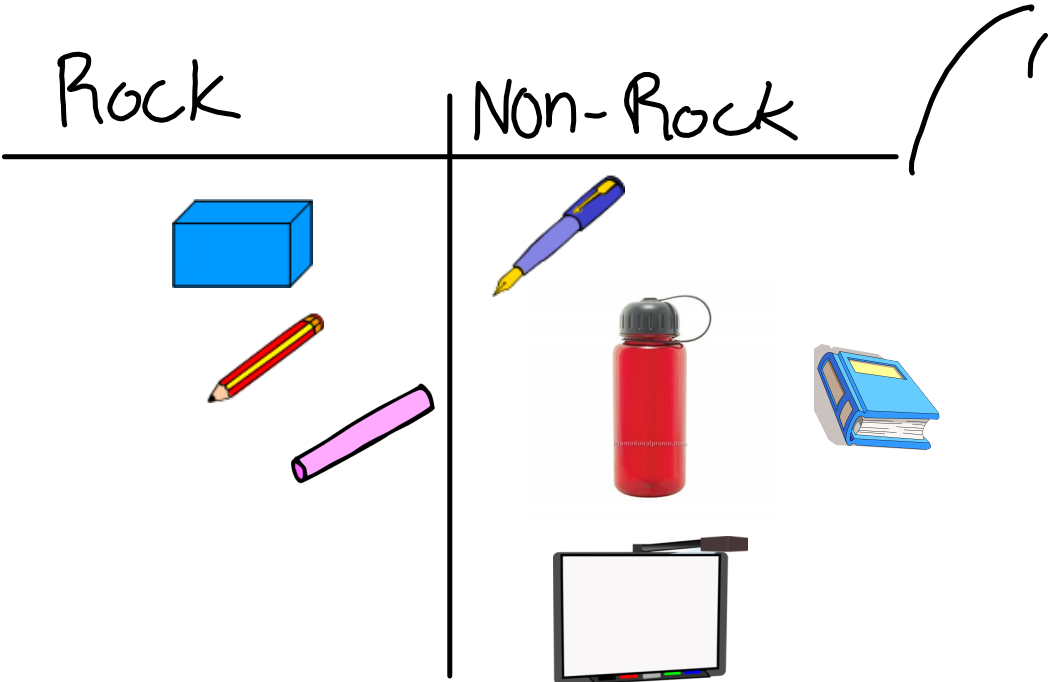
Is made up of minerals or mineral like matter.

Minerals: an inorganic naturally occurring solid material, minerals can be either elements (pure substances) or compounds (two or more substances combines).



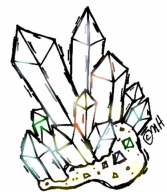
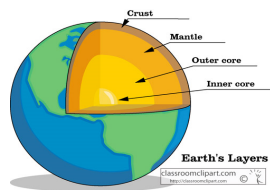
Earth Crust - (Part 1 Mineral identification)

Classroom Sorting? Rock or Not?



Earth Crust - (Part 1 Mineral identification)

Read P. 280-281



Minerals

Earth's Crust: The thin outermost layer of earth.

Rock : is made up of 1 or more pure, naturally occurring, non-living solid called minerals.

Element: a type of pure substance that can not be broken down into simpler parts by chemical means and that has a unique set of properties.

There are over 3000 different minerals, a way to identify them is to use The Mohs Hardness Scale. This scale characterizing scratch resistance of various minerals through the ability of harder material to scratch softer Minerals.

Crystals: a building block of minerals, crystals occur naturally and have straight edges, flat sides and regular angles.

What is a Mineral?

- Most minerals are rare. Only a few, such as quartz and mica, are common and found throughout Earth's crust
- Minerals can be an element (pure substance) or a compound (two or more substances)
- Mineral Elements - sulfur, copper, gold, diamond
- Mineral Compound - Quartz (silicon and oxygen)

How can I tell the difference between different Minerals?

In order to recognize the difference between different minerals you need to identify important clues in the properties of minerals.

Clues to look for: (will discuss in a bit)

Hardness,

Lustre

Color,

Streak,

Cleavage and

Fracture

310-2A

Hardness

The Mohs Hardness Scale

Hardness of a mineral refers to the "scratchability" that it has

in 1812 Friedrich Mohs developed a scale from 1 to 10 that measures a mineral's hardness

Ex) you can scratch a piece of chalk with your thumbnail, but you cannot scratch most other rocks

Table 10.1

| The Mohs Hardness Scale | | |
|-------------------------|------------------|----------------------------|
| Mineral | Mineral hardness | Hardness of common objects |
| talc | 1 softest | soft pencil point (1.5) |
| gypsum | 2 | fingernail (2.5) |
| calcite | 3 | piece of copper (3.5) |
| fluorite | 4 | iron nail (4.5) |
| apatite | 5 | glass (5.5) |
| feldspar | 6 | steel file (6.5) |
| quartz | 7 | streak plate (7) |
| topaz | 8 | sandpaper (7.5) |
| corundum | 9 | emery paper (9.0) |
| diamond | 10 hardest | |

To explain why the "hardness of common objects" can be harder than the hardness of the actual mineral like in the example

EX:

| | | |
|---------|---|-----------------------|
| calcite | 3 | piece of copper (3.5) |
|---------|---|-----------------------|

Is that a piece of copper is made of mixtures materials

Earth Crust - (Part 1 Mineral identification)

How to use the Mohs Hardness scale:

Suppose you have an unknown mineral that looks like talc or corundum. Scratch it with your fingernail. If it is talc, it will scratch easily, if it doesn't scratch easily then it is corundum.













Some other means are needed to help classify minerals. Mineral sometimes occur as crystals.

Minerals can occur as Crystals

A Crystal occurs naturally and has straight edges, flat sides, and regular angles

All of the minerals in Earth's crust can be grouped according to 6 different crystal shapes. shown below

Table 10.2 The Six Major Crystal Systems

| Examples | | Systems | |
|---|-----------|---|--------------|
|  | halite |  | cubic |
|  | wulfenite |  | tetragonal |
|  | corundum |  | hexagonal |
|  | topaz |  | orthorhombic |
|  | gypsum |  | monoclinic |
|  | albite |  | triclinic |

Need to look under a high powered microscope to see the crystal shape.

Mineral Identification

Luster

Luster is the "Shininess" of the Mineral - it depends on how much light is reflected from its surface.



Which of the mineral examples has more Luster?



Mineral Identification

Colour

Colour can help to identify different minerals

Colours of the following 3 Minerals



whitish-
grey-brown



Grey



light brown

Earth Crust - (Part 1 Mineral identification)

Physical properties of minerals

▶

▶

COLOUR

▶

▶

▶

white or yellowish

brassy yellow

muscovite

pyrite

white or pink

white or transparent

olive green

different colours

black

different colours

olivine

clay minerals

biotite

quartz

feldspar

halite

Mineral Identification

Streak

When a mineral is rubbed across a piece of unglazed porcelain tile, it leaves a streak.

The color that shows is actually the mineral's crushed powder, and it can be a different color than the rock itself.

Any Mineral that is harder than Porcelain (hardness of 7) will not leave a streak.



Feldspar

Colour: pink

Hardness: 6

Streak: white/colourless

Uses of Minerals

Minerals are important in our world because of the value and use the minerals have.

Diamonds are valuable for their beauty and hardness (used in cutting glass and metals)

Ore - Mixture of metals that gets extracted.

Uses of Minerals

More uses of Minerals

Iron, copper, zinc ~ used in everyday appliances and utensils ~ but they are also used by your body (your body needs over 20 different kinds of elements found in minerals)

Iron helps blood carry oxygen

Calcium builds strong bones and teeth

Sodium regulates water in the body

Mineral Identification

Cleavage and Fracture

The previous properties of minerals were observable to the eye.

Cleavage and Fracture involve how the mineral breaks apart.

Cleavage ~ breaks smooth, flat surfaces, or planes
(mica)

Fractures ~ break rough with jagged edges.
(Obsidian)

Cleavage vs. Fracture

cleavage

- Lets say I would break a mineral
 - If the mineral breaks with smooth edges or surfaces it is said to have cleavage
 - If the mineral has jagged or rough surface by the break then it is said to be fractured.



fractured

