Sedimentary Rocks

The Lamest of Rocks

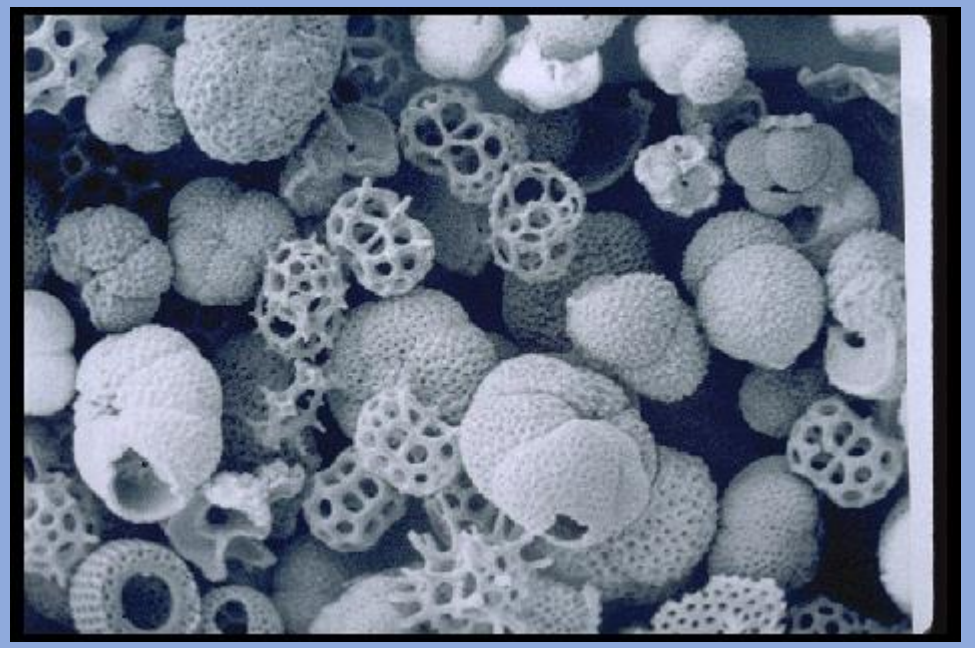
The Best of Rocks

Classes of Sedimentary Rocks

- Clastic
- Biochemical
- Organic
- Chemical

Biochemical Sedimentary Rocks

wiki



geoclasses.tamu.edu

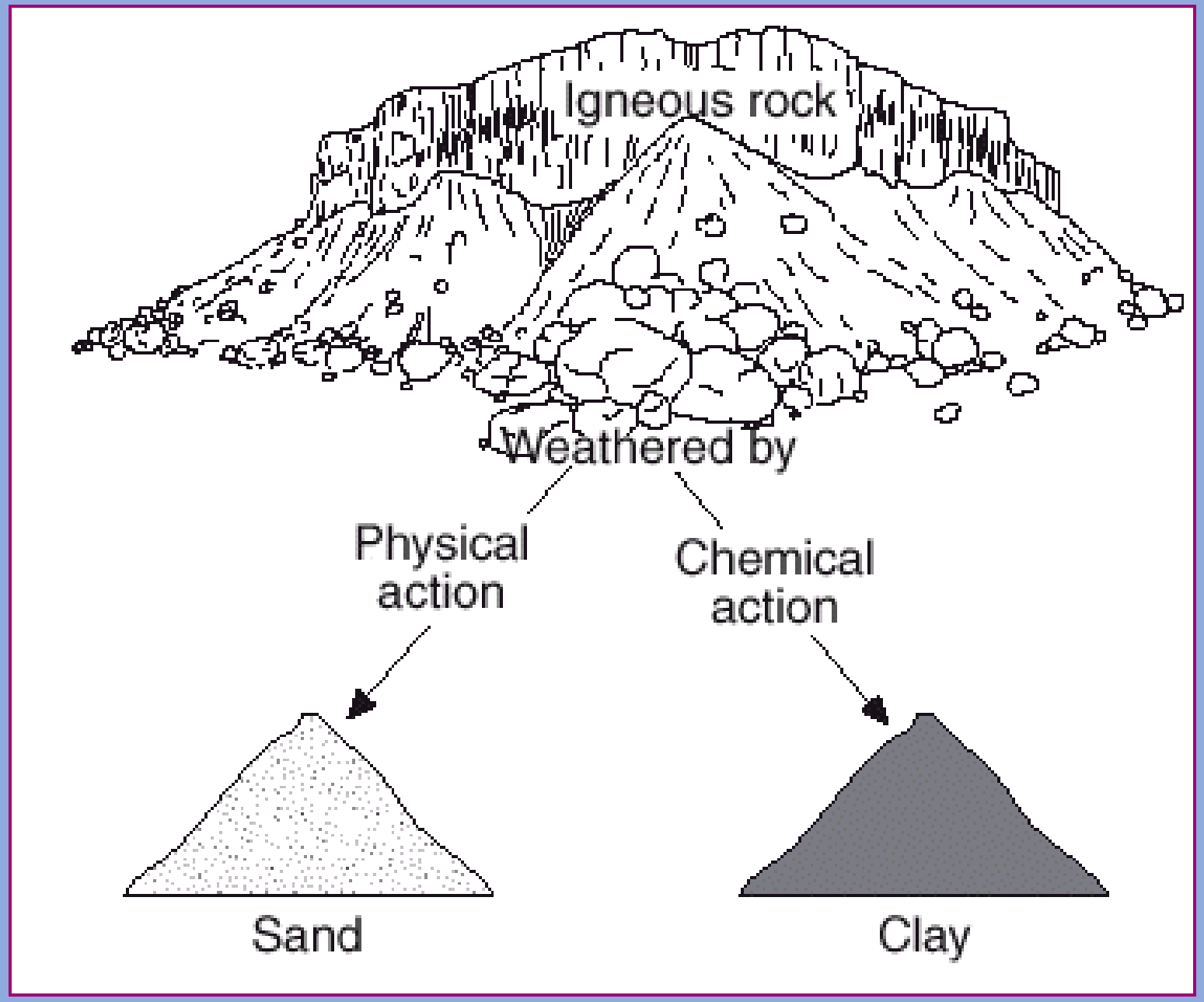
Organic Sedimentary Rocks

Chemical Sedimentary Rocks

- Precipitates from water

Clastic Sedimentary Rocks

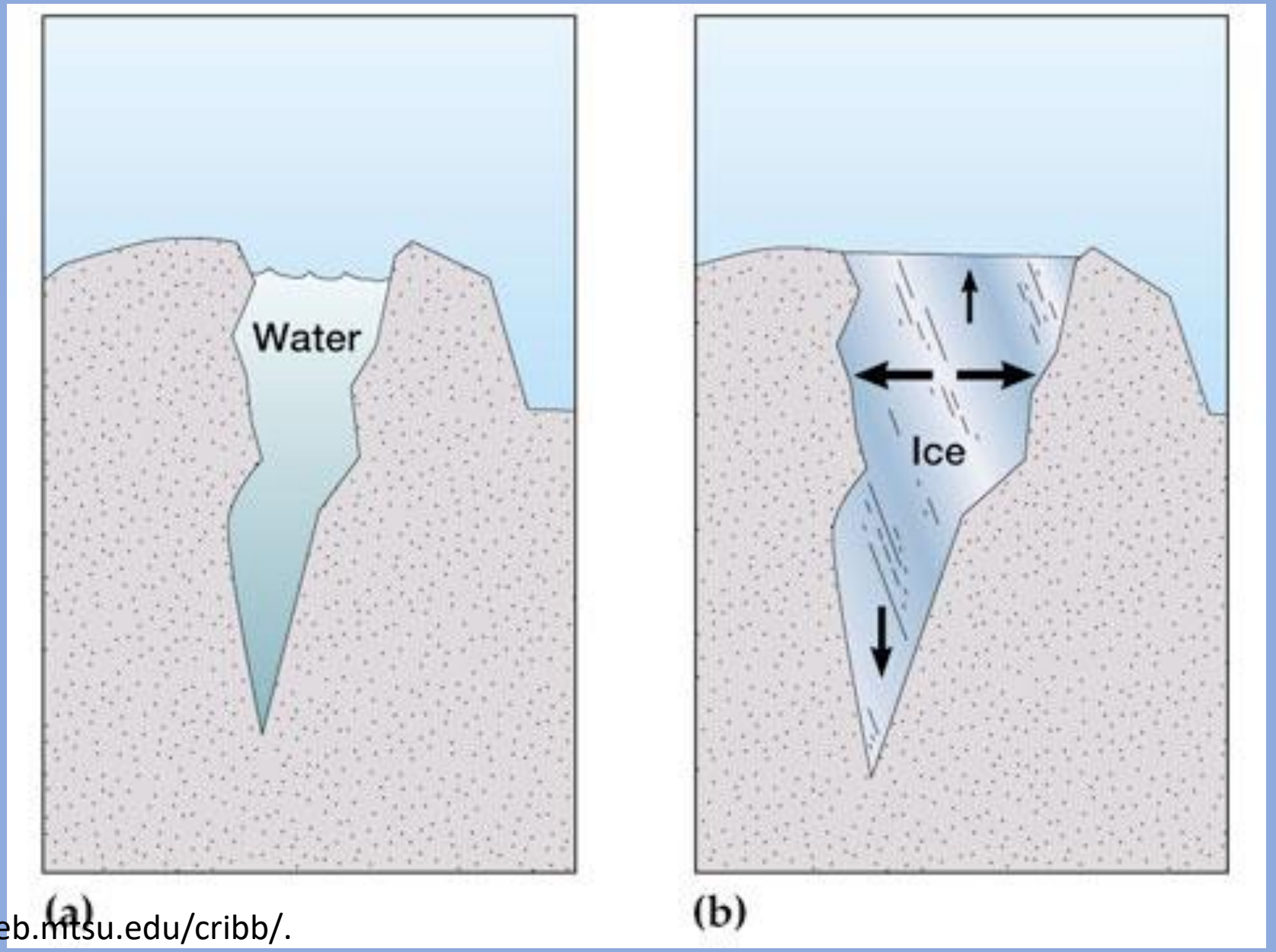
Weathering


Igneous rock
Weathered by
Physical action
Chemical action
Sand
Clay

Weathering

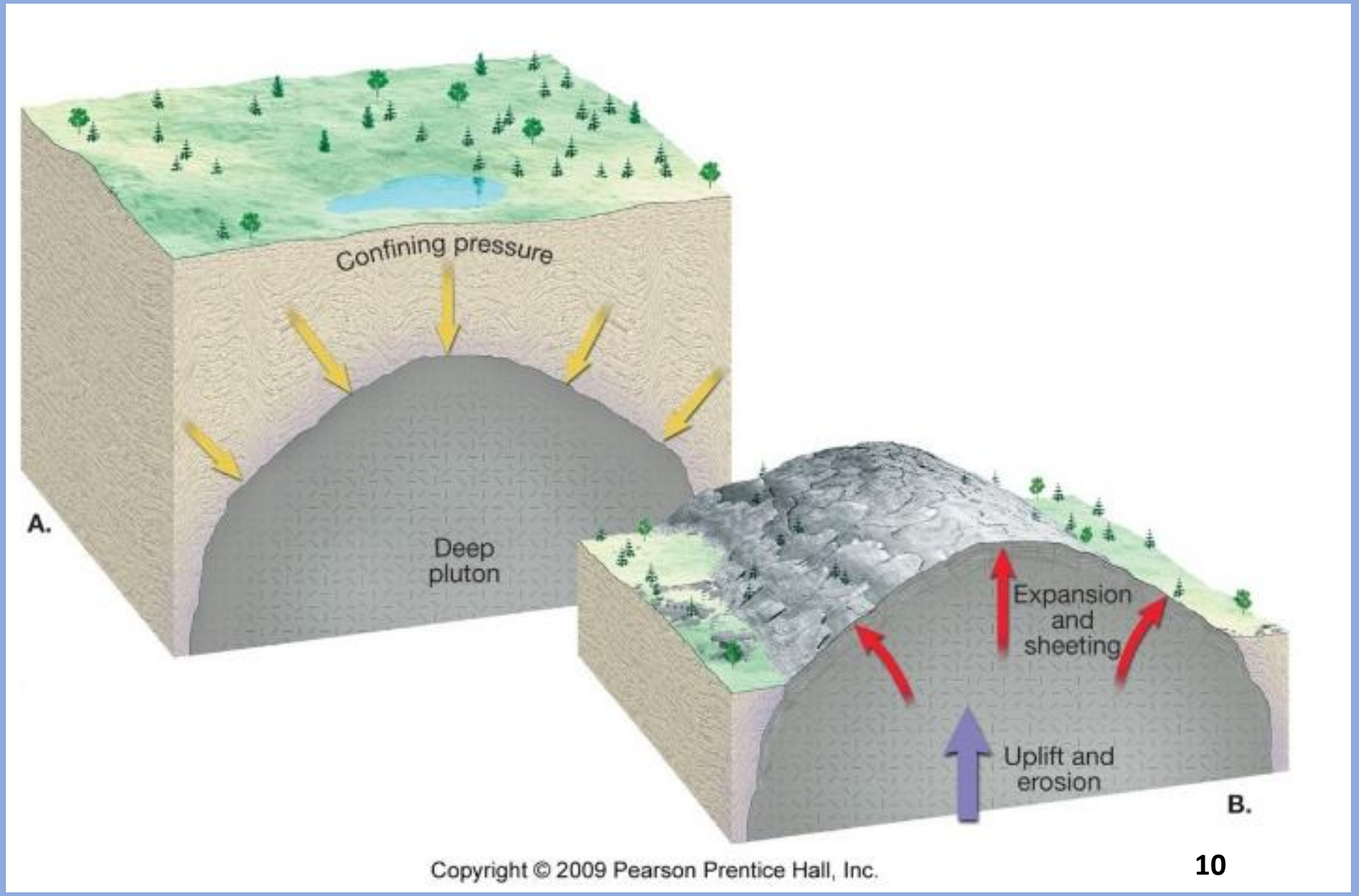
- Mechanical (physical) weathering
  - Frost wedging
  - Unloading
  - Biological activity
  - Thermal expansion and contraction
  - Mineral precipitation
  - Impacts

Frost Wedging

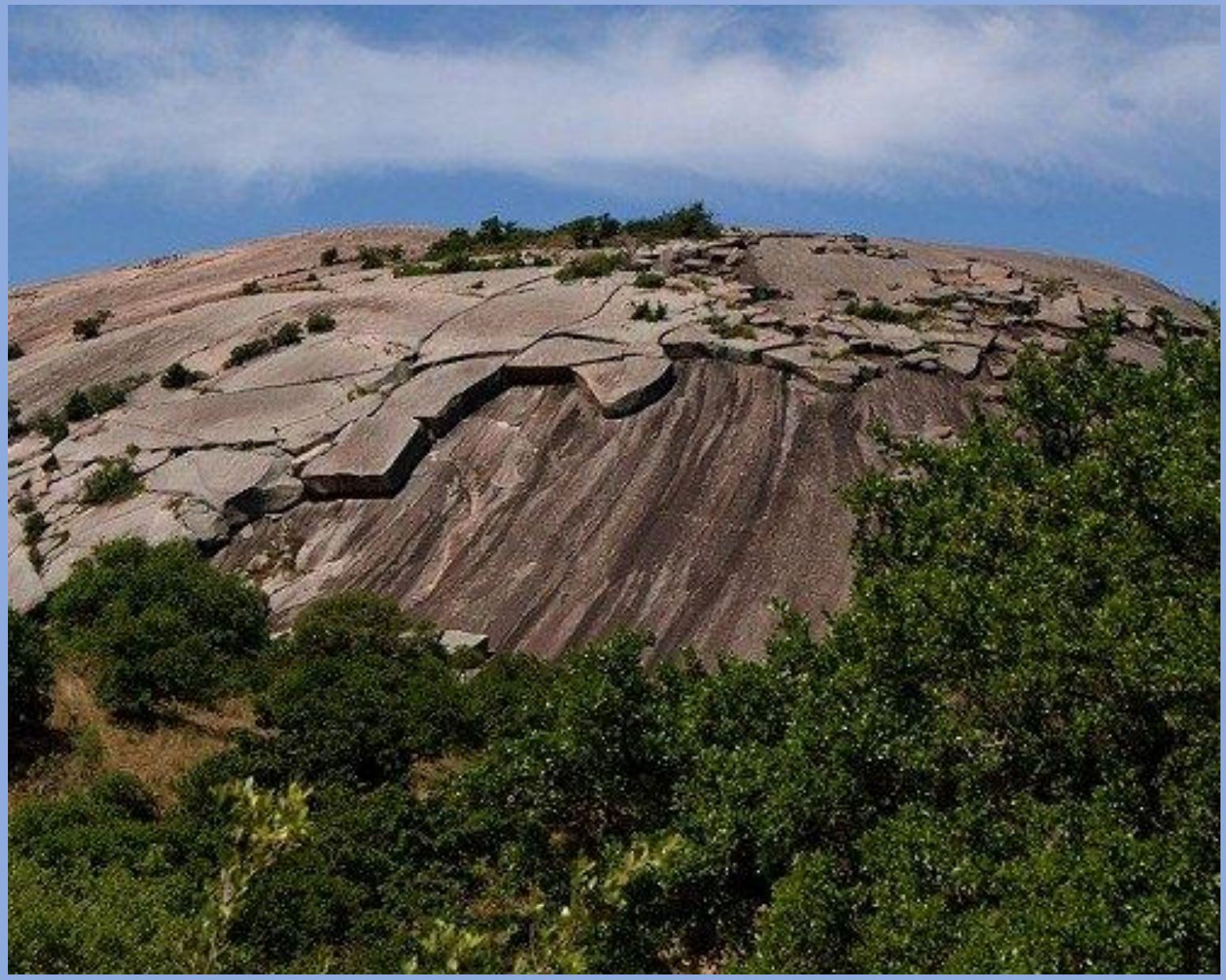


Warner Cribb, http://mtweb.mtsu.edu/cribb/.

Unloading



Unloading



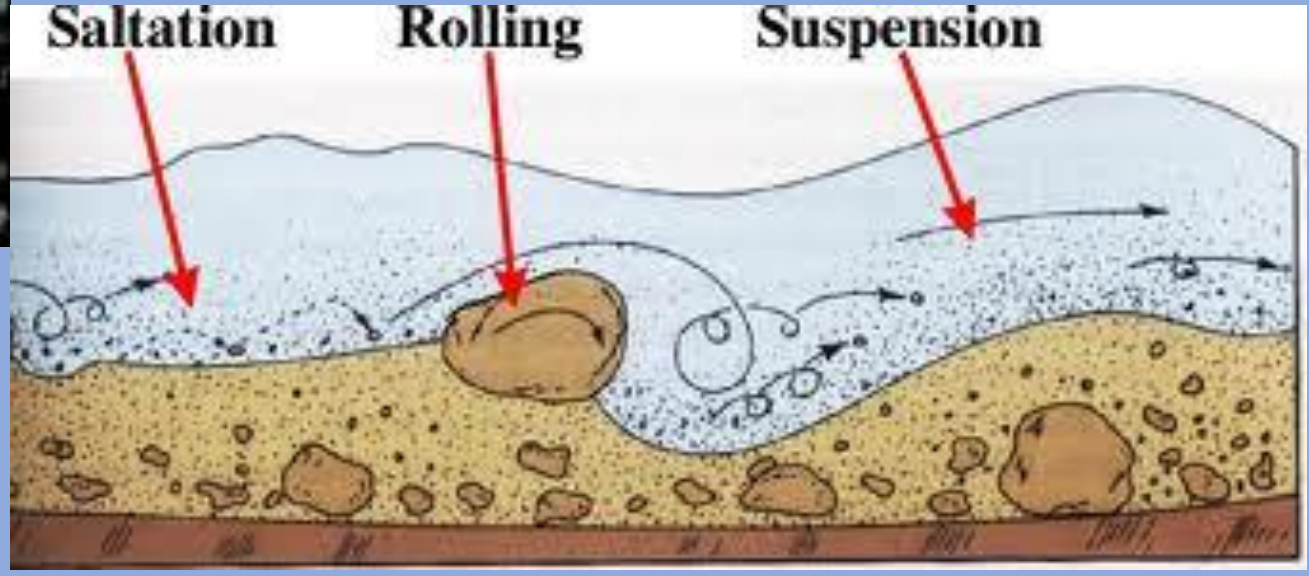
Biological activity

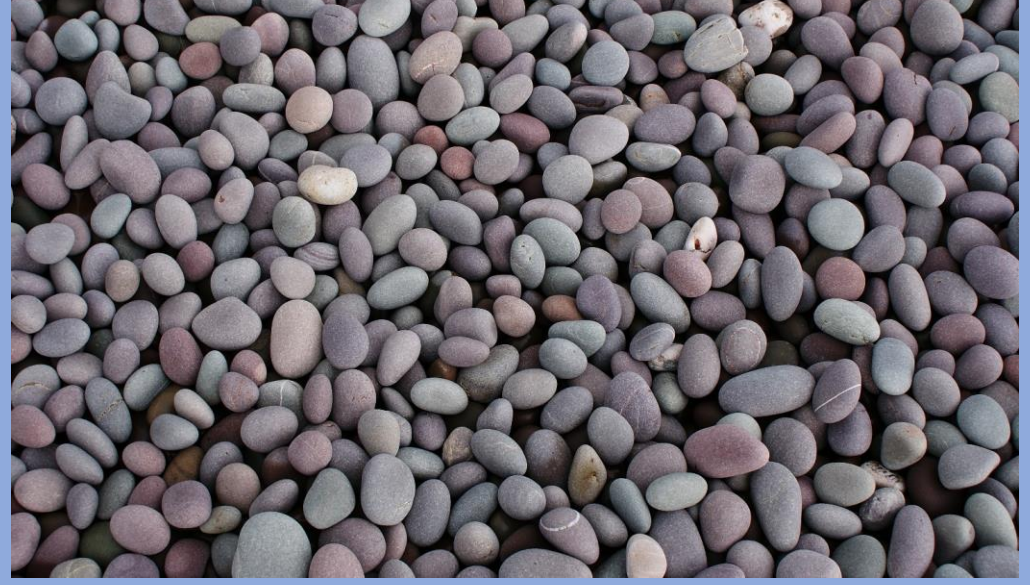
Mineral precipitation

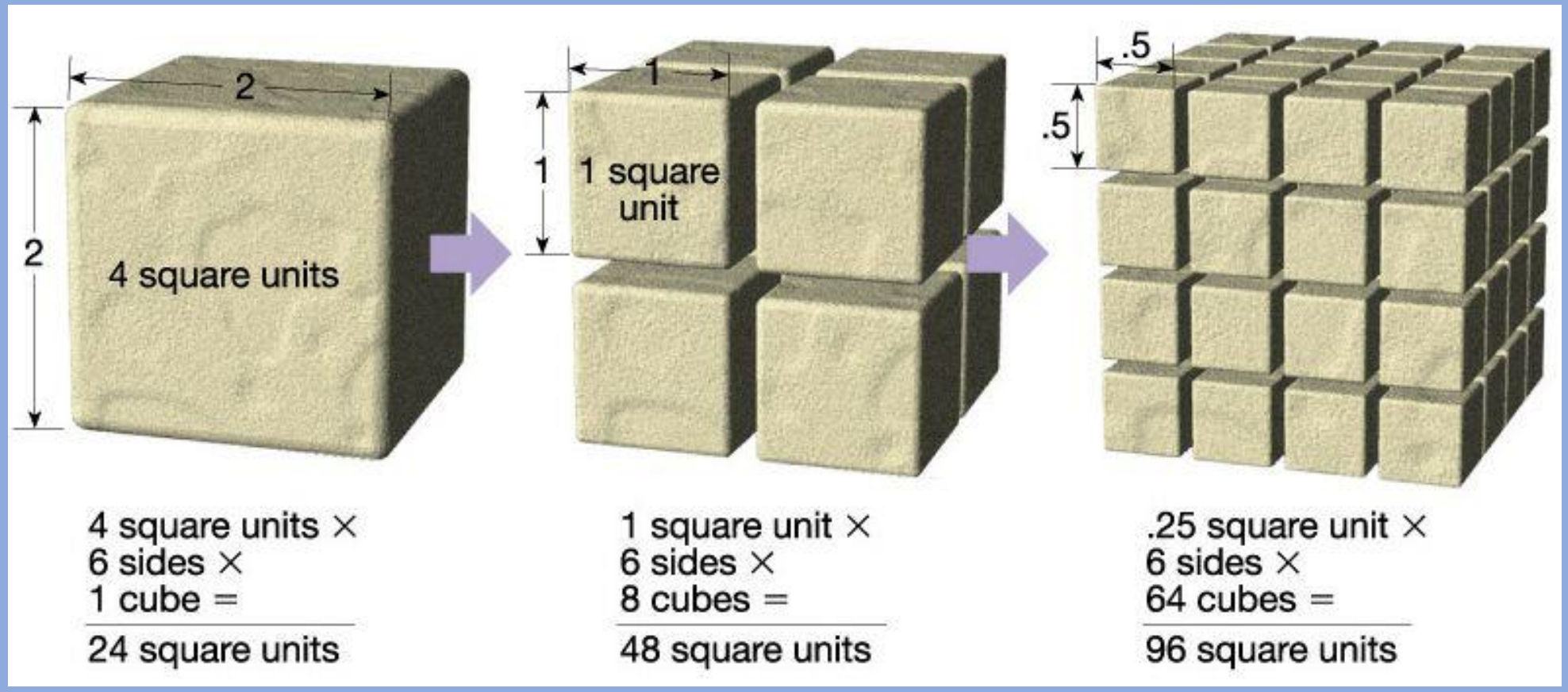
- Salt water in rock crevasses evaporate, leaving salt behind

By Dr Suzanne M MacLeod (= user Bagamatuta) Public Domain, https://commons.wikimedia.org/w/index.php?curid=3347409

Impacts (abrasion)







4 square units ×
6 sides ×
1 cube =

24 square units

1 square unit ×
6 sides ×
8 cubes =

48 square units

.25 square unit ×
6 sides ×
64 cubes =

96 square units

Chemical Weathering

- Oxidation
- Hydrolysis
- Dissolution

- $H_2O + CO_2 \text{---->} H_2CO_3$
- $H_2CO_3 \text{---->} H^+ + HCO_3^-$

Oxidation

- $2FeS_2 + 7O_2 + 2H_2O \rightarrow 2Fe^{2+}\ H_2SO_4 + 2H^+$
- pyrite + oxygen + water → iron ions + sulphuric acid + hydrogen ions

Hydrolysis

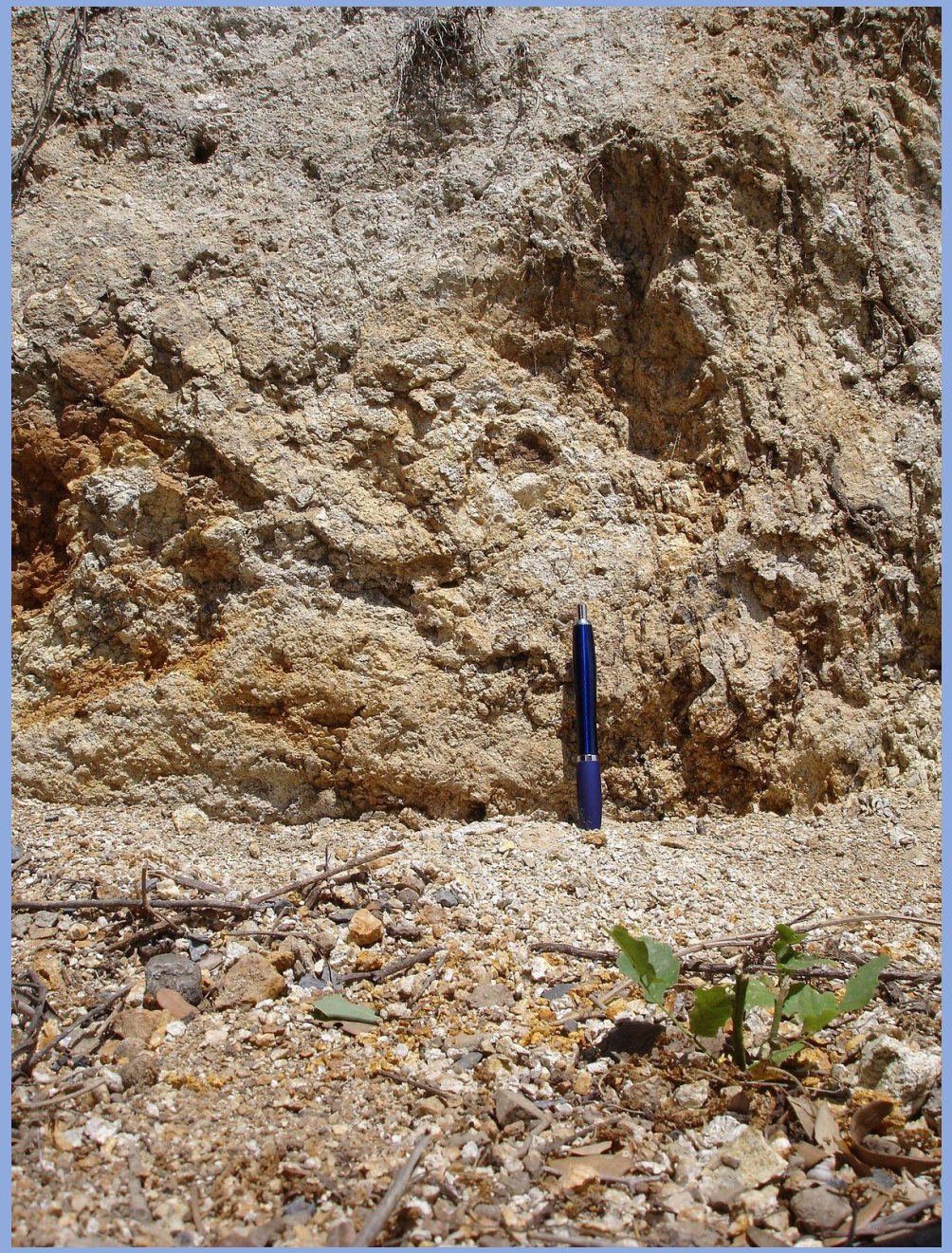
- Minerals + water → Clay + water + ions

- $CaAl_2Si_2O_8 + H_2CO_3 + ½O_2 \rightarrow$

(plagioclase)

$Al_2Si_2O_5(OH)_4 + Ca^{2+} + CO_3^{2-}$

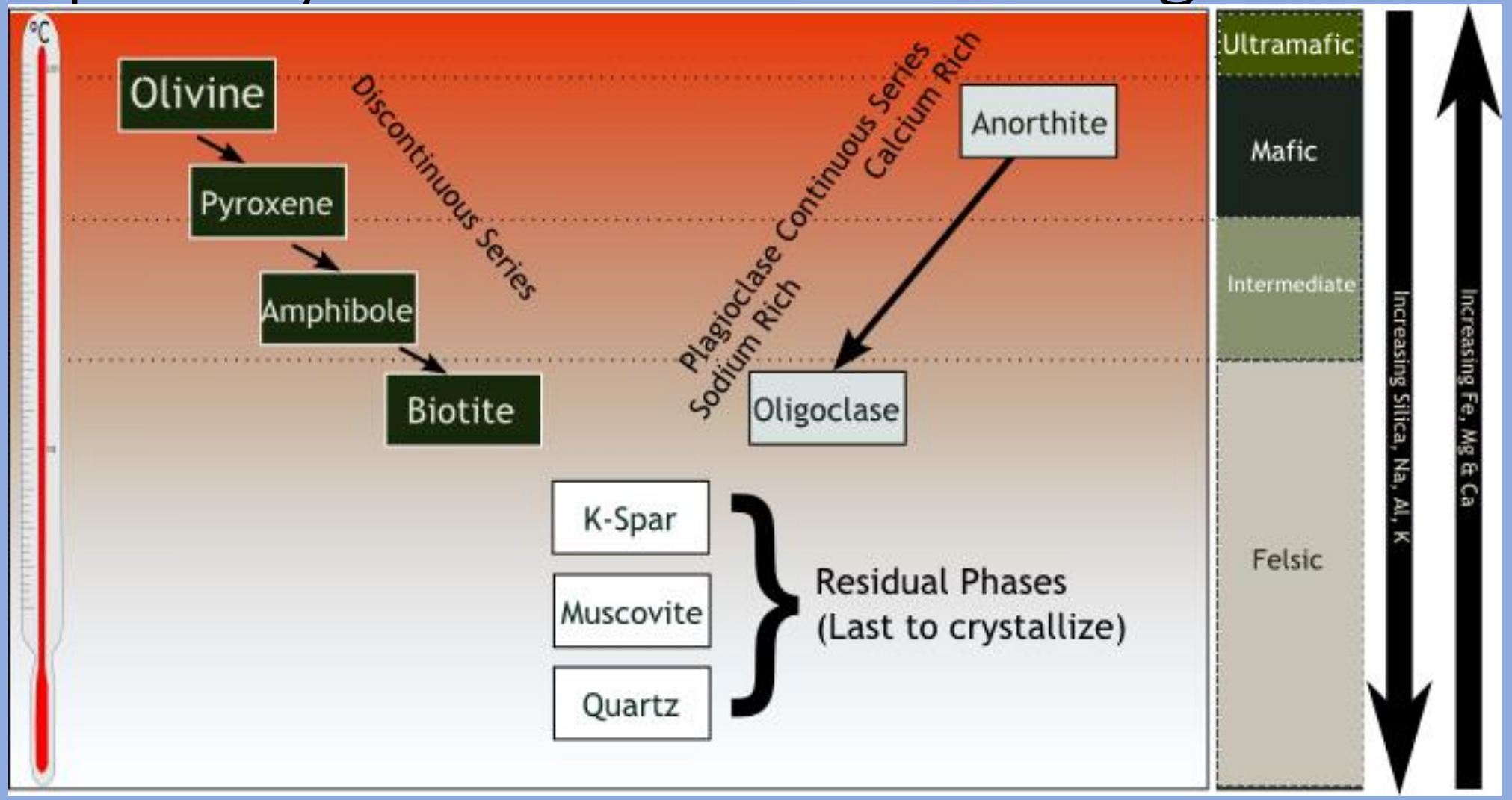
(kaolinite)



Dissolution

- $CaCO_3 + H^+ + HCO_3^- \rightarrow Ca^{2+} + 2HCO_3^-$
- calcite + hydrogen ions + bicarbonate → calcium ions + bicarbonate

Susceptibility to Chemical Weathering



End products of chemical weathering

- Ions in solution (carried away)
- Clay minerals
- Quartz grains
- Fe-oxides/hydroxides

Clastic Sedimentary Rocks

- Formation
  - Weathering
  - Erosion
  - Transportation
  - Deposition
  - Lithification

Erosion

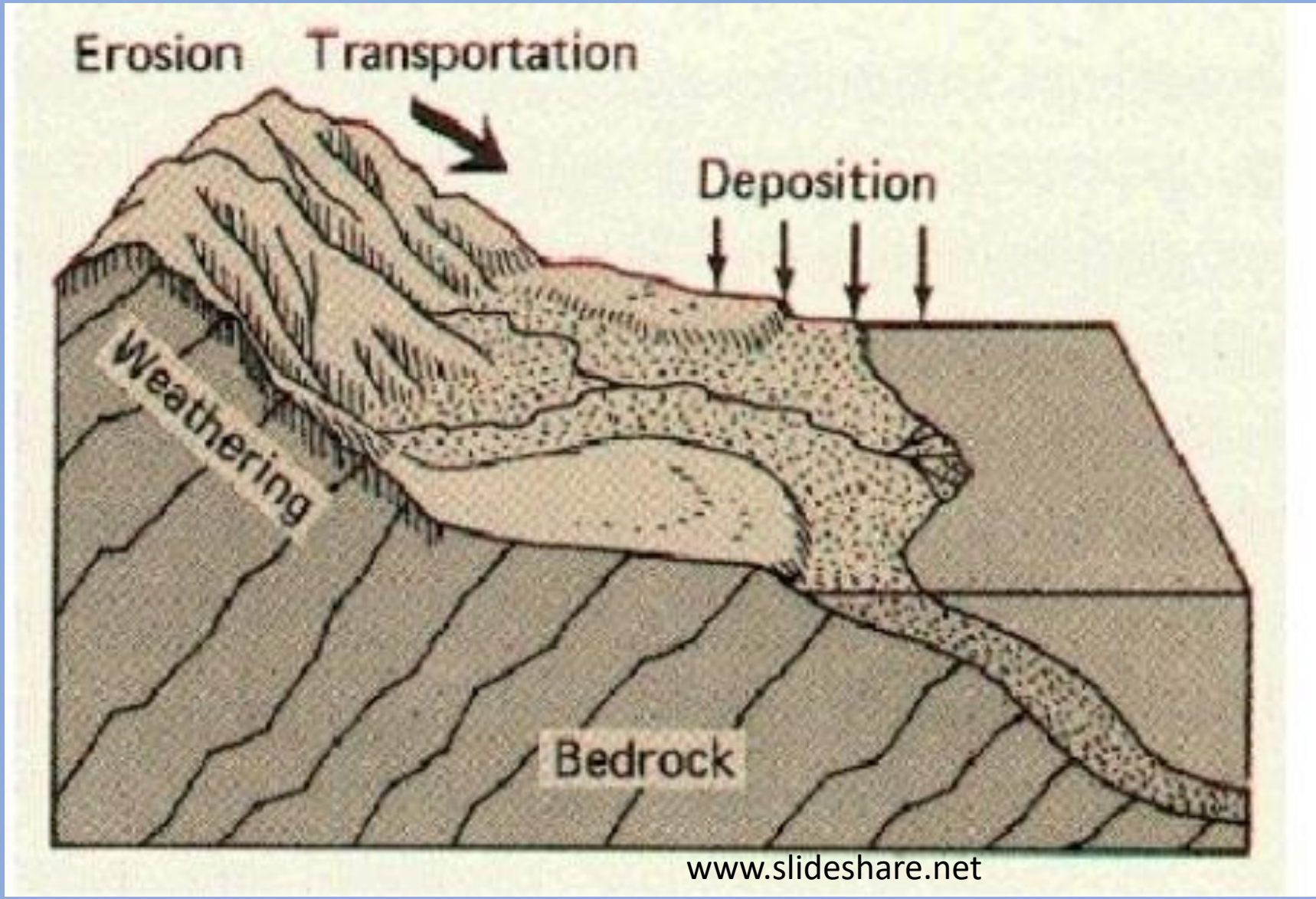
- Processes that separate the rock from the bedrock or substrate

Transportation

- Gravity, wind, water, ice
- Depends on the energy of the medium

Deposition

- Process by which the sediment settles out of the medium
- As energy drops, increasing smaller grains settle out


Erosion
Transportation
Deposition
Weathering
Bedrock
www.slideshare.net

Clastic Sedimentary Rocks

- **Lithification**
  - Sediment deposition
  - Burial
  - Compaction
  - Cementation
  - Rock

Diagenesis: Might require millions of years & km of burial