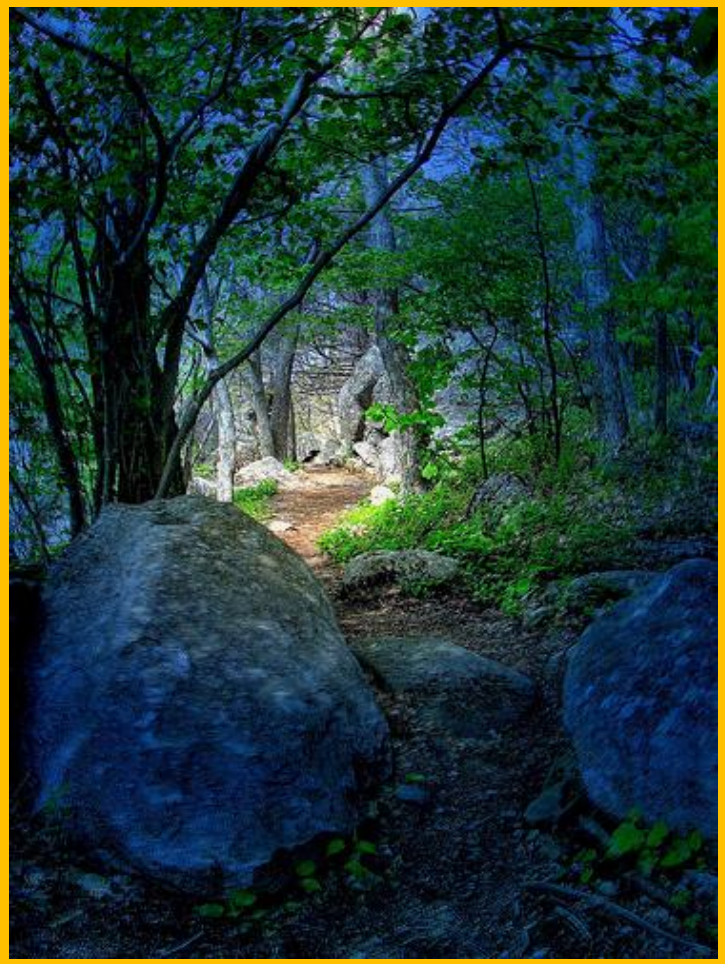
What is weathering?

- **<u>The process that breaks down rock and other substances on the Earth's surface.</u>**

- **What contributes to weathering?**

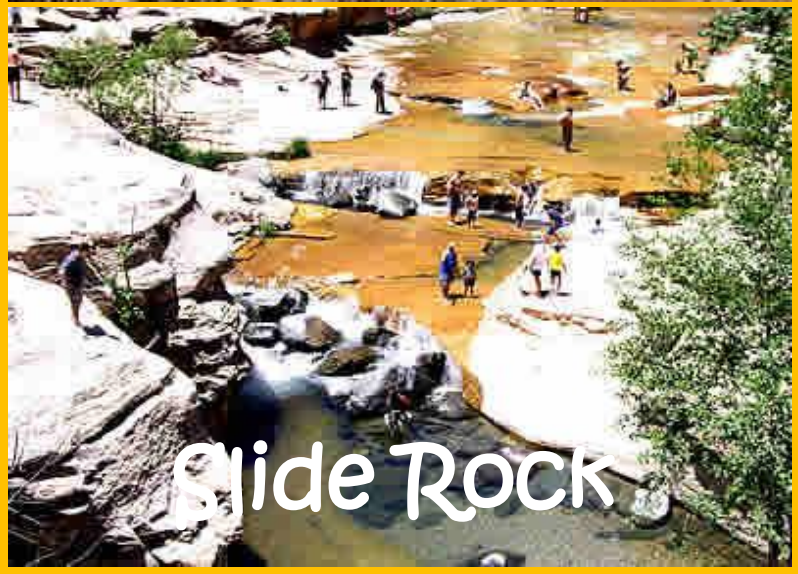


What contributes to weathering?

- **Heat, cold, water, ice, plants, animals, oxygen and carbon dioxide.**
- **Other examples?**

What is erosion?

- **<u>The removal of rock particles by wind, water, ice, or gravity.</u>**



How do weathering and erosion work together?

- **<u>They are continuously working together to wear down and carry away the rocks on the Earth's surface.</u>**

- **What is the difference between weathering and erosion?**

What are the two types of weathering?

Weathering #1: Mechanical

- **<u>The type of weathering in which rock is physically broken into smaller pieces.</u>**

What are the causes of mechanical weathering?

What are the causes of mechanical weathering?

- **<u>Freezing and thawing, release of pressure, plant growth, actions of animals, and abrasion</u>**

What is release of pressure?

- As erosion removes material from the surface of a mass of rock, pressure on the rock is reduced. This release of pressure **causes the outside of the rock to crack** and flake off like the layers of an onion.

What is freezing and thawing?

- **Wedges of ice in rocks widen and deepen cracks.**

Cracks expanded by ice wedging

How do animals affect weathering?

- **Animals that burro loosen and break apart rocks in the soil.**

How does plant growth affect weathering?

- **Roots pry open the cracks in rocks.**

Sugarland Mountain, Great Smoky Mountains National Park, Tennessee May 2002

What is abrasion?

Write this below the word "abrasion":

- **<u>Defition: Grinding away of rock by rock particles</u>**

Arches National Park, UT

Weathering #2: Chemical

- **<u>The type of process that breaks down rock through chemical changes (i.e. break down the bonds holding the molecules together).</u>**

What are the causes of chemical weathering?

What are the causes of chemical weathering?

- **Water reactions, oxidation (metal and oxygen), carbonation (CO_2 = H_20), organic acids (moss, lichen, and pine needles), acid rain.**
- **Chemical weathering can produce new chemicals as it breaks down rock.**

Water reaction

- **Many rocks dissolve in water.**

Oxygen and carbon dioxide

Organic Acids

- There are things called **lichens** (combinations of fungi and algae) which live on rocks. Lichens slowly eat away (molecular breakdown of minerals) at the surface of rocks.

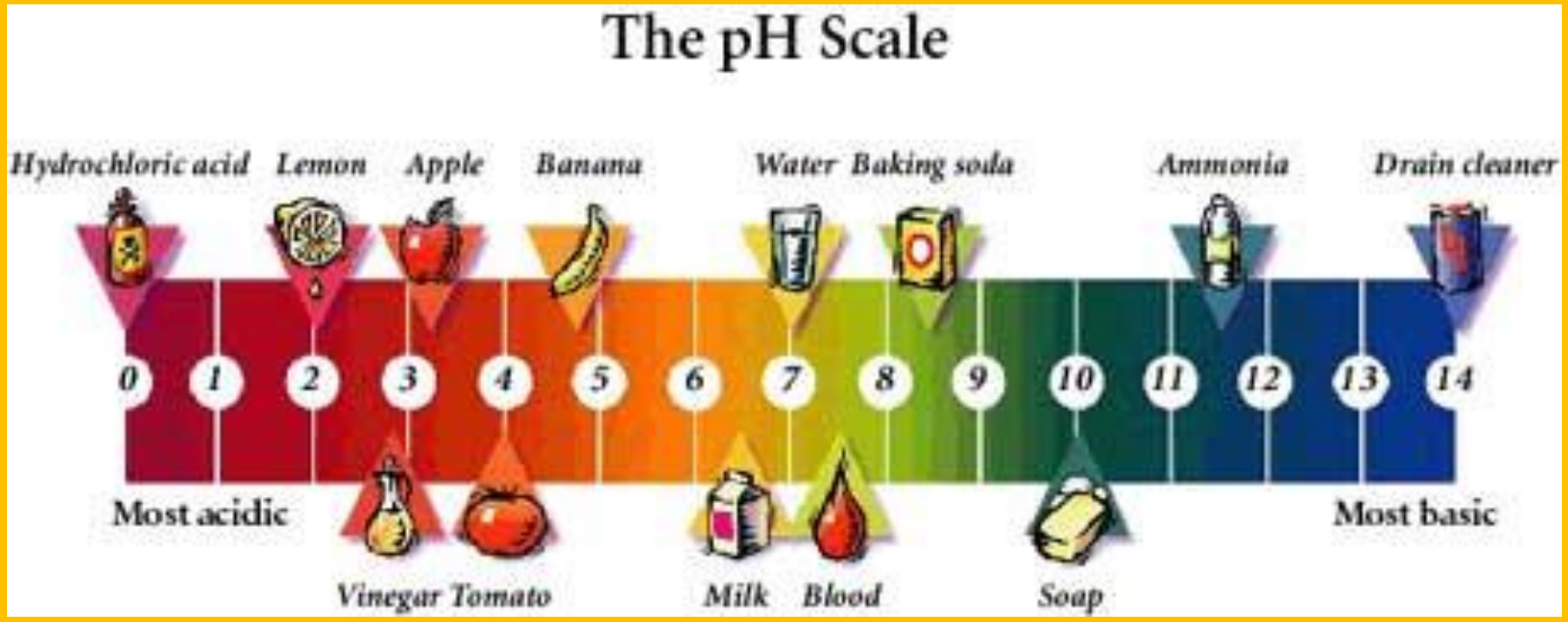
What is acid rain?

What is acid rain?

- **Acid rain is a mixture of water vapor and chemical compounds that come from burning fossil fuels. It is a type of chemical weathering.**

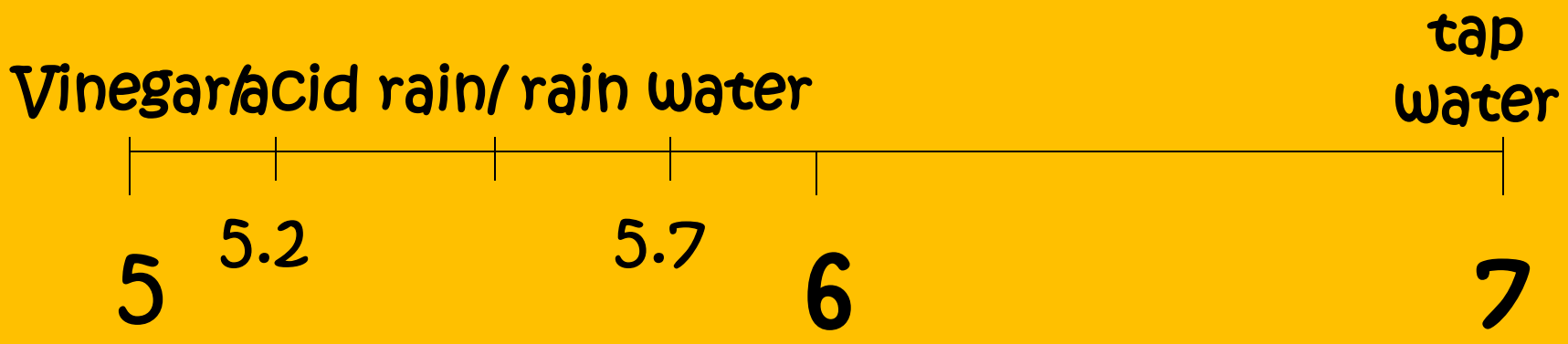
Compare the acidity of tap water, rainwater, vinegar, and acid rain.

Picture this...



DRAW

Acidity or pH



Does acid rain weather rock faster than regular rain? Why?

Does acid rain weather rock faster than regular rain?

- **Since acid rain is more acidic than regular rain, it can damage the surface of buildings (made of rock).**

What is Limestone?

- **Sedimentary rock**
- **Made of the mineral calcite or calcium carbonate**
- **Used in architecture and sculpture**

What determines the rate of weathering?

- **<u>Type of rock and climate</u>**