Weathering: The Breakdown of Rocks (not including soils) & Sedimentation and Sedimentary Rocks – Chapter Questions (2 Chapters!)

1. **Compare and contrast weathering and erosion.
2. **Compare and contrast the two styles of weathering. How does each add to the effectiveness of the other?
3. Describe the physical weathering process that cause frost wedging, exfoliation, and spheroidal weathering.
4. What is the most common naturally formed acid? How does it form?
5. **Understand the process and results of these types of chemical weathering:

Types	Description of process and results
Dissolution	Water molecules gang up on ions on outside of mineral lattice (surface) and break the mineral bonds, releasing the ions into solution. Water carries ions away.
Hydrolysis	Water molecules enter mineral formula, replacing other components and changing mineral to a new one: a clay mineral. Example: $2KAlSi_3O_8 + 2H^+ + 9H_2O = Al_2Si_2O_5(OH)_4 + 4H_4SiO_4 + 2K^+$ K-feldspar + water = Kaolinite clay + silicic acid and potassium ions
Oxidation	Oxygen bonds with Fe ions on outside of mineral lattice (surface) removing Fe from mineral and producing Hematite (rust).

6. Describe what happens to various elements during chemical weathering (see handout – complete activity):

Elements/minerals	Results during chemical weathering	Elements/minerals	Results during chemical weathering
Na, Ca, K, Mg, etc.		Al, Si, O (when all together in a mineral)	
Fe		Quartz	

7. Which silicate minerals are most susceptible to chemical weathering? Why?
8. **List all characteristics of a rock outcrop and its surroundings that would make it weather fastest.
9. What two minerals are most common in detrital sedimentary rocks? Why are these minerals so abundant?
10. How can you use grain composition (minerals), sorting, and grain size and shape to tell sediment maturity (distance the mineral has traveled from its source and/or time mineral has been exposed at surface)?

Characteristic	Description where grain forms:	Description of grain after major transit by water:
Grain composition	All compositions possible	Only most resistant minerals left: clay and quartz
Grain size	All possible (gravel, sand, mud)	Only fine sand and mud
Grain sorting	Very poor	Very good
Grain shape	Angular	Rounded

11. Describe different sedimentary structures found, uniquely in sedimentary rocks, and what each indicates about the surface environment at the time to sediment collected/formed? (Include graded bedding, ripple marks, cross-bedding, and fossils)
12. **Describe a turbidity current, how it relates to submarine canyons, and what its deposits look like.
13. **How is detrital or organic (both together = clastic) sediment turned into sedimentary rock (lithified)? (Two main processes, not including precipitation.) For what kind of sediment does each occur?
14. Describe the three most common cements for sedimentary rocks and know how to identify each one.

Cement	How to recognize?
Fe Oxide (rust)	Red color (usually); red streak (always)
Calcite	Reacts with acid
Quartz	Doesn't react with acid and isn't red!

15. The term clay can be used in two different ways. Describe the two meanings of this term.
16. **What are evaporites? How do they form?
17. Distinguish between clastic and chemical textures. How does this differ from detrital vs clastic?
18. Describe the basic distinguishing characteristics of these major sedimentary rocks (bolded names are the only ones required):

conglomerate, breccia, sandstone (including arkose, quartz arenite, graywacke), **mudstone** (including **shale**) **limestone** (including **chalk** and coquina), **chert** (including **diatomite**), **evaporite**.