

Study Exam 1 and 2- all aspects.

Know how to calculate slope and read basic topographic lines.

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

What major elements make up the earth's crust?

UPPER MOST MANTLE + CRUST = LITHOSPHERE

ATHENOSPHERE –What is it?

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 Vocabulary: craton, shield, sub-surface (buried) plutons (granite), Volcanic Eruptions (shield volcanoes, composite volcanoes, flood basalts); Sedimentation into large basins or ocean floors, Terranes; Exotic Terranes Deformation of the crust Orogeny

Rock cycle-

Read vertically under each of the 3 major rock types

<u>Igneous</u> ↓	<u>Sedimentary</u> ↓	<u>Metamorphic</u> ↓
Intrusive flow = magma	1) Clastic type	heat/ pressure
Extrusive flow = lava	2) Chemical	changing crystal structure
Give Examples	Give Examples	Give Example
Variance in Crystal size	Strata or layers	foliated texture
Cooling differences	Cementation	
Viscosity differences	Lithification	often near plate boundaries

Δ High viscosity = sticky, stiff lava or magma creating composite volcanoes

^ Low viscosity = more liquid-like and flows easily creating shield volcanoes and flood basalts; like that of the Columbia Plateau.

Hot spots. Know how they work.

Chapter 9 Tectonic earthquakes and volcanoes

Plate tectonics. How it works. Be able to name major the plates that have convergent and divergent boundaries. Be able to understand dynamics of Juan de Fuca Plate (a micro plate).

What are common features of convergent and divergent boundaries? Subduction zones, **Where?**

What? Why? Sea-floor spreading centers, **Where? What? Why?** Transform faulting **Where?**

What? Why?

Volcanism? **Where? What? Why?** P. 309 Rifting **Where? What? Why?**

Changes in Major continents over Geologic time; India, Africa, South America, North America (generalization – do not attach time scale to this but understand basic plate movements such as the rifting of Atlantic Ocean resulting from North America diverging from Eurasia.

Crustal Deformation- Different forces and pressures that make rock bend/break in different ways.

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

Orogeny – Mountain building processes and forces

Folded mountains- Forces involved? Where they are common? P. 299

Fault Block mountains- Forces involved? Where they are common? P. 295-299

Volcanic Mountains- Forces involved? Where they are common? P. 309

3 Types of forces and resulting landscapes, fault types, and features p. 290-296

Compression

Reverse faulting

Folded mountains

Where? What Why?

Tension

Normal Faulting

Fault block mountains

Where? What Why?

Shear

Strike Slip Faulting

not necessarily mountain building

Where? What Why?

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

Earth quakes Common locations of quake activity; p. 300- 307.

Quake Terminology: Seismic waves foci epicenter asperities p. 306

Liquefaction

land subsidence

Tsunami

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

Tree roots

Pressure Joint Release

Chemical Weathering Processes

Oxidation

Hydration & Hydrolysis

Carbonation

Carbonation- Rain dissolves CO₂ Carbon Dioxide creating 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)

MASS MOVEMENT; weathered materials displaced by erosion transport and deposition

See figure 10,3 p 335. Rock fall to Creep; note influence of water on mass movements

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

EROSION Channel abrasion, hydraulic action, dissolution

TRANSPORT suspended load (suspension), saltation, traction of bedload, and dissolved load

11.13

DEPOSITION (aggradation the building up of alluvial sediments); Braided rivers. River deltas, sand bars, point bar, alluvial fan

Terminology

Drainage basin Drainage divide – highest elevation between watersheds 11.3
Base-level (local, artificial and ultimate)
Stream profile 11.18 floodplains p. 362 Tributary & Distributaries 11.26 11.27
Braided Stream 11.4 Alluvium (Glossary G-1) Alluvial Fan 11.25
Aggraded stream (i.e. aggradation (Glossary G-1))
Terraces: paired landforms that change with climate cycles& human impact 11.24 a&b

Meanders, point bar, undercut bank (aka cut-bank) 11.15 11.23
Incised or degraded channel, entrenched meander 11.19 a degraded stream is the erosion of the channel (deepening) also known as an incised or entrenched stream

Glaciers and Landscapes. Chapter 13 pp 410--420 and 428-430.

ALL LECTURE NOTES

Isostasy regarding glaciers.

Open systems

Two basic types of glaciers

Alpine: High elevation and/or high latitude regions that flow into rivers or into tidal areas.

Parts of an alpine glacier terminology

accumulation zone, **firn** **tributary glacier**, 13.5a. d.

Ablation zone 13.5b 13.5 moraines crevasses

Flow of ice- internal and external, Plastic flow, basal slip, 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

U-shaped glacial valleys, fjord, see 13.12

horns, arêtes, cirques see 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; paleo-lakes in Western US p. 430. Think about positive feedback loops. Think about aquifer recharge in ground water.

Landforms results of continental glaciers: p 421 fig 13.15

“Kettle Lakes”; Example: Minnesota “Land of 1,000 Lakes” – all “Kettle Lakes”;

“Till” big dumps of course unsorted rocks.

“Drumlins” – stream-lined deposits of glacial “till”;

“Loess” (aka glacial dust or glacial flour) comes from grinding of rock inside glacier as it moves then released with melt. Silt sized material laid by the wind erosion from the end moraine of a continental glacier. Much of Midwest soils are created in these rich deposits. Also the Palouse Hills of Eastern Washington are also Loess.

Video notes from Missoula Floods)

