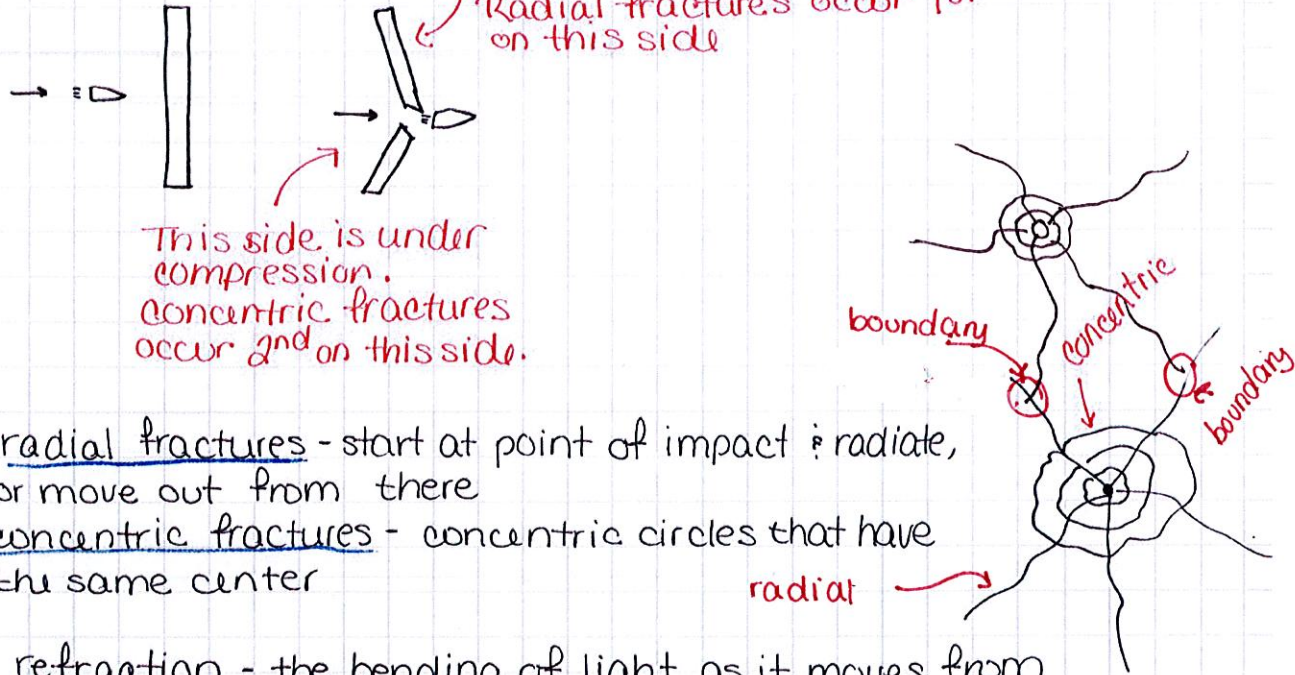


Key Unit 2 B: Questioned Documents, Glass, & Soil Review

1. exemplar - an authentic sample (usually hand-written) used for comparison purposes
2. forgery - the act of producing a copy of a document, signature, bank note, or work of art
Ex) Signing your parent's name on a permission slip
fraudulence - committing forgery for monetary gain
Ex) changing the amount on a check
3. (1) examine handwriting / typescript to determine source / authenticity
(2) identify alterations
(3) recover original contents
4. (1) angularity
(2) slope
(3) speed
(4) pressure
(5) letter & word spacing
(6) relative dimension of letters
(7) connections
(8) pen movement
(9) writing skill
(10) finger dexterity
(11) margins
(12) spacings
(13) crowding
(14) insertions
(15) alignment
(16) spelling
(17) punctuation
(18) phraseology
(19) grammar
5. An adult's handwriting is more of an individual characteristic than a child's handwriting because a child is learning how to write and are copying letter forms as opposed to writing unconsciously.
6. Gilbert v. California - Supreme Court upheld taking exemplars before appointment of counsel & that it lies outside the protection privileges of the 5th Amendment (protection against self-incrimination)
United States v. Mara - Supreme Court states that getting a handwriting sample did not constitute an unreasonable search and seizure of a person (4th Amendment)

7. (1) several pages of writing, required
- (2) write by dictation, similar but not exact of questioned document
- (3) sit comfortably at a desk or table
- (4) use similar pen and paper
- (5) dictate writing 3 times
- (6) show questioned document in consultation to a document examiner

8.



9. radial fractures - start at point of impact & radiate, or move out from there
- concentric fractures - concentric circles that have the same center

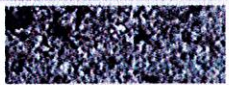


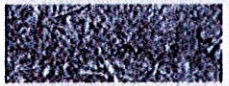
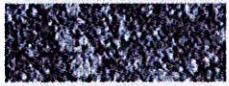

10. refraction - the bending of light as it moves from 1 substance to another
- refractive index - if a piece of glass and a liquid have the same refractive index, the piece of glass seems to disappear in the liquid. If it is still visible you need to try another liquid with a different refractive index

11. Becke lines - white lines that can appear either inside or outside the edge of a glass piece if the glass and liquid do NOT have the same refractive index
 - inside glass - glass has a higher refractive index than the liquid
 - outside glass - glass has a lower refractive index than the liquid

12. See refractive index in #10

13. soda-lime glass - silicon dioxide w/ soda (sodium carbonate) and lime (calcium oxide) mixed in.
tempered glass - created by stressing soda-lime glass through a repeated process of heating and cooling the glass surface, doesn't shatter but fragments into small pieces. It's stronger than soda-lime glass. Used in side & rear windows of autos
laminated glass - created by bonding a layer of plastic between 2 sheets of soda-lime glass, stronger than soda-lime glass & stops fragments from flying into cars. Used in windshields
bullet-proof glass - 2 pieces of glass, one softer & more elastic than the other to absorb the energy of the bullet & stop it.
14. Soil is produced in a complicated process of breaking down rocks, plant, and animal material. It's influenced by temperature, rainfall, chemicals, & minerals

15. Soil Types

Soil Type	Feel	Composed of	Location	Other Characteristics	
Sand	gritty	weathered rock	deserts, beaches, riverbeds	large visible particles, loses water quickly	
Clay	sticky	small particles adhering to each other	various	small particles, clumps, poor drainage	
Silt	crumbly, slippery like flour	medium-sized mineral particles	sediment in riverbeds	good drainage, easily farmed	
Peat	compressible	decaying organic material	bogs, areas where water is retained by organic matter failing to decompose	acidic, used with other soil types in fertilizer because of its ability to retain water	
Loam	loose	sand, silt, and clay mixture	various	best soil for agriculture	
Chalk	various colors, white to brown	alkaline (basic) soil with mineral stones	below the top soil	poor for agriculture, requires the addition of fertilizer and humus	

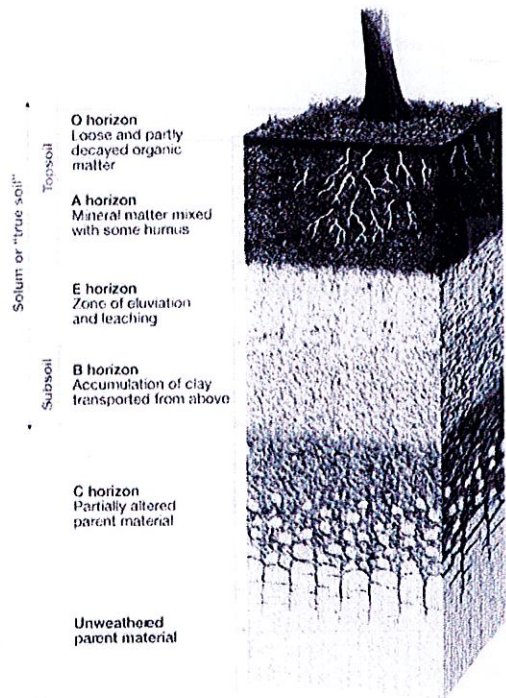
sand Types

- Continental sand - mostly quartz, mica, &/or feldspar, if there is a high % of quartz, it's very old
Volcanic sand - comes from mid-ocean volcanoes
Skeletal (biogenic) sand - made of the remains of marine organisms, such as microorganisms, shells, & coral
Precipitate sand - when dissolved minerals settle as water evaporates

16. density columns, low & high powered microscopy
Color is a very important factor

17. see #16

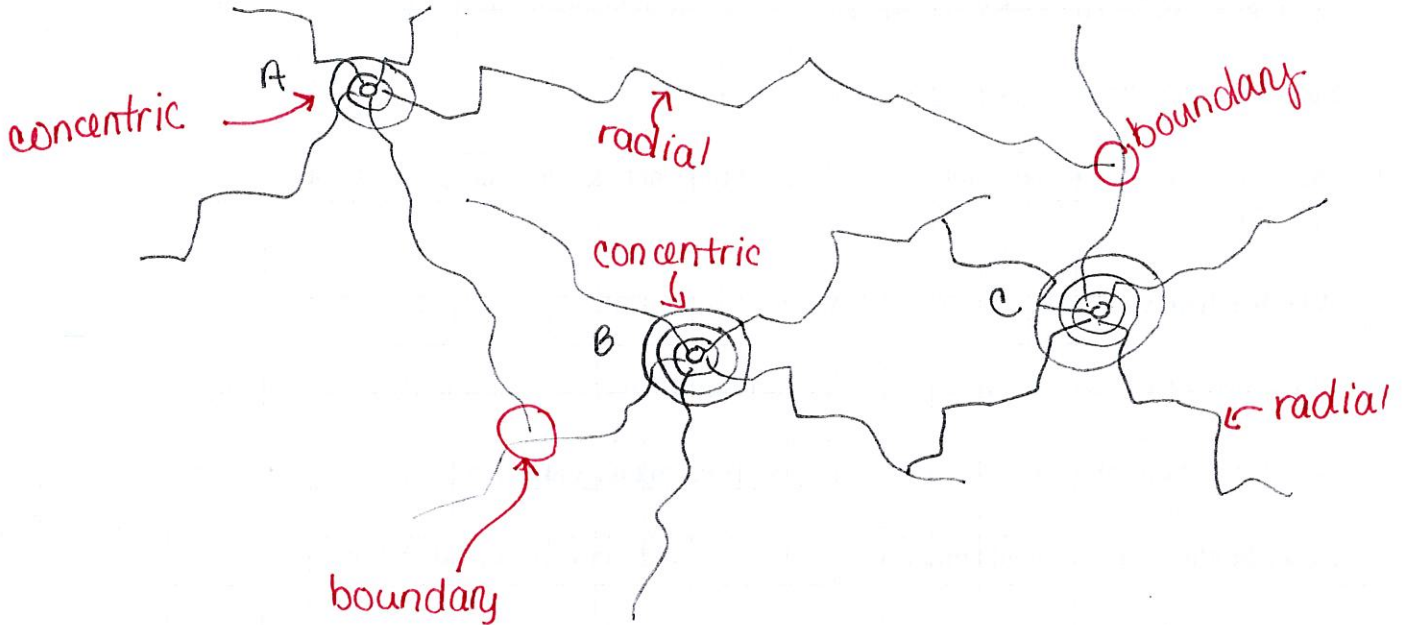
18. Soil contains minerals, decaying organisms, water, and air in varying amounts.



19. weathering - sand is created when wind and water push rocks around against each other, breaking into tiny, smooth pieces.

Glass Fracture Practice

Determine the order of the bullet holes. Label boundary fractures, 2 radial fractures, 2 concentric fractures. order: B → C → A



Glass Density Practice

Type	Density
soda-lime	2.4-2.8 g/cm ³
pyrex	2.21 g/cm ³
tempered	2.27 g/cm ³
laminated	1.2 g/cm ³
bullet proof	1.02 g/cm ³

$$d = \frac{m}{V}$$

A glass shard was found embedded in the deceased forensic science teacher's forehead. It was weighed and has a mass of 10.52g. Its volume is 4.76 cm³. Find its density and determine the type of glass.

$$d = 10.52g / 4.76cm^3 = 2.21 g/cm^3$$

This is pyrex glass