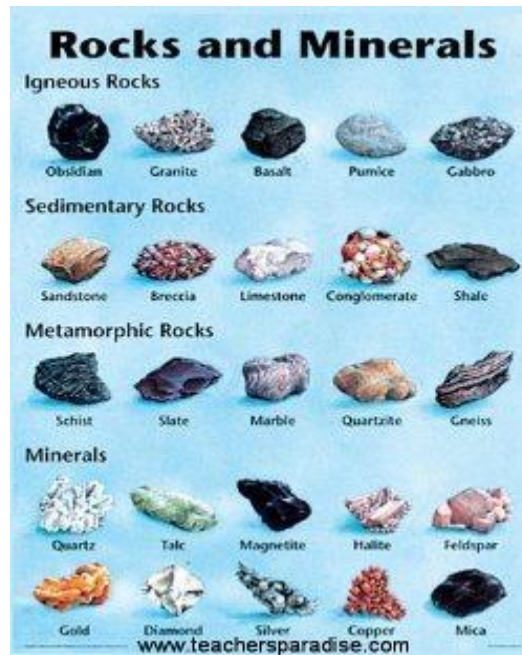


## Rock Review

**Rock:** made up of minerals. (Mineral grains)

**Mineral:** Has a specific name and specific atomic make-up.



<http://www.teachersparadise.com/c/images/prods/1mhcp/0768212871>

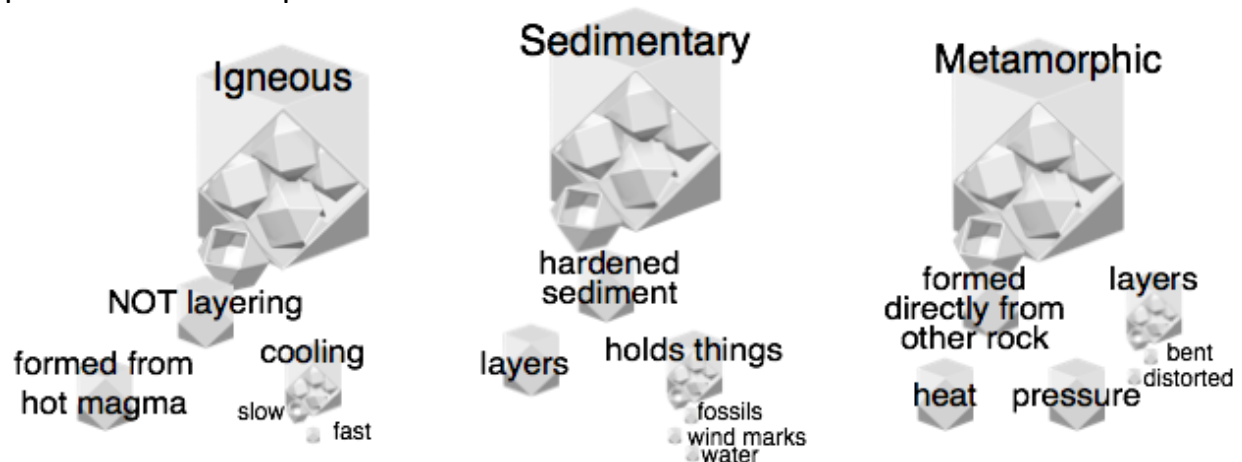
**Monomineralic Rocks:** Rocks made of one type of mineral

**Polymineralic Rocks:** Rocks made of two or more types of minerals.

**Igneous Rocks:** Formed from the cooling and consolidation of magma.

**Sedimentary Rocks:** Rocks formed by the consolidations of sediments from previously existing rocks. Makes up most of the earth's surface.

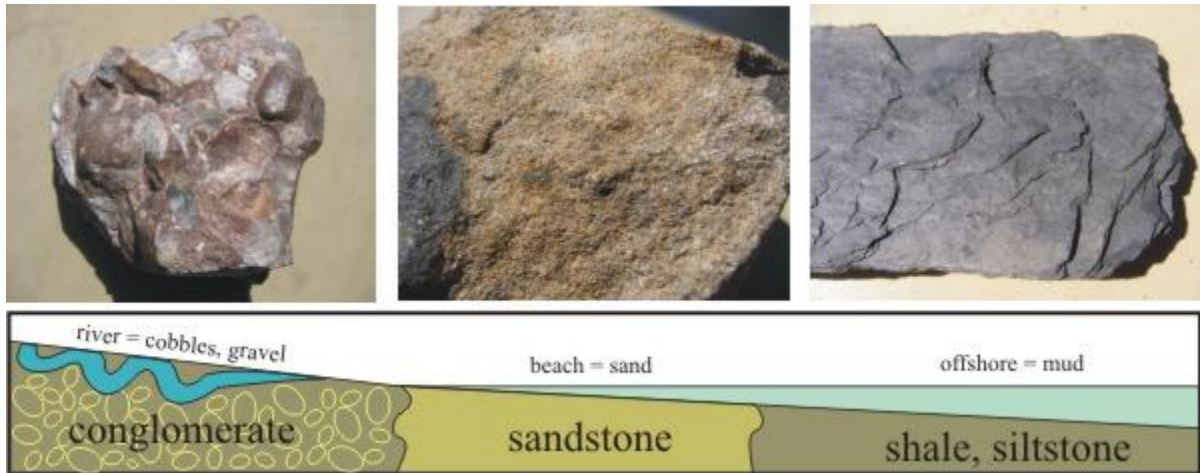
**Metamorphic Rock:** Rocks that change their identity, in solid state, because of pressure. Makes up most of the earth.



[http://www.thinkipedia.wikispaces.net/file/view/Geology\\_12.png/74663699/Geology\\_12.png](http://www.thinkipedia.wikispaces.net/file/view/Geology_12.png/74663699/Geology_12.png)

## Classifying Sediment

- **Size:** Gravel (Big), Sand (medium), Mud (small)



[http://www.nvcc.edu/home/cbentley/gol\\_135/billy\\_goat/images/sediment\\_size.jpg](http://www.nvcc.edu/home/cbentley/gol_135/billy_goat/images/sediment_size.jpg)

- **Sorting:** Measures the variation of grain size in Clastic rock and sediment.
  - **Well sorted:** Same size, subject to prolonged water and wind action.
  - **Poorly sorted:** Different sizes, close to source of sediment. (possibly in ice)
  -
- **Roundness:** Measures smoothness
  - **Angular:** short time as sediment, still close to source.
  - **Rounded:** long time as sediment, traveled far from source.
    - (different rocks and minerals get smooth at different paces)
    -
- **Color:** provides clues to the depositional environment.
  - **Black/Dark gray:** presence of carbon
  - **Red:** Oxygenation

## Formations on sedimentary rock

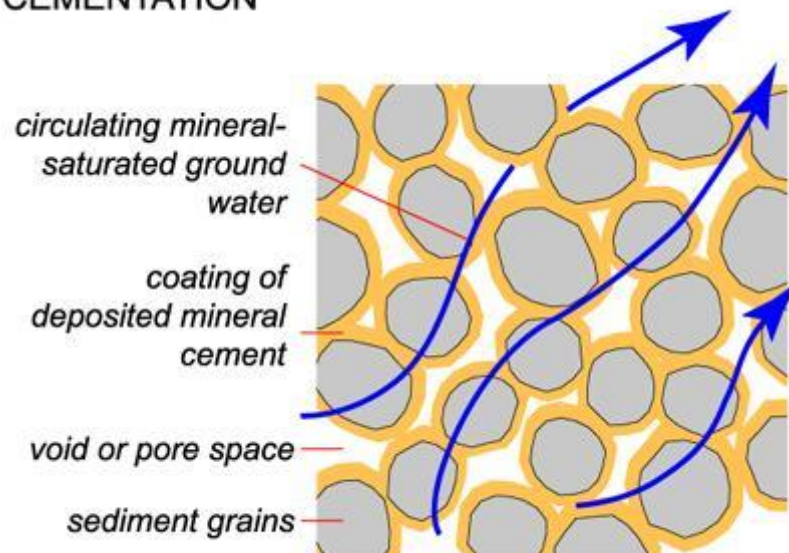
### 1. Presents of Clastic/ Detrital sediments

- **Lithification:** Turning sediment to rock by compaction and precipitation of cement.

### 2. No Clastic/Detrital sediments

- The ions in the solution can precipitate out and form rocks such as rock salt.

#### CEMENTATION



©Northstone (NI) Ltd.

<http://www.northstone-ni.co.uk/filestore/images/X-20070327111628109.jpg>

## Detrital / Clastic sedimentary rocks

### • Classification

- **Sediment:** Gravel (Big), Sand (medium), Silt/Clay (Small)
- **Rocks:**
  - **Breccia:** Clastic rock marked by its angularity of its component grains and rock fragments greater than 2mm.
  - **Conglomerate:** Clastic rock, marked by the roundness of its component grains greater than 2mm.
    - Coarse rounded sediments.
    - Larger fragments usually rock clast



**Breccia and conglomerate**

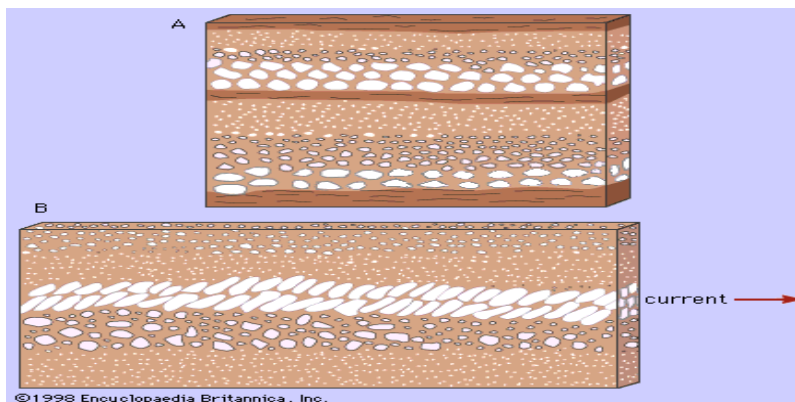
<http://www.sydneycichlid.com/gallery/d/816-3/breccia>

- **Gravel:** Coarse angular sediments.
  - Larger sediments: usually rock clast (fragments).
- **Sand stone:** Composed mainly of sand sized minerals and rock grains.
  - **Quartz:** mostly quartz, extensive weathering removes everything but the quartz (it's the most stable mineral).
  - **Arkoses:** 25+% feldspar: poorly rounded and less sorted than quartz.
  - **Lithic sandstone:** made from lithic fragments (fragments of other rocks eroded to sand size) derived from shale, volcanic rock and fine grain metamorphic rock.
  - **Graywacke:** Mixture of lithic fragments and angular grains of quartz and feldspar.
  - **Eolianite:** composed of sand grains, transported by wind, extremely well sorted rich in quartz.
  - **Oolite:** more limestone than sandstone, made of sand-sized carbonate ooids found in saline beaches with gentle wave action
- **Limestone:** microcrystalline calcium carbonate
  - **Calcite precipitation from solution:** Can lead to inorganically produced limestone.
- **Shale:** made of detrital/clastic rock (less than .004mm), found in relatively still water.
- **Chert:** waxy, hard, microcrystalline silica, found in deep abyss.
- **Coal:** Mostly plant remains, high in carbon

- **Peat:** made from plant and animal matter, precursor of coal
- **Lignite:** lowest rank, used for electric power generation.
- **Sub-bituminous:** next up from lignite, used for steam-electric power generation.
- **Bituminous coal:** next up from sub-bituminous, same uses as above + heat and power application.
- **Anthracite:** highest rank, hard, glossy, used for space heating.
- **Graphite:** tip top ranking, difficult to ignite (so not used other than pencils).

### Structural layering

- **Graded bedding:** sorted coarse → fine. Sorted by water.
  - Turbidity currents and turbidite deposits
    - As energy in the environment (water) decreases the larger particles are unable to be stabilized and they fall to the bottom. As the environment loses energy, it supports less and less still only air or water is left. So the bottoms are sorted coarse to fine.



<http://media-2.web.britannica.com/eb-media/07/2707-004-EF56DCEB.gif>

- **Cross Bedding:** Bedding developed from side to side on top of each other.
  - **Progradation:** Development of cross bedding. One layer at a time.
    - Wind creates this steep layers
    - Water creates thing less steep layers.

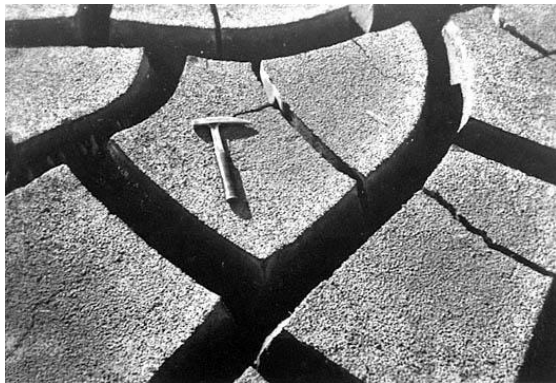




<http://home.earthlink.net/~becky400/paleologia/xbed.jpg>

**Lithified mud crack:** a fracture that develops at the top of a layer of fine-grained , muddy sediment when it is exposed to air, dries out, and shrinks.

**Lithified ripple marks:** A pattern of wavy marks formed along the top of a bed by wind, water currents, or waves.



<http://www.umt.edu/geosciences/faculty/hendrix/g100/mudcracks.jpg> - mudd crack



<http://www.soton.ac.uk/~imw/jpg/3PT-Oscillation-ripple-Mutton.jpg> - water ripple