

## Lecture 3

- geology in the news
  - mt tavurvur erupt in papau new guinea
  - evacuating but it's not easy
- Chemistry review and mineral basics
  - Rocks and minerals
    - Basic building materials
    - Different properties
      - Make several different things
    - Valuable
  - Basic chemistry
    - Atom-basic building block of matter
      - Electrons(outer part)
      - Nucleus (center)- proton and neutrons
    - Atomic number- number of protons
      - Assign atom to specific element on periodic table
    - Element- substance made of only 1 type of atom
    - Oxygen and silicon make up majority of crust (\*\*table)
  - Building molecules
    - Electrons exist in shells
    - Make molecules through atoms bonding
    - Each shell can hold a certain number of electrons
    - Atoms want to fill their shells. Empty slots=unhappy atoms
  - Ions and ionic bonds
    - Exchanging electrons
    - Cation=positive charge
    - Anion=negative charge
    - When 2+ combine=compound held together by ionic bonds
- What is a mineral?
  - Mineral
    - must meet specific requirements to be declared as mineral
    - non synthetic-100% natural
      - nylon, styrofoam
    - Inorganic
      - Cannot be a compound
      - Do not have proteins, fats, amino acids, starches
    - Crystalline
      - All the atoms are put together in definite pattern
      - Amorphous material (does not have form/pattern=glass)- not mineral
    - Solid
      - State is determined by T/P conditions
    - Set chemical composition
      - Write out chemical formula (H<sub>2</sub>O)
      - Some substitutions occur
      - Materials must be present to grow
- Mineral properties
  - Color
    - Notice instantly

- Defining trait
- Some minerals always same color but some become wide variety of colors
- Streak
  - Color of mineral when ground against tile
  - 9/10 streak is the same color as the color of mineral
- Moh's scale
  - Hardness(how difficult to scratch/mark up surface)
  - Diamond(10-hardest)...apatite(5)...talc(1-weakest)
  - Tools can also help with finding hardness
    - Penny, nail, knife, key...
- Luster
  - Shininess
  - Silky, greasy, metallic, vitreous, pearly, dull, resinous
- Effervescence
  - "acid" test
  - Bubbly
- Crystal form
- Fracture
  - Breakage patterns
  - Jagged/curvy
- Cleavage
  - Breakage pattern
  - Flat/smooth
- Striations
  - Long straight lines (thin stripes)
  - Only 1 mineral has striations
    - pyrite
- Some magnetic
- Sulfur bearing minerals smell like rotten eggs
- Halite have a strong, salty taste
- Common mineral groups
  - Grouped by common anion (negative charge)
  - Many groups exist
    - Sulfides (S)
      - Anion=sulfur
      - Basic (1 metal attached to S)
    - Oxides (O)
      - Anion=oxygen
      - Basic (1 metal attached to O)
    - Sulfates (SO<sub>4</sub>)
      - Common on surface of earth in certain areas
      - Construction materials (dry wall, plaster cast)
    - Phosphates (PO<sub>4</sub>)
      - Primary ingredient in fertilizer
      - Bones and teeth primarily made of phosphate
    - Carbonates (CO<sub>3</sub>)
      - React with weak acids
      - Abundant at surface of earth

