

Endogenic and Exogenic processes – re-read p. 253 Part III Earth Atmosphere Interface
 Endogenic processes (internal driven) Exogenic processes (external driven)

Chapter 8 Dynamic Planet

Super-position Uniformitarianism

What major elements make up the earth's crust?
 UPPER MOST MANTLE + CRUST = LITHOSPHERE
 ATHENOSPHERE
 CONTINENTAL crust vs OCEANIC crust What? Where? Why?

Extrusive rock; from lava (i.e. molten rock exposed at the surface); fast cooling; volcano eruptions; lava flows on surface.

Intrusive rock; from magma (i.e. molten rock NOT exposed to surface); slow cooling; plutons; batholiths, cooled under the surface.

Building Crust: Craton, shield, sedimentation in large basins, sub-surface plutons
 Terranes or Exotic Terranes Orogeny

Rock cycle-		
Igneous	Sedimentary	Metamorphic
Intrusive-Plutons-magma Examples ↓	1) Clastic type ↓ Give Examples	heat/ pressure Examples? see text
Extrusive-flow- lava Examples ↓	2) Chemical ↓ Give Examples	
↓	↓	↓
Various form and texture ↓	Strata or layers ↓	foliated texture ↓
Variance in Crystal size Viscosity differences Cooling differences	Cementation Lithification Examples of Cementing agents??	Crystals Changed

Δ High viscosity = sticky, stiff lava or magma creating composite volcanoes
 ^ Low viscosity = more liquid and flows easily creating shield volcanoes and flood basalts; like that of the Columbia Plateau.

Chapter 9 Tectonic earthquakes and volcanoes

Topography = lay of the land

Plate tectonics: Where are Convergent and Divergent plates? Can you name some?
 Subduction zones, **Where?** What? Why?
 Sea-floor spreading centers, **Where?** What? Why? Transform faulting on Ocean floor along plate boundaries

Continental Drift
 Hot spot. Give some examples , know how it works.

Crustal Deformation- Different forces and pressures that make rock deform in different ways.

Tectonic activity - landform development - slope

Ductile Rock v. Brittle rock; importance to landform topography?

Folded mountains Forces involved? Where they are common?

Fault Block mountains Forces involved? Where they are common?

Volcanic Mountains Forces involved? Where they are common?

3 Types of forces and resulting landscape fault types and features

Compression

Tension

Shear

Reverse fault

Normal Fault

Strike Slip Fault

Folded mountains

Fault block mountains

not necessarily mountain building

Where? What Why?

Where? What Why?

Where? What Why?

All of these can come together in areas due to complexities of nature. But dominant stresses occur in various regions,

Earth quakes Common locations of quake activity; know terminology of....

Seismic waves; foci epicenter asperities

Elastic rebound theory

Volcanism Common locations of volcanic activity Where? Why?

Explosive vs effusive landform features (see text), conditions, viscosity and characteristics

Landform features: composite volcanoes, shield volcano, flood basalts, and fissure

Chapter 10 Weathering and Mass Movement

Terminology: Denudation Geomorphology

WEATHERING –

Jointing is important to all types of weathering. Jointing is initiated by tectonic activity.

Rock is unstable at earth's surface due to conditions upon which they were formed.

Mechanical /Physical Weathering

Frost Action

Salt Crystal Growth,

Tree roots

Pressure Joint Release

Chemical Weathering Processes

Oxidation

Hydration & Hydrolysis

Carbonation

Carbonation- Rain dissolves Carbon Dioxide CO₂

H₂O + CO₂ = H₂CO₃ carbonic acid- a weak natural occurring acid

“Carbonation process” effectively dissolves limestone, dolomite and carbonate cemented sedimentary rock.

Cave formation in sedimentary rock is due to carbonation process.

Soil formation and the variety of soils are caused by combination of Climate, Organisms Parent material and Time. (CLORPT)

Soil forms in layers called horizons A B C (see video notes)

MASS MOVEMENT; Earth weathered materials displaced by erosion transport and deposition. Know difference between a flow and a slide.

See figure 10,3 p 335. Rock fall to Creep

Influence of water on mass movements

WIND, WATER (RIVERS) & ICE (GLACIERS) ALL CREATE LANDFORMS from denudation of weathered material

Ch 11 River or Fluvial Landforms; Key Learning concepts and review

EROSION Channel abrasion, hydraulic action, solution

TRANSPORT suspended load (suspension), saltation, traction, and dissolved load 11.13

DEPOSITION aggradation; Braided rivers. River deltas, sand bars, point bar

Base level

Drainage basin = Catchment area, Watershed 11.2

Drainage divide – highest elevation between watersheds 11.3

Base-level (local, artificial and ultimate)

Confluence (define)

Stream profile 11.18

Sheet flow

Tributary & Distributaries 11.26 11.27

Braided Stream 11.4

Alluvium Alluvial Fan 11.25

Aggraded stream (i.e. aggradation process)

Bed-load

Active floodplain - Where does it extend to?

Terraces: paired landforms that change with climate cycles& human impact 11.24 a&b

Flow and Channel Characteristics

Meanders, point bar, undercut bank (aka cut-bank) 11.15 11.23

Incised or degraded channel, entrenched meander 11.19

Human impact of dam construction.

Glaciers and Landscapes. Chapter 13 pp 409--421 and 428-430

Isostasy regarding glaciers.

Open systems

Ice covers about 11% of planet.

% of fresh water is tied up as ICE

Two basic types of glaciers

Alpine: High elevation and/or high latitude regions.

Formation Alpine Glaciers& Tidal Glaciers Where? Why?

Parts of an alpine glacier listed:

Cirque basin 13.5a & c aka **accumulation** zone,

firn line 13.5 a What is firn

tributary glacier, 13.5a&d

Ablation zone 13.5b 13.5a

moraines

Flow of ice- internal and external, Plastic flow, basal slip, crevasses, glacial surges. p 416

See extent of Pleistocene Glaciation at 18K fig 13.25

Erosion- glacial plucking, abrasion, grinding, gouging, polishing, striations

Landforms created by Alpine Glaciers and Piedmont Glaciers =

fjord, see 13.12

U-shaped glacial valleys,

horns,

moraines

arêtes

cirques 13.9

compare with 13.10

Continental: 428-430 see all figures and maps

High to mid Latitude areas depending on climate cycle. See 428 13.24 glacial interglacial cycles over two million years.

Glacial cycles nearly every 100,000 years. Followed by interglacial cycles. Milankovitch Theory and sun-earth relationship.

Ice dome, albedo rate changes, **sea level changes**, Isostasy of the landmass

See maps and diagrams of continental glacier p. 429 lobes domes p. 429, paleolakes in Western US p. 430. Think about positive feedback loops. Think about aquifer recharge in ground water.

Landforms of continental glaciers: p 421 fig 13.15 Example: Minnesota “Land of 1,000 Lakes” – all kettle lakes; kames – big dumps of “Till” (coarse unsorted rocks) collected in crevasses; drumlins – stream-lined deposits of glacial “till”; till plain; **loess** (aka glacial dust or glacial flour) comes from grinding of rock inside glacier as it moves.

Paleo-lakes of the American West p 430. (Lake Missoula video on Friday)