

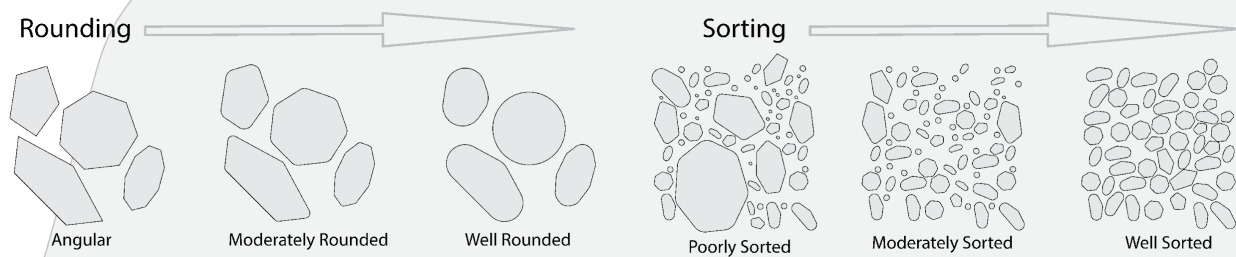
First some review of Sediment and Sedimentary Rocks:

Sediment



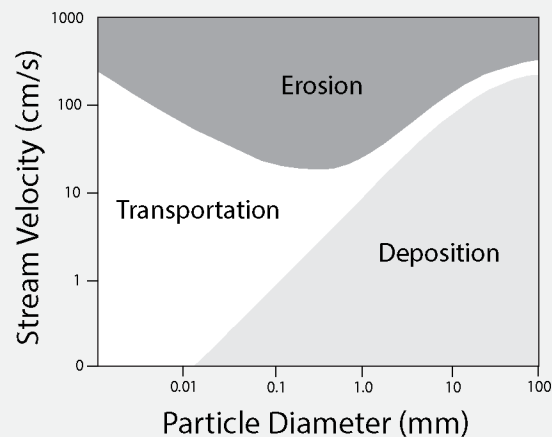
Sediment consists of loose grains either: 1) weathered and eroded from rocks or 2) precipitated from solution or secreted by organisms. Detrital particles are classified according to size (as above).

Transportation



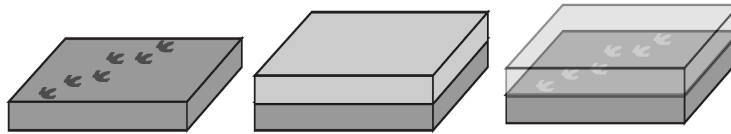
During transport by wind, water or ice (all three being driven by gravity), particles become rounded and sorted.

Deposition



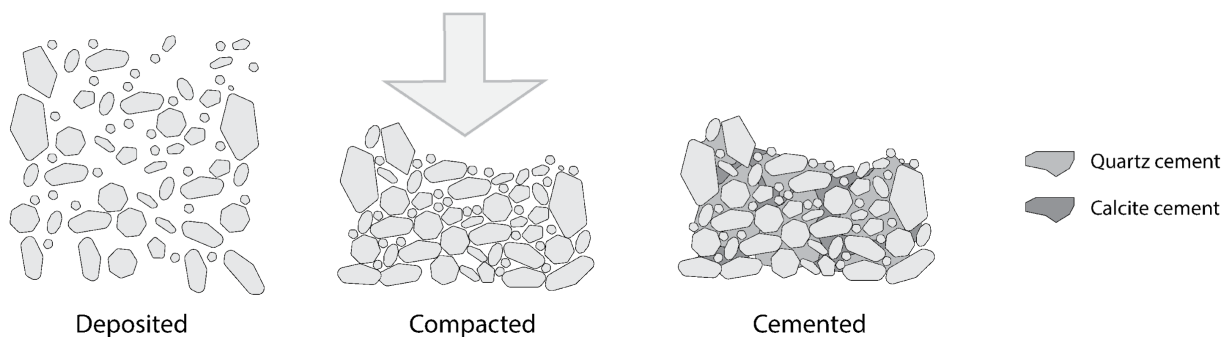
Stream velocity is equivalent to energy. It takes a large amount of energy to erode (break loose) a large particle, and similarly for very small particles as well. Once eroded and in suspension (transport), a lowering of stream velocity (energy) will cause large particles to deposit (stop moving), whereas a small particle will carry on in transport almost indefinitely.

Burial (Preservation)



Once sediment is deposited somewhere, it needs to be buried in order to be preserved. If not, the material would eventually become re-mobilized when conditions change.

Lithification



Lithification is the process in which loose sediment is compacted under pressure and growth of mineral cement locks the grains together as rock. This process occurs as sediment becomes buried deep below younger sediment deposited above.

Evaporite Deposits



When large salty lakes and seas evaporate, they leave behind extensive deposits of halite and gypsum, which may become buried and preserved, similar to detrital sediments described above.

Now, test your knowledge:

Briefly define the following terms:

sediment -

transportation -

rounding -

sorting -

deposition -

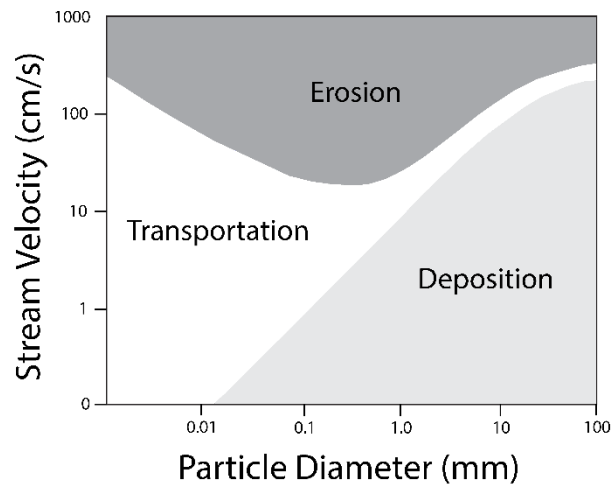
burial -

lithification -

Answer the following:

1. True/False. Sand is a size classification, not a composition.
 - A. True
 - B. False
2. True/False. Clay can be used to refer to a mineral type, as well as a particle size.
 - A. True
 - B. False
3. In the following environment, sediment can become rounded.
 - A. In a glacier
 - B. In a river
 - C. On a beach
 - D. In a wind-blown desert
 - E. All of the above

4. During transport in a river, energy is highest near the headwaters, and consequently sediment particle size becomes _____ downstream.
- A. Larger
 - B. More elongate
 - C. Shorter
 - D. Smaller
 - E. Taller



5. During flood stage, when stream velocity is at 100 cm/s, which size particles will become eroded from the river bottom? (Be careful, perhaps use a pencil and straight edge)
- A. 0.01 mm only
 - B. 0.01, and 0.1 mm
 - C. 0.01, 0.1, and 1.0 mm
 - D. 0.01, 0.1, 1.0, and 10 mm
6. When the river slows again to 10 cm/s, which size particles will become deposited. (Again, be careful. You may want to check your answer by using a straight edge on the plot).
- A. 10, 1, 0.1, and 0.01 mm
 - B. 10, 1, and 0.1 mm
 - C. 10, and 1 mm
 - D. 10 mm only



7. In the above scenario, dinosaur footprint *trace fossils* (more on trace fossils in another unit) are preserved in the dark grey sediment. What is the primary process responsible for making sure these trace fossils are not destroyed?
- A. Transport
 - B. Sorting
 - C. Deposition
 - D. Burial
 - E. Lithification
8. Pore space is the space between sediment grains in deposited material. This space will often be filled with water. Which stage do you think has the highest amount of pore space, therefore the most water in a given volume of sediment?
- A. Freshly deposited sediment
 - B. Compacted sediment
 - C. Cemented sediment
9. Evaporites are deposits of minerals crystallized out of water as the water was evaporated away. Much of the material that forms these deposits did not start in the now evaporated seawater, but instead was transported to the seaway as _____.
- A. Detrital sediment grains
 - B. Dissolved ions
 - C. Halite
 - D. Gypsum
 - E. Calcite cement

Now, think deeper:

On your own:

10. Which parts of the sedimentary rock formation process is similar for detrital vs. inorganic chemical (evaporite)?

11. Which parts of the sedimentary rock formation process is different for detrital vs. inorganic chemical (evaporite)?

12. What is unique about biochemical sedimentary rocks (limestone) relative to the previous questions (10 and 11)?

Working in groups of 2 or 3:

13. Compare your answers to questions 10, 11 and 12.