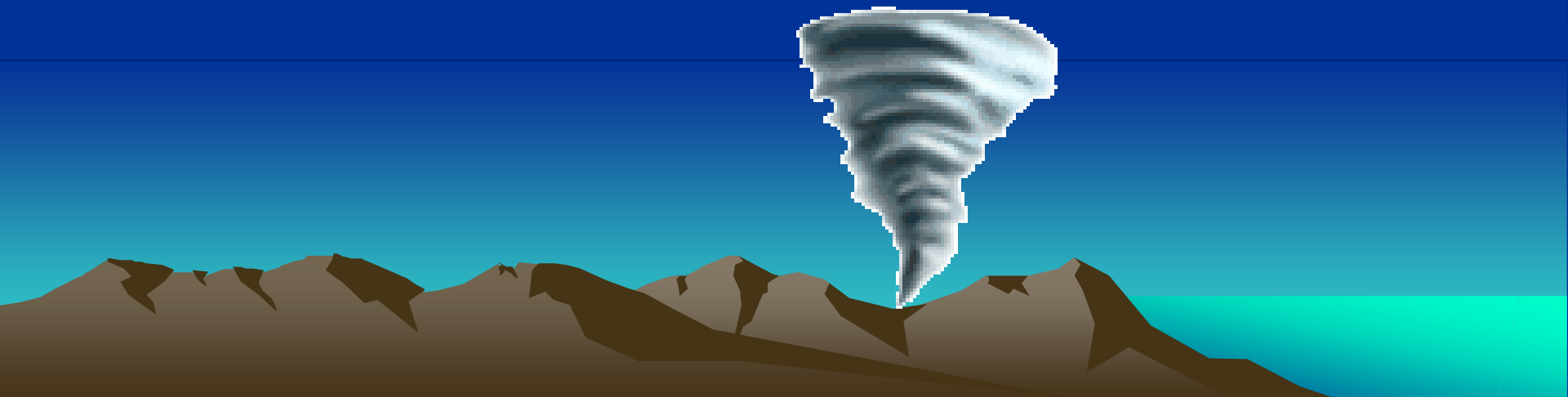
Earth Science

With

Mr. Thomas



Weathering & Erosion

- What is weathering & erosion?
  - The breakup of rock due to exposure to processes that occur at Earth's surface.

- There are basically 2 types of Wx'ing & Erosion:

Mechanical **Chemical**

Mechanical Wx'ing:
(Disintegration)

Definition: When rock is broken into smaller pieces of the same material without changing its composition.

Mechanical Wx'ing:
(Disintegration)

Examples:

- **Frost Wedging**: When water fills a crack, freezes and expands, forcing the crack to become bigger.
  http://www3.interscience.wiley.com:8100/legacy/college/strahler/0471238007/animations/ch15_animations/animation2.html
- **Wetting & Drying**: Some clay particles will swell-up when wet, and contract when dry.

Mechanical Wx'ing:
(Disintegration)

Examples:

- **Abrasion by Rock Materials**: As moving sand, pebbles & larger rocks grind & scrape against one another.
- **Plant & Animal Activity**: Animals trample the ground and dig holes (exposes underlying rock), while roots grow in cracks and force the rocks apart.

Mechanical Wx'ing:
(Disintegration)

Examples:

- **Exfoliation**: The breaking away of loosened sheets of rock, exposing underlying rock.
- **Upward Expansion**: When underlying rock is thrust upward and exposed to the atmosphere via plate tectonic activity. (See pg. 260 in Text)

Mechanical Wx'ing:
(Disintegration)

Let's take a look at some examples of Mechanical Weathering!!

Click for animations!

Chemical Weathering

All chemical weathering involves water or water vapor.

There are 2 types of chemical wx'ing:

1) **Hydrolysis** – Chemical weathering involving water and any other substance.

Example: Feldspar/Hornblende/Augite break down into clay minerals.

Chemical Weathering

Acid can increase the chemical effect on minerals.

Examples:

- Carbonic Acid – Completely dissolves calcite leaving huge caverns underground.

(See picture on pg. 261)

- Acid Rain – Wears out structures made out of concrete, stone, & metal. Also increases acidity of waterways.

Chemical Weathering

2) **Oxidation** – Chemical weathering involving oxygen and any other substance.

Example: When rust forms on minerals which contain *IRON*. These minerals include: magnetite, pyrite, augite, & biotite.

- Annimation -

Rates of Weathering

Normally a slow process, the rate of weathering can be affected by 3 factors:

- **Surface Area Exposed**:

  Click here for animation!

- **Composition of the Rock** :

-Some rock types are more resistant to weathering than others – a function of hardness.

⇨Metamorphic (Marble)

Rates of Weathering

Normally a slow process, the rate of weathering can be affected by 3 factors:

- **Climate** :

- Warm, wet climates typically have higher rates of chemical weathering!

-Cold, dry climates typically have higher rates of mechanical weathering!


That's it