LECTURE 12: WEATHERING AND SOIL

12. Regolith is:
   A. broken down rocks produced as a result of frost wedging
   B. the process by which rocks are converted to soil
   C. fragments of rocks that result from the processes of weathering
   D. sedimentary particles that are produced by mechanical weathering
   E. a middle eastern spice used for flavoring curry dishes

12. The movement of material by moving wind, water, or ice is a process called (1)________ whereas the process that breaks down solid rock into loose sediment is called (2)________.
   A. (1) mechanical weathering (2) chemical weathering
   B. (1) chemical weathering (2) mechanical weathering
   C. (1) erosion (2) weathering
   D. (1) weathering (2) erosion
   E. (1) mass wasting (2) regolith

12. Which of the following definitions most accurately pertains to weathering?
   A. the physical or chemical breakdown of rock exposed to air, water, and organic matter
   B. the downslope movement of loose material under the influence of gravity
   C. the sole process by which regolith becomes soil
   D. the movement of sediment by surface processes involving wind, water, and ice
   E. none of these statements defines weathering

12. Weathering is:
   A. the break down of solid rocks into regolith by moving water or wind
   B. a purely chemical process that allows rocks to break down into soil
   C. the physical or chemical break down of rocks into regolith and then soil
   D. also called erosion
   E. a process that extends to depths of 100s of kilometers into the Earth

12. Which of the following is NOT true of frost wedging in rocks?
   A. it is also called “freeze and thaw”
   B. it is a direct result of water in cracks freezing and expanding by 9% in volume
   C. it is a form of mechanical weathering
   D. it only occurs in the polar regions on Earth
   E. it is responsible for causing blocks of rock to dislodge, forming talus

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   D. responsible for causing blocks of rock to dislodge, forming talus
   E. all of the above

12. Frost wedging is:
   A. when rocks cool and contract at night causing bits to break off
   B. a form of chemical weathering whereby rock minerals dissolve in cold water
   C. when moving glacier ice breaks rocks into smaller pieces of regolith
   D. when water in cracks in rock freezes and expands, breaking the rock apart
   E. when water in soil turns to frost, causing the soil to become frozen

12. Rocks that are brought to the surface from deep down are said to undergo (1)_____. Near the surface, the resultant pressure release may cause the rocks to form (2)_______.
   A. (1) exhilaration (2) exfoliates
   B. (1) exhumation (2) sheet joints
   C. (1) extension (2) normal faults
D. (1) existentialism   (2) explosions  
E. (1) exfoliation   (2) mountains

12. Rocks under high pressures deep inside the crust are sometimes uplifted to the surface. This process is called (1)_______. The drop in pressure may result in (2)_______.  
A. (1) uplift   (2) volcanic eruptions  
B. (1) exposure   (2) metamorphism of the rocks  
C. (1) exhumation   (2) expansion of the rocks, forming sheet joints  
D. (1) intrusion   (2) partial melting  
E. (1) exfoliation   (2) your ears popping

12. Which of the following forms of weathering does NOT involve a mechanical weathering process?  
A. oxidation  
B. frost wedging  
C. thermal effects  
D. unloading  
E. biological activity

12. Which of the following is not associated with the process of mechanical weathering?  
A. hydrolysis reactions  
B. sheet joints  
C. exfoliation  
D. frost wedging  
E. breakdown of rocks by plant roots

12. Which of the following processes is a chemical weathering phenomenon?  
A. frost wedging  
B. hydrolysis  
C. unloading  
D. biological activity  
E. spalling

12. Rainwater can mix with CO₂ in the atmosphere to form carbonic acid. This can result in the chemical weathering of rocks because:  
A. hydrolysis reactions cause H⁺ ions in the acid to displace cations in minerals  
B. rocks are naturally weak and easily go into solution  
C. it is the same as acid rain, which forms wherever CO₂ exists in the atmosphere  
D. oxidation reactions are produced that turn the rocks into red soil  
E. all rocks contain feldspar, which breaks down into clay

12. Hydrolysis reactions are when H⁺ cations in water replace mineral cations like K⁺, Na⁺ and Mg²⁺ in the mineral crystal lattice, forming a new mineral. This is how feldspars commonly break down to form:  
A. soil  
B. quartz  
C. olivine  
D. clay  
E. mineral dust

12. Minerals like halite and calcite are particularly prone to chemical weathering through the process of dissolution. As a result, the following type of rock is prone to this type of weathering:  
A. limestone  
B. rock salt  
C. marble  
D. all of the above  
E. none of the above

12. From the following list, choose a mineral that is commonly subject to the weathering process called dissolution:  
A. marble  
B. limestone  
C. rock salt  
D. halite  
E. all of the above
12. What mineral commonly breaks down into clay when it is chemically weathered?
   A. quartz
   B. muscovite
   C. feldspar
   D. olivine
   E. calcite

12. Which of the following combinations of weathering process and resultant effect is the correct combination?
   A. frost wedging and spalling
   B. oxidation and exfoliation
   C. thermal effects and acid mine drainage
   D. crystal growth and spalling
   E. unloading and exfoliation

12. The correct order of soil horizons from the top down is:
   A. O E A C B
   B. O A E B C
   C. O C B A E
   D. A O E C B
   E. A B C D E

12. Which of the soil horizons make up humus?
   A. the O horizon
   B. the E horizon
   C. the A horizon
   D. the O and A horizons
   E. the A and E horizons

12. Which of the soil horizons make up topsoil?
   A. O
   B. E
   C. A
   D. O and A
   E. E and A

12. Which of the following is NOT a type of soil?
   A. loess
   B. pedirites
   C. laterites
   D. pedalfers
   E. pedocals

12. Soils in warm, dry climates like the SW United States often contain soluble minerals like calcite and gypsum. These types of soils, called (1)___________, may be subject to the effects of evaporation and drying, resulting in precipitation of the soluble minerals forming a hard, light-colored layer called (2)___________.
   A. (1) pedocals (2) caliche
   B. (1) laterites (2) caliche
   C. (1) pedalfers (2) loess
   D. (1) pedocals (2) humus
   E. (1) laterites (2) topsoil