Sedimentary Rock Characterization and Identification – LECTURE

Chemical sedimentary rock (precipitated minerals or recrystallized shells – interlocking microscopic crystalline texture)

Composition	Texture and physical properties	Name	Depositional environment
Calcium carbonate $CaCO_3$	Interlocking texture, crystals too fine to see. Light brown, grey, or white.	**Limestone***	Precipitation in the deep sea or recrystallization of shells accumulated on the deep sea floor (clastic texture gone).
	Layers of crystals – formed from evaporation of water.	**Limestone** (Evaporitic or crystalline)	Precipitation in salt lakes and inland seas.
Quartz SiO_2	Interlocking texture, crystals too fine to see. White, red, brown, black, or green.	**Chert**	Precipitation in the deep sea or hydrothermal zones or recrystallization of shells accumulated on the deep sea floor (clastic texture gone).
	Occurs as black nodules, usually surrounded by powdery white rind.	**Chert** (Flint)	Precipitation in hydrothermal zones.
Halite NaCl	Crystalline; salty taste	**Rock salt**	Precipitation in salt lakes and inland seas.
Gypsum $CaSO_4\ 2H_2O$	Very soft, crystalline	**Rock Gypsum**	Precipitation in salt lakes and inland seas.

***Remember: use mineral ID skills to help distinguish among these!**

Clastic sedimentary rock (cemented or compacted fragments)

Grain sizes:

Gravel (>2mm); Sand (>1/16 mm; < 2 mm); Mud (<1/16) mm

Organic (biochemical) sedimentary rock (mostly shell fragments)

Composition and Texture	Grain size	Name	Depositional environment
Calcium carbonate $CaCO_3$ WHITE (usually); Macro/microscopic shell fragments; Loosely cemented; porous.	Gravel	Coquina (**Limestone**)	Beach with fringing reef
	Sand	Calcarenite (**Limestone**)	At outside edges of fringing reefs
	Mud	**Chalk** (Limestone)	Deep seafloor where zoo/phytoplankton with microscopic $CaCO_3$ shells rain down.
Silica SiO_2 WHITE (usually); Macro/microscopic shell fragments. Loosely cemented; porous.	Mud	**Diatomite** (Chert)	Deep seafloor where zoo/phytoplankton with microscopic SiO_2 shells rain down.

Detrital sedimentary rock (mostly rock and/or mineral fragments)

Grain size	Texture and composition	Name	Depositional environment
Gravel > 2 mm	Rounded fragments; poorly sorted	**Conglomerate**	Beach headlands, river banks, canyon fans.
	Angular fragments; poorly sorted	**Breccia**	Base of landslides, faults, and debris flows.
Sand < 2 mm > 1/16 mm	Mostly quartz grains; well sorted; well rounded	**Sandstone** (quartz sandstone)	Beach, sand dunes (desert or beach); river banks.
	>25% potassium feldspar grains, with quartz	**Sandstone** (arkose)	Beach sands; river deposits.
	Mixed mineral grains/rock fragments.	**Sandstone** (greywacke)	Beach sands; river deposits.
Mud < 1/16 mm	Microscopic quartz/clay grains; can be bedded. **Shale variety is compact; splits into thin layers.**	**Mudstone** or **Shale**	Shallow, quiet lagoon; tide flats; outer continental shelf; deep sea.

*Dolostone is similar to chemical limestone (same depositional environment, look, and texture), but has Mg in it.