

SEDIMENTARY ROCKS

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- Sedimentary rocks are formed **near or at the surface of the earth.**
- They are derived from **preexisting source rocks.**
- They are composed by **sediments**, this is material that has been **weathered, transported and deposited** by processes such as running water (**rivers**) glaciation (**glaciers**), etc., or formed by **chemical precipitation from solutions.**
- They cover **75%** of the Earth's surface and are the sites of important resources such as **COAL, OIL** and **GROUNDWATER.**
- Sedimentary rocks frequently contain fossils that can be used to interpret earth's history
- They are **composed** only by **few mineral species.**

Their physical appearance is due to different factors

- **SOURCE AREA** (rock type present, relief, climate, degree of weathering)
- **TRANSPORTING MEDIUM** (running water, glacier, wind, gravity)
- **DISTANCE OF TRANSPORTATION**
- **TYPE OF ENVIRONMENT OF DEPOSITION** (water depth, climate, current strength)

SEDIMENTARY ROCK FORMATION

DEPOSITION	COMPACTATION	RECRYSTALLIZATION + COMPACTATION	SEDIMENTARY ROCKS
LITHIFICATION			

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Sedimentary rocks are classified based on their **TEXTURE** and **COMPOSITION**

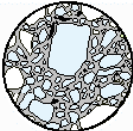
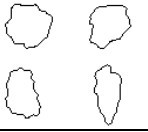

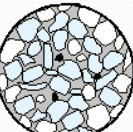
TEXTURE. Is the geometrical arrangement of the constituents of a rock (**SIZE, SHAPE** and **MUTUAL RELATIONSHIPS OF PARTICLES**).

Based on their composition there are three main groups of sedimentary rocks:


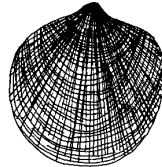
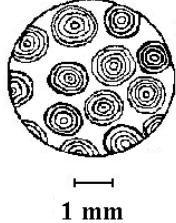
<u>CLASTIC or DETRITAL</u>	Formed by fragments of mineral or rocks
BIOCHEMICAL	Formed by remains of organisms.
CHEMICAL	Formed by chemical processes. Crystals that have precipitated from solutions

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CLASTIC TEXTURES / ROCKS -TEXTURAL FEATURES / COMPOSITION

SEDIMENT	SIZE	DEGREE OF SORTING	ROUNDING	MINERALS	ROCK NAME
GRAVEL- (boulder- cobble- pebble-) SIZED	> 2mm in Ø	POORLY SORTED 	ANGULAR 	Source dependent	BRECCIA
			WELL- ROUNDED 		CONGLOMERATE
SAND- SIZED	1/16 - 2 mm Ø (0.062 mm)	WELL SORTED 	WELL- ROUNDED	QUARTZ ORTHOCLASE	QUARTZ SANDSTONE ARKOSE
SILT-SIZED	0.005 - 1/16 mm Ø Feels gritty when rubbed	Grains to small to be seen without the aid of a microscope	Grains to small to be seen without the aid of a microscope	Grains to small to be seen without the aid of a microscope	SILTSTONE
CLAY- SIZED	<0.005 mm Ø Feels smooth	Grains to small to be seen without the aid of a microscope	Grains to small to be seen without the aid of a microscope	Grains to small to be seen without the aid of a microscope	SHALE

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BIOCHEMICAL –CARBONATES					
Composition	Fragment size	Name of the fragment	Origin	Textural Characteristics	Rock name
CaCO₃ (calcium carbonate) CALCITE Fizz strongly with dilute HCl CARBONATES <u>LIMESTONES</u> are generally <u>gray</u> (but may be tan, pink, white, black, or other colors).	Microscopic 1 - 5 μ	MICRITE	Results from the lithification of <i>lime mud</i> , most of which originates from the breakdown of the hard "skeletons" secreted by calcareous algae which live in warm, shallow seas	The color is variable, ranging from gray to tan, or other colors. 	MICRITIC LIMESTONE or MICRITE
	Microscopic (larger than above)		Probably formed by the accumulation of the remains of planktonic marine algae called coccolithophores or shells of Foraminifera and/or by chemical precipitation.	White, but it may be stained with iron oxide or other impurities. It is a soft porous rock that crumbles easily. Less dense, and less compact than micrite.	CHALK
	Macroscopic	ALLOCHEMS FOSSILS	The remains of ancient plants or animals Many organisms have calcareous shells or skeletons, and their remains may accumulate in lime mud	Whole fossils, broken shell fragments with a calcareous skeleton or body parts. 	FOSSILIFEROUS LIMESTONE
				Composed almost entirely by broken shell fragments	COQUINA
		OOLITES are small (1/4 - 2mm; sand-sized)), concentrically layered, spherical grains, so named because they look like fish eggs. On a cut or broken surface they look circular, and internal concentric laminations may be seen with a hand lens or microscope.	Commonly are formed by layers of material (usually calcite), that have been deposited around some tiny particle such as a sand grain or fossil fragment and are rolled back and forth in quiet waters		OOLITIC LIMESTONE

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BIOCHEMICAL -OTHER COMPOSITIONS				
Composition	Fragment size	Origin	Textural Characteristics	Rock name
SiO₂ SILICEOUS	Microscopic to very fine grained silica sediment	Chemical or biochemical origin. Some chert contains siliceous skeletons of micro-organisms known as <i>radiolarians</i> and diatoms.	Chert can be recognized by its extremely fine grain size, smooth feel, and hardness (scratches glass) Breaks with a conchoidal fracture	CHERT Two main varieties: Nodular Bedded
C CARBON		The plant fossils in coal generally indicate deposition in <u>fresh-water swamps</u>	Black, light weight smudgy or shiny	COAL

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CHEMICAL			
	Mineralogy	Texture / Properties	Rock name
EVAPORITES Chemical precipitates, which form by precipitation of dissolved minerals from water during evaporation.	Halite NaCl	Cubic crystals and cubic cleavage; usually transparent; softer than glass; salty taste	Rock salt
	Gypsum $\text{CaSO}_4 \cdot 2\text{H}_2\text{O}$	Very finely sugary, usually white nor pink; silky luster Softer than nail	Gypsum Gypsum rock
	Anhydrite CaSO_4		Anhydrite
	Calcite CaCO_3	Reacts to HCl	Crystalline limestone
	Calcite CaCO_3	Coarsely crystalline; can be recognized by their cylindrical shape and internal "tree-ring-like" appearance. Reacts to HCl	Travertine
Forms by evaporation of cave, spring, or river waters. stalactites and stalagmites			