

Natural Environment GEOGRAPHY 141

Chapter 1

ALL Spatial questions: **EXPLAIN WHERE IS IT? WHAT (are its attributes or conditions)? WHY/how/why does it work?**

KNOW SYSTEMS THEORY and its basic components; explain feedback loops = positive and negative; Steady-state equilibrium; Dynamic equilibrium; Threshold

KNOW that **Models** are idealized and simplified representation of the real world (maps, globes, diagrams) Know the concept of SCALE (Reference Factor RF) We did this in class on USGS map

KNOW Latitude/Longitude; parallels/meridians; degrees, minute and second designations; the concept of time zones and why.; why distances change on the grid on a globe or map as one gets away from the equator; important locations of the geographic grid that you will be asked to find on the map. For a list see Map Quiz 1 materials. Know Latitudinal geographic zones fig 1.13

Understand the role of projection of maps; why 2 dimensional maps are flawed in some way.

KNOW concept Scientific Method; What is GIS; Remote Sensing

Know continents and oceans.

Chapter 2

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

Thermo-nuclear energy from hydrogen fusion of the sun our "star" among many in the Milky Way

Elliptical path; Perihelion Aphelion

Solar Wind, Solar insolation

Earth's magnetic field (Nova "Magnetic Storm" notes)

Aurora Borealis, Aurora Australis (what? Where? why?)

Electro-magnetic spectrum; Short Wave and Long-wave **fig 2.5** wave lengths by name in sequence but not numbers. For example Gamma are shorter than x-rays, etc.

Wavelength and frequency concepts

Understand Earth's simplified energy budget fig.2.7

Sub-solar point what is it? Does it move? Where? When? Why?

Solstices & Equinoxes Where? When? Why? Know seasonal positions of Sub-solar point. Circle of illumination of arctic and Antarctic circles visit Reasons for SEASONS Table 2.1

KNOW ATMOSPHERE

COMPOSITION of major gases (Nitrogen, Oxygen, Argon and Carbon Dioxide)

What are homosphere and heterosphere differences

Atmospheric density where and why?

TEMPERATURE layers in order (not altitude in numbers)

Lapse Rates where

FUNCTIONAL layers Magnetic shield, IONOSPHERE 2.23 OZONOSPHERE Where are they? What is the character of those spheres? Why are they important?

Explain Loss of Ozone; Ozone O_3 and CFC's Chlorofluorocarbon interaction in the atmosphere; Affect of UV on CFCs Be able to tell the story (try it on a friend)

Synthetic Chlorine VS Natural Chlorine (differences)

Natural Pollutants vs Anthropogenic Pollutants; What are SOME examples of the anthropogenic pollutants, Temperature Inversions? Where? (type of environment as in basins and valleys) why?

Chapter 3

Understand the simplified atmospheric energy budget.

Flow of Energy and Pathways

Earth system balance = Transmission IN and OUT Earth - Atmosphere energy budget –general (not numbers) **except for** Average earth albedo rate.

Transmission types= Scattering/diffused radiation Refraction Reflection (Albedo rates fig. 3.5)

Absorption is a conversion process

Heat Transfer by Conduction; Convection; So how does each work? Be able to tell me

KNOW Types of Heat Energy *Sensible- Specific – Latent heat- energy*

See Chapter 5 page 141-143 for more about latent heat. Fig. 5.3

Absorption Review Ch 2 **pg 42 fig 2.6**

natural vs anthropogenic pollutants

Cloud greenhouse forcing and cloud albedo forcing; Greenhouse Effect So how does it work?

Jet contrails study around 9/11 and effect on atmosphere

Diurnal temperature patterns; lag time

KNOW Principal Temperature controls on the Planet- Latitude, Altitude, Cloud cover and land/water differences.

Continental vs marine effects on temperature fig 3.18 fig 3.27

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

Specific heat –atmosphere, land and water differences

Continental Effect vs Marine Effects on temperature

Evaporation & Condensation roles of earth cooling?

Urban heat Islands

Chapter 4

Circulation Patterns transfer and distribute heat energy.

WINDS and OCEAN CURRENTS are instrumental to troposphere circulation.

KNOW AIR PRESSURE= WEIGHT OF ATMOSPHERE; VARIES PLACE TO PLACE

Air pressure measured in Millibars; High Pressure pushes air down with more weight of the atmosphere ; low pressure allows air to rise

Differences in air pressure cause wind

PRESSURE GRADIENT determines wind speed fig. 4.6

LOW PRESSURE: Rising, cooling (N lapse rate) converging at surface, likely precipitate. Less dense

HIGH PRESSURE: descending, warms, expands, divergent at surface, giving potential evaporation, light wind, precipitation is unlikely.

Largest scale of pressure gradient force is equator to pole.

Winter is most dynamic when pressure gradient is steepest. Warm air aloft pulls cold air along surface.

CORIOLIS FORCE DEFLECTS AIR OR FLUID FROM A STRAIGHT PATH fig 4.7

Know location, direction of the prevailing winds Trade Winds (aka Easterlies) & Westerlies.

KNOW Spin directions of high and low pressure in hemispheres and cyclone anti-cyclone directions

FRICTION – mountain and topography create friction. Fig. 4.7

Hadley Cell important to energy mixing. Understand parts, why shifts and how they work. P. 117.

ITCZ belt -where what and why?

Subtropical high Pressure belts-- where what and why?

Upper atmosphere=**JET STREAM** direction and characteristics that effect us.

Trough and Ridges of **jet stream** (see Rosby waves figure 4.14to visualize).

KNOW Local winds: Why Onshore and offshore breeze, Why valley wind; Why monsoon and how it shifts with the ITCZ

SURFACE WINDS push Ocean surface currents **4.19**

Know where and the direction of surface 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 **fig. 4.21**

You will be expected to know SOME currents on a map. *North Equatorial Current; 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, Down welling cyclic time?

