

Mechanical Weathering

- Breaks into smaller pieces
- Frost most important agent

Chemical Weathering

- Equilibrium with conditions
- Forms new minerals and releases ions to solution
- Oxidation, acidosis
- Enhanced by mechanical weathering

Sedimentary rocks

Two main types

- Rocks formed by deposition of sediment—Clastic (or detrital)
- Rocks formed by precipitation from water--Chemical (includes rocks formed by organisms)

Sediment clasts

- Particle loosened from pre-existing rock
- Transported and rounded to place of deposition
- Shape, size, and sorting of clasts can tell about the environment of deposition

Lithification

Process of becoming stone

- Burial and compaction
- Precipitation of cement
- Each reduces 'pore space'

Cement

- Brought in by water
- Mineral material between clasts
- Fills in pore spaces
- Commonly calcite, silica, and sometimes iron oxide

Types of Clastic Rocks

- Shale (most abundant)
- Sandstone
- Conglomerate

Shale

- Composed of very fine grained sediment
- Shows obvious tendency to split along planes (fissile)
- Usually gray
- Most common type of sedimentary outcrop

Shale with plant fossils



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Sandstone

- Composed of sand-size particles
 - Between 1/16 mm and 2 mm diameter
 - Particles may be individual mineral grains or rock fragments
 - Quartz most common type of grain
- Environments include
 - Beach,
 - shallow sea,
 - river,
 - sand dunes

Sandstone



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Conglomerate

- Composed of particles larger than 2 mm
- Usually particles are rock fragments
- When describing conglomerate, refer to shape of the clasts it is composed of, not the overall shape of the rock

Conglomerate



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Detrital (clastic) rocks

- Shale is the most common one
- Made from solid particles
- Classified by particle size

Chemical rocks

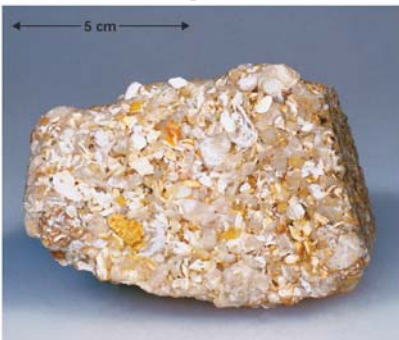
Material was once in solution and precipitates to form sediment

- Directly precipitated as the result of physical processes, or
- Through life processes (biochemical origin)

Chemical rocks

- Limestone
 - Composed of the mineral calcium carbonate
 - Much of this calcite was precipitated by organisms
- Considered an 'organic sediment' if from organisms
- Second most common type of sedimentary rock—most common type of chemical rock

Coquina

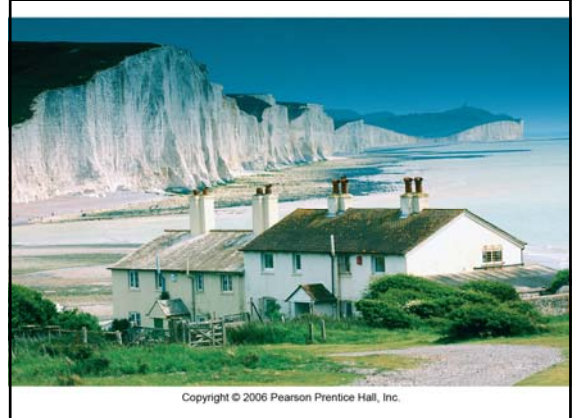


Close up



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Fossiliferous limestone



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Chemical rocks

- Direct mineral precipitation from water
 - Microcrystalline quartz (precipitated quartz) known as chert, flint, jasper, opal or agate
 - Evaporites such as rock salt or gypsum
 - Travertine (calcite) and sinter (silica) from hot spring deposits

Rock salt



Classification of sedimentary rocks

Detrital Sedimentary Rocks			Chemical Sedimentary Rocks		
Texture (grain size)	Sediment Name	Rock Name	Composition	Texture (grain size)	Rock Name
Coarse (over 2 mm)	Gravel (Rounded fragments)	Conglomerate	Calcite, CaCO ₃	Fine to coarse crystalline	Crystalline Limestone
	Gravel (Angular fragments)	Breccia			Travertine
Medium (1/16 to 2 mm)	Sand	Sandstone	Various size shells and shell fragments locally cemented with calcite cement	Microscopic shells and clay	Coquina
	(If abundant feldspar is present the rock is called Arkose)				Fossiliferous Limestone
Fine (1/16 to 1/256 mm)	Mud	Siltstone	Quartz, SiO ₂	Very fine crystalline	Chalk
Very fine (finer than 1/256 mm)	Mud	Shale			Chert (light colored) Flint (dark colored)
			Gypsum CaSO ₄ ·2H ₂ O		Rock Gypsum
			Halite, NaCl		Rock Salt
			Altered plant fragments		Bituminous Coal

Sedimentary rocks

Features of sedimentary rocks

- Strata, or beds (most characteristic)
- Bedding planes separate strata
- Fossils

Sedimentary rocks

Features of sedimentary rocks

- Bedding and bedding planes
- Size, shape and distribution of grain sizes
- fossils

Fossils

- Traces or remains of prehistoric life
- Are the most important inclusions
- Help determine past environments
- Used as time indicators
- Used for matching rocks from different places

Features of sedimentary rocks

- Porosity
- Permeability

Sedimentary rocks

Economic importance

- Coal
- Petroleum and natural gas
- Sources of iron and aluminum