

Natural Environment GEOGRAPHY 141

Chapter 1

ALL Spatial questions: **WHERE** is location? **WHAT** are characteristics? **WHY/how** it functions?

SYSTEMS - difference of open and closed systems; able to explain the basic parts of a system

System feedback loops = positive and negative

Explain steady-state equilibrium; dynamic equilibrium threshold

Models are idealized and simplified representation of the real world (maps, globes, diagrams)

Understand location and geographic grid. Latitude/Longitude; degrees, minutes and seconds.

Parallels/meridians; Know where Regions of : tropics , sub-tropics, mid latitudes, sub-arctic etc.

Prime Meridian, International Date Line, Tropic of Cancer, Tropic of Capricorn; SCALE (Reference Factor RF), What is GIS, GPS, Remote Sensing

Chapter 2

SOLAR SYSTEM AND EARTH'S ENERGY What ? Where? Why?

Thermo-nuclear energy created by Hydrogen FUSION emits energy and mass from sun

Solar Wind, Radiation, Insolation

Earth's magnetic field (nova Magnetic Storm notes) (what kinds of data used?)

Aurora Borealis, Aurora Australis (where & why?)

Understand Wave-length and frequency measurements

Short wave lengths respectively (Gamma, X-rays, ultra violet, visible spectrum, near infrared, shortwave infrared), Long wave (middle infrared Thermal Infrared, Microwave, radio-tv) **See figure** and know the sequence but not the micron or numbers.

Sub-solar point: What is it? Where is it at different times of the year(Solstices & Equinoxes)

SEASONALITY Why do we have seasons?

ATMOSPHERE make-up (major gases)

COMPOSITION- **Fig. 2.18** homosphere heterosphere -where are they? What do they represent ?

TEMPERATURE layers in order (not altitude)

Normal lapse rates or inverted lapse rates for each Temp layer

FUNCTIONAL layers IONOSPHERE Where? What? and Why?

Ozone = O₃ and ozonosphere. What does it do and how does it react to human created pollutants?

CFC's Chloro-fluoro-carbons and role in atmosphere; Residence time? Affect on UV? Affect on Ozone?

Natural and anthropogenic pollutants. Be able to name a few

Chapter 3 Temperature and Global Energy

Flow of Energy and Pathways What are they and explain? Where & why they occur?

Earth system balance = Transmission IN and OUT

Earth - Atmosphere energy budget in very general figure.

Transmission and pathways of wavelengths via= Scattering Refraction Reflection, Albedo rates (do not memorize albedo rates but understand main points).

Absorption of solar insolation; Absorption is a conversion process.

Conduction; Convection; Advection processes; think about operation with liquid, gas, and solids

Types of Heat *Sensible- Latent- Specific; how calculated or measured*

What is latent heat? Review pages in Ch 5 and change of phase of H₂O

Major Controls on Temperature? And how they work. Latitude, Elevation, Cloud cover and Land/Water heating differences.

Green house forcing and Cloud cover; Jet contrails effect from 9/11

Diurnal temperature pattern; Landmass vs. Water affects climate locations on earth.

Water transparency and transmission (convection and conduction processes of absorption)

Specific heat and land and water differences; Continental Effect vs Marine Effects on temperature.

See graphs and be able to read graphs and discuss effects and differences.

Know basics of Topo maps and how to calculate slope

Chapter 4

Circulation Patterns transfer and distribute energy and heat

WINDS and OCEAN CURRENTS are instrumental in troposphere.

AIR PRESSURE= WEIGHT OF ATMOSPHERE; VARIES PLACE TO PLACE measured in Isobars

Differences in pressure cause wind

Pressure gradient (steepness) determines wind speed

LOW PRESSURE: Rising, cooling, likely precip. density increases, converging at surface,

HIGH PRESSURE: descending, divergent at surface, warms, expands, light wind, potential to evaporate

MIXING due to uneven pressure causing advection and convection

Largest scale of temperature/pressure gradient force is equator to pole (hottest to coldest).

Winter is most dynamic when pressure gradient is steepest.

CORIOLIS FORCE

DEFLECTS AIR OR FLUID FROM A STRAIGHT PATH; the momentum changes with latitude

Know location and why Easterlies (aka Trade Winds) Westerlies occur; Know directions of rotation of high and low pressure movement in opposing hemispheres and cyclone anti-cyclone directions

FRICTION – mountain and topography create friction.

Hadley Cell (convection cell) important to energy mixing. Understand parts, why they shift and how they work.

ITCZ where? What? and Why?

Subtropical high pressure where? what? and why?

JET STREAM Upper Troposphere=direction and characteristics that effect us.

Trough and Ridges of jet stream

What are the prevailing wind of the globe and **how they occur** (**Trade-winds** (aka Easterlies) and **Westerlies** of each hemisphere. Be able to show on a map.

Santa Anna Winds

Local winds: Why **Onshore and offshore breezes** occur; valley wind; monsoon and ITCZ

SURFACE WINDS push **Ocean surface currents**

Know where and the direction of ocean current (gyres) on a world map. Find/ place them in the major ocean basins Atlantic and Pacific Oceans (north Atlantic Basin, South Atlantic Basin, North Pacific Basin and South Pacific Basin

North Equatorial Currents South Equatorial Currents Gulf Stream North Pacific Current; Kuroshi or (Japan Current) Peru Current, California Current, Brazilian Current Benguela Current (off Western Africa)

DEEP CURENTS Thermohaline currents; upwelling, Downwelling cyclic time?

Review all current geo problems (first page of each chapter) Fracking, Stratosphere jumps, Santa Anna Winds .