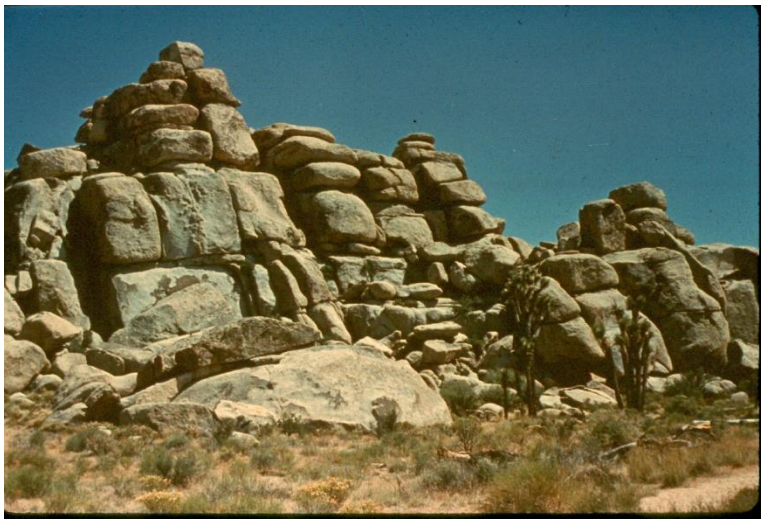
ENVS*1060 DE - Principles of Geology
MIDTERM 2, Winter 2016

1. In the photograph, what is the MAIN form of weathering that produces this unique appearance? It is likely that multiple weathering processes have taken place, so choose the most noticeable process.



a) Root wedging
b) Biologic activity
c) Sheeting
d) Spheroidal weathering

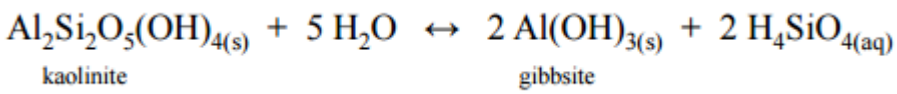
2. In which US state would you expect to find the most significant weathering from thermal expansion?

a) North Dakota
b) Utah
c) South Carolina
d) Missouri

3. Which of the following statements is TRUE regarding the weathering of rocks?

a) All rocks found within the same climatic region (moisture and temperature) will weather at the same rate
b) Chemical weathering is more dominant than mechanical weathering in semi-arid regions
c) Coral reefs can form large wave-resistant structures in tropical oceans because their calcite skeletons dissolve very slowly in warm water
d) Mechanical weathering of minerals can be assessed accurately using Bowen's reaction series

4. The following reaction is an example of what kind of chemical weathering?



a) Carbonation
b) Dissolution
c) Hydrolysis
d) Oxidation

5. Which of the following igneous rocks would weather to produce the most fertile soil?

a) Granite
b) Limestone
c) Basalt
d) Trachyte
e) They would all weather to produce equally fertile agricultural soils

6. Where would you most likely expect to find a Chernozemic soil?

a) Queensland, Australia
b) Florida, USA
c) South Africa, Africa
d) Manitoba, Canada
e) Ontario, Canada

7. You would expect to find polygonal patterned grounds on the ground surface on which of the following soils?

a) Cryosol
b) Vertisol
c) Brunisol
d) Chernozem
e) Gleysol

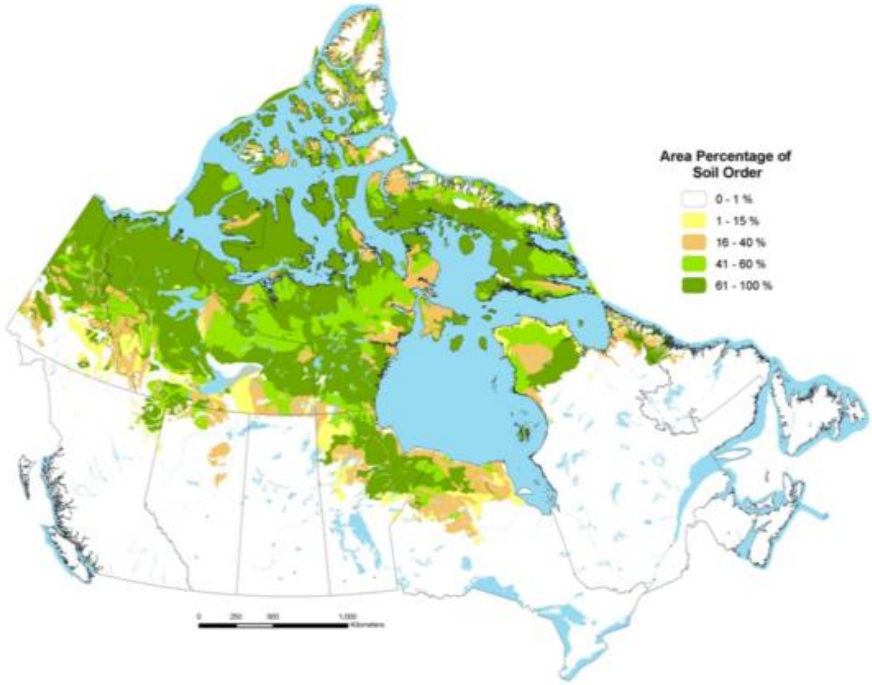
8. In which soil horizon do clay particles accumulate?

a) A horizon
b) B Horizon
c) C Horizon
d) All horizons accumulate clay particles

9. The _____ is the soil horizon which contains most of the _____ that is present within that soil profile.

a) Topsoil, biological activity
b) B horizon, organic matter
c) A horizon, plant rooting
d) Subsoil, burrowing by earthworms
e) Both a and c are correct

10. What type of soil would you expect to have the distribution shown on the map?



a) Luvisolic
b) Cyrosolic
c) Vertisolic
d) Regosolic

11. _____ is an example of _____.

a) Olivine, a relatively quick weathering mineral
b) Exfoliation, weathering on the moon
c) Chernozemic soil, common agricultural soils in British Columbia
d) Oxidation, soils found in a bog
e) None of the above

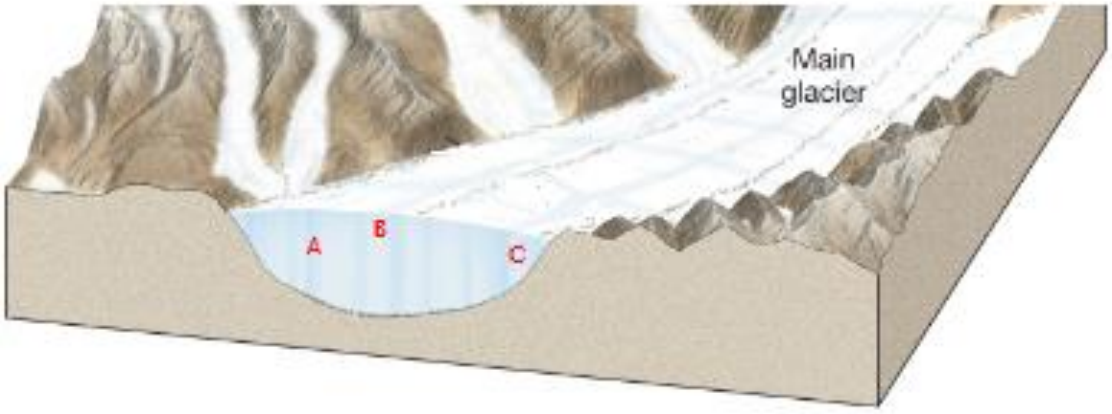
12. Glacial sediments provide a source of sand and gravel used in road construction. The most valuable sediments are those that are well-sorted and do not require much modification after extraction. Knowing this, which glacial deposit do you think provides the best source for gravel?

a) Drumlin
b) Outwash plain
c) Moraine
d) Varve deposit
e) Roche moutonne

13. Glaciers form where the snowline intersects the Earth's surface. Currently, the snowline only intersects in mountainous areas with _____ and lowlands with _____. This makes places like _____ unsuitable for the formation of glaciers.

a) High latitude, High altitude, Alaska
b) High altitude, Low latitude, N. Korea
c) High altitude, High latitude, Southern Ontario
d) High altitude, High latitude, Greenland

14. Using the image, complete the following sentence:
"It can be expected that a glacier will move fastest at location ____ and slowest at location ___ because _____."



a) A, C, friction with the valley floor creates slower flow
b) C, B, snow is accumulating rather than flowing
c) B, C, friction with the valley floor creates slower flow
d) B, A, drag causes deeper glacial ice to move slower

15. What best describes the processes happening around the South Pole?

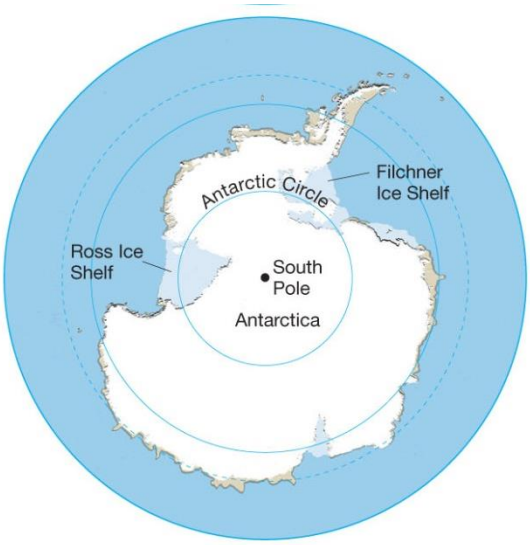
a) This polar, continental ice sheet is actively flowing, moving rocks and sediments with it

b) This temperate, alpine ice sheet is frozen solid to the rock beneath, resulting in very little movement and erosion

c) This temperate continental ice sheet is relatively colder and less erosive in the middle than around its edges

d) This polar, continental ice sheet is frozen solid to the rock beneath, resulting in very little movement and erosion

d) None of the above are descriptive of conditions around the South Pole



16. Which of the images shows the best example of a medial moraine?

a)

b)

c)

d)

17. A sample of glacial till containing large amounts of olivine, ilmenite, pyroxene and pyrope garnet might have originated from an area that contains_____.

a) Diamonds
b) Good fossils
c) Regosolic soil
d) Active plate boundaries

18. Use the image and your knowledge of glacial movement and deposition. Approximately what direction was the glacier ice moving during the formation of this hill? (notice the North arrow)

a) Toward the North
b) Toward the West
c) Toward the South
d) Toward the East

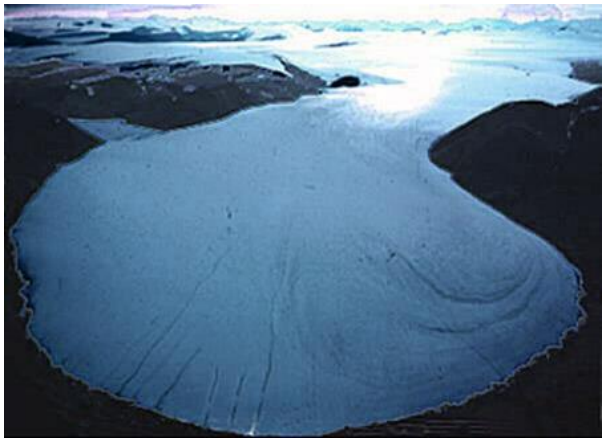
19. Which of the following statements is true?

a) When an alpine glacier melts, the ice inside the glacier retreats up the valley carrying sediments with it
b) Glacier ice always flows down the valley even when the glacier is said to be retreating
c) When two glaciers meet, their lateral moraines merge to form a medial moraine
d) River drainage from glaciers is and has always flowed from north to south
e) Option b and c are both correct

20. What statement is FALSE?

a) During an ice age, when ice cover is at its maximum, sea levels are at a minimum
b) Based on past climate evidence, we are currently living in an inter-glacial period
c) Earth's orbital variation is a major cause of ice ages
d) Glaciers modify the landscape very little compared to wind erosion and deposition

21. The image shows an example of what kind of glacier?



a) Ice sheet
b) Alpine glacier
c) Outlet glacier
d) Piedmont glacier

22. Which of the following statements is TRUE?

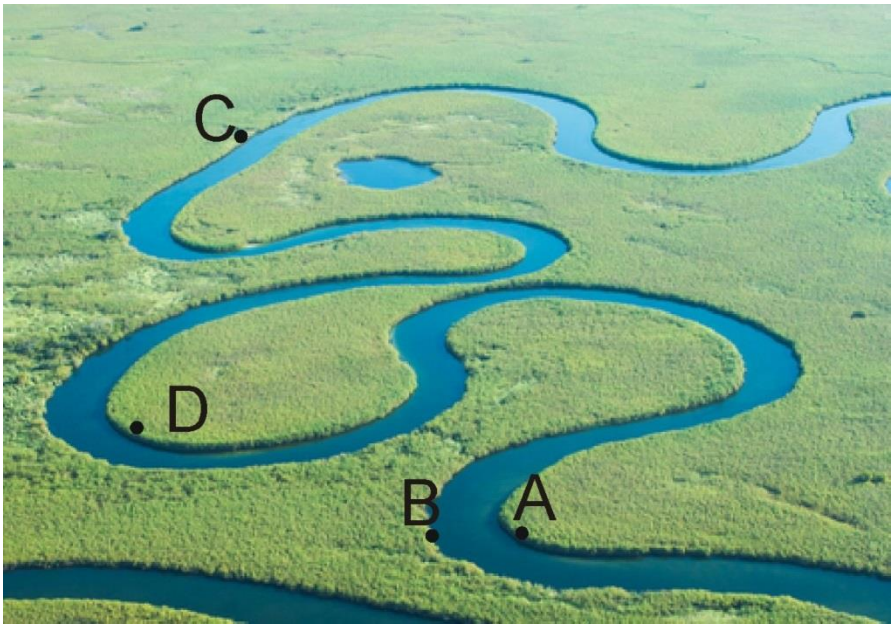
a) The bedload of a river will typically contain larger sized sedimentary particles that the saltation load
b) The difference between Breccia and Conglomerate rocks is that the latter has angular gravel particles
c) Walther's Law explains how different sized sedimentary particles are transported within a river
d) A talus fan is thickest at it's upslope end, near the mountains

23. _____ flow, can produce _____ in sandy sediments and could occur _____.

a) Very slow laminar, planar bedding, in a coral reef environment
b) Turbulent supercritical, planar bedding, in sediments toward the middle of a stream channel
c) Turbulent subcritical, varves, in a glacial lake
d) Meandering flow, erosion, in the deep ocean basins
e) Turbulent supercritical, ripples, near the inside of a meander bend

24. In the image, where would you expect the highest rate of erosion?

a) A
b) B
c) C
d) D



25. You're enjoying a day on the water and observe the following sedimentary structure. Which of the following assumptions could you make?

a) There is a lot of current and turbulence
b) The bottom is rocky and you will need your swimming shoes
c) Laminar or quasi-laminar flow is gently moving sand particles
d) The water is warm
e) b and d are both possible

26. Where would you expect to find an Alluvial Fan?

a) Death Valley, California
b) Hudson Bay Lowlands, Ontario
c) Pyrenees, France
d) Both a and b
e) Both a and c

27. The presence of rocks such as shale and limestone in an area indicate that _____ once existed there.

a) A high water table
b) Ancient seas
c) Iron-rich minerals
d) Volcanism
e) An ice sheet

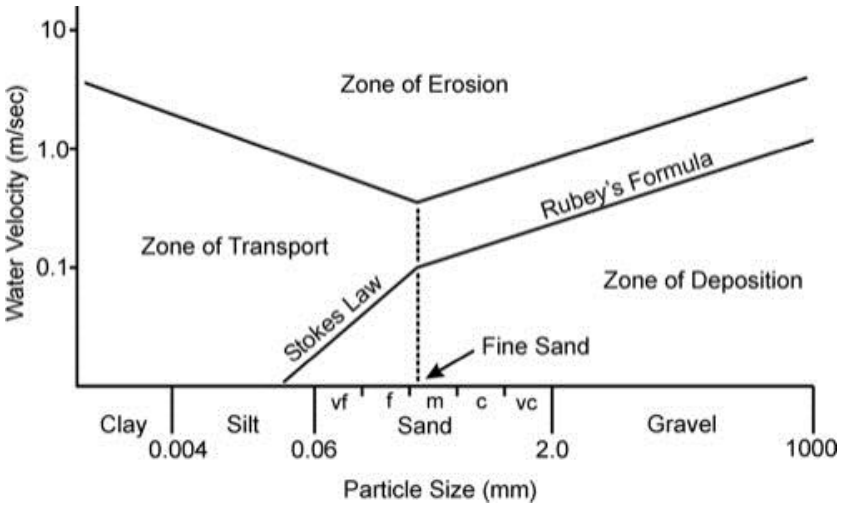
28. Which of the following terms best applies to the sedimentary rock, conglomerate?

a) Pebbles indicate a gradual settling from quiet water
b) An abundance of organic matter can be indicated by the typically dark colour.
c) Deposition in a high-energy environment like a glacial stream or an exposed beach
d) It is the most abundant sedimentary rock
e) None of the above is true

29. Sand settles quickly in water (try it for yourself sometime) so how do you think that sand could be found in deep ocean sediment, thousands of kilometers from the nearest land?

a) Carried there by fish
b) Rock slides
c) Carried there by tsunami
d) During huge river floods
e) Carried by turbidity currents

30. Look at Hjulstrom's diagram (Fig 8.4 in your course notes). The top line shows the velocity required to start erosion of various particle sizes by running water. Approximately how fast would water need to flow to erode small gravel particles?



a) 1000 cm/s
b) 100 cm/s
c) 10 cm/s
d) There is no way to know from this diagram

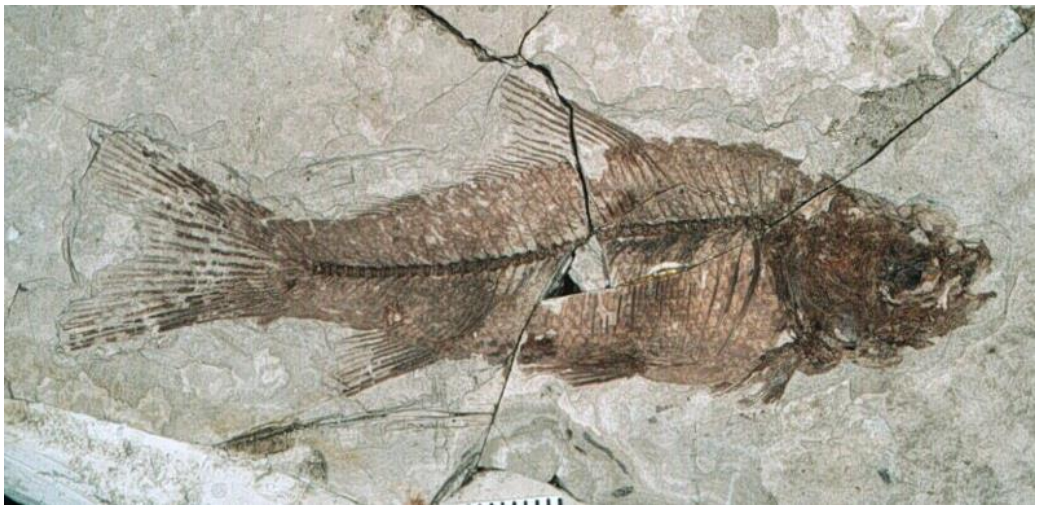
31.) The type of bedding shown in the photograph is characteristic of deposition from flowing water containing many different particle sizes. It is called _____ and indicates that the water flow was _____ during deposition.

a) Planar bedding, laminar
b) Graded Bedding, decreasing
c) Chaotic bedding, turbulent
d) Clastic bedding, warm
e) Graded bedding, increasing
f) Planar bedding, increasing

32. The most common components of biochemical sediments include:

a) Oil, gas, coal and chemical precipitates
b) Gravel, sand, silt and clay
c) Silt grains, nutrients, salt grains
d) Shell fragments, oolites, chemical cement

33. How did the fish in the photo become fossilized?



a) Unaltered preservation
b) Mold and cast
c) Carbonization
d) Petrifaction

34. Soft tissue is rarely preserved, however with rapid burial and the suppression of scavenging and decomposition, it is possible that it can be fossilized within what kind of material?

a) Amber
b) Tar
c) Permafrost
d) All of the above

35. The likelihood that an organism will be fossilized after death can be called “preservation potential”. Under which set of circumstances is preservation potential highest?

a) Silica shell, rapid burial in fine-grained sediment
b) Carbonate shell, rapid burial in gravelly sediment
c) Silica shell, in a mountainous environment
d) Carbonate shell, slow burial in wind-blown sediment

36. The photo (3 cm x 4.5cm) shows an organism with the following characteristics:

- Colonial organism.
- Openings less than 1mm.
- No thin laminations.

What is the organism called?

a) Bryozoa
b) Crinoid
c) Trilobite
d) Coral

37. There are several important requirements for index fossils. Which of the following is NOT one of them?

a) They must be easily identifiable
b) They must have been present in several types of environments/climates.
c) They must have existed, unchanged for a long period of geologic time
d) They must be relatively common

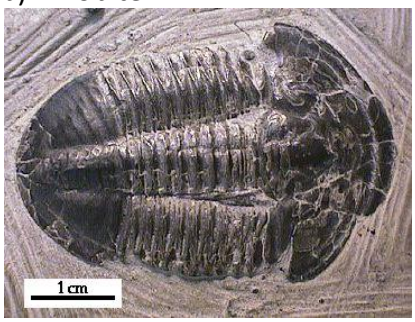
38. The oldest known hominid species, _____, had a cranial capacity approximately _____ of what modern humans have today.

a) Australopithecus, 1/3
b) Australopithecus, 1/2
c) Neanderthal, the same
d) Chimpanzee and gorilla, 1/2

39. Which of the following photos is labelled incorrectly?

a) Echinoid

b) Trilobite



c) Tabulate Coral

d) Crinoid

40. Fossil molds form:

a) When the shell is buried intact and minerals precipitate outside it
b) When the shell dissolves and leaves a shell-shaped cavity in the lithified sediment
c) When minerals carried in by percolating groundwater, precipitate in a cast
d) By the activity of organisms (tracks and burrows)

41. What kind of fossilized organism is shown in the photograph?

a) Echinoid
b) Porifera
c) Bivalvia
d) Cephalopoda

42. Which of the following scenarios can be partially described using the Doppler Effect?

a) When the perceived pitch of an emergency vehicle's siren suddenly drops as it passes you
b) Some stars in the universe are closer to us than others and appear to be more violet
c) Expansion of the Universe after the big bang
d) All of the above are related to the Doppler Effect

43. The wide variety of heavy and light elements found in and on the Earth can be attributed to_____.

a) Fusion processes in the original stars
b) Fission process in the Earth's core
c) Fusion process in the Earth's core
d) Radioactive decay of unstable elements

44. The hardest mineral on Moh's hardness scale forms at a depth of about _____

a) 50 Km
b) 100 Km
c) 200 Km
d) 20 Km
e) 10 Km

45. Meteorites containing _____ and _____, have provided information about the composition of the entire Earth.

a) Mg and Fe silicates, chondri
b) Mg and Fe Silicates, variable composition
c) Fe alloyed with Ni, chondri
d) Fe alloyed with Mg, variable composition

46. A(n)_____ rich rock might be found on a _____ with characteristically _____soil.

a) Olivine, stratovolcano, acid
b) Quartz, shield volcano, fertile
c) Olivine, shield volcano, fertile
d) K-feldspar, cinder cone, poorly drained
e) Quartz, stratovolcano, acid
f) c and e are both possible

47. Which of the following minerals would be most likely to occur together in the same igneous rock?

a) Quartz, K-feldspar, olivine
b) Olivine, pyroxene, Na-rich plagioclase
c) Olivine, pyroxene, basalt
d) K-feldspar, dolomite, halite
e) Pyroxene, biotite, amphibole

48. Why did you choose your answer for question 47?

a) Because they all had approximately the same hardness
b) Because they all had similar colour
c) Because they all formed in a similar temperature range
d) Because they all formed in the same part of the Moh scale

49. Shortly after the formation of the Earth, elements were sorted by _____.

a) Density
b) Particle size
c) Bonding ability
d) Their positive or negative charge

50. A mineral with hardness of 7 on Moh's scale is most likely to be found in large quantities in:

a) Limestone
b) Basalt
c) Rhyolite
d) a and b
e) a and c