

Laboratory 5. Sedimentary Rocks

- The two primary types of sediment are ***chemical*** and ***detrital***.
- Sediment*** becomes lithified into sedimentary rocks by cementation and compaction.
- Chemical sediment*** consists of minerals precipitated from solution by inorganic processes and from accretion by biological organisms.
- Chemical sedimentary rocks*** (limestone, coal, microcrystalline quartz) are formed from chemical sediment.
- Detrital sediment*** consists of solid particles, products of mechanical weathering.
- Detrital sedimentary rocks*** are formed from detrital sediment
- Both chemical and detrital sediment and sedimentary rock can contain fossils, some being macroscopic (visible to the naked eye) and microscopic (viewable to humans only through magnification).***

Laboratory 5. Sedimentary Rocks

- The primary exercise for this lab is to study and become familiar with 12 sedimentary rock types included in a Ward's scientific rock kit including those of plutonic (intrusive) and volcanic (extrusive) origin.
- A secondary exercise will be to examine the loose samples of detrital and chemical sediment and rocks held by RVCC, discuss them among your peers and professor, and categorize them.
- A third exercise will quiz you as to some common and primary sedimentary features seen in sedimentary rocks
- By the end of this lab you should have a working familiarity with the principal types of sedimentary rocks, including the terminology and methods of discriminating between clastic (detrital) and chemical varieties, including microcrystalline forms of quartz and calcium carbonate.

Laboratory 5. Chemical Sedimentary Rocks



Chemical sedimentary rocks are:

- a) Precipitated directly from fresh or sea water by biological accretion,
- b) Precipitated directly from saturated water (fresh, marine, and hydrothermal), or
- c) Formed in bogs or swamps from the accumulation of dead organic matter (animal and vegetation)

Laboratory 5. Chemical Sedimentary Rocks

Checklist:

- Limestone (CaCO_3 in its pure form) is generally soft, gray to cream colored, will react with HCL, and is softer than metal, and *can contains marine fossils (coquinas, sea shells, coral, etc.)*
- Dolomite is similar to limestone but is commonly has some Mg^{+2} replacing Ca^{+2} , can have an orange tint from also having some Fe^{+2} , is slightly harder than limestone, is less reactive to HCL
- For coal, recognize the peat → lignite → coal transition and the bituminous versus anthracite types. Bituminous is lower grade, has more sulfur (yellow mineral) and is not as shiny. Anthracite of higher 'grade' as it burns cleaner and gives off more energy.
- Differentiate among cryptocrystalline quartz and limestone that are precipitated out of hydrothermal solutions or saturated waters.

Laboratory 5. Detrital Sedimentary Rocks



Common cementing agents are silica and calcium carbonate.

a) Detrital sedimentary rocks are transported and deposited by running water, wind, or glacial ice.

b) Most are composed of silica grains and/or mineral and rock fragments, and are therefore differentiated using grain size.

Laboratory 5. Detrital Sedimentary Rocks

Sediment Particle Sizes

Sedimentary particles are classified according to grain (particle) sizes, in decreasing diameter:

1. Gravel, includes boulders (> 256 mm or ~10 in.), cobbles (64-256 mm or ~2.5 –10 in.), and pebbles
2. Sand
3. Silt, and
4. Clay (or mud).



A. Grain size		
"Gravel" > 2mm	Pebbles 4–64 mm	
	Granules 2–4 mm	
	Coarse sand 0.5–2 mm	
	Medium sand 0.25–0.5 mm	
	Fine sand 0.06–0.25 mm	
	Silt 0.004–0.06 mm	
	Clay < 0.004 mm	

Grain Size and Sorting core.ecu.edu



**Exercise 1.
A Sedimentary
Rock Collection by
Ward's Scientific**

- 13 Travertine
- 14 Siltstone
- 15 Coquina
- 16 Conglomerate
- 17 Sandstone
- 18 Gray shale
- 19 Limestone
- 20 Chert
- 21 Limestone 1
- 22 Tan sandstone
- 23 Gray shale
- 24 Gypsum

Laboratory 5. Detrital Sedimentary Rocks

Checklist:

- Recognize increasing grain size of mudstone → siltstone → sandstone → conglomerate.
- Mudstone and shale differ because the latter has initial layering, or fissility, by the preferred alignment of platy minerals during early phases of burial and compaction.
- The degree of rounding and sorting of grains in the various samples and discuss the significance with respect to transport distance.
- Conglomerate contains rounded grains whereas breccia contains angular grains
- Those cemented with calcium carbonate are commonly more friable and can react with dilute HCL whereas silica-cemented ones are harder and nonreactive to HCL.