

Study Guide Natural Environment GEOGRAPHY 141

Exam includes approximately 30 Multiple Choice, 15-18 written points (short answer essay, definition and/or list things) and 16-20 map points. Review all old quizzes, video notes, class notes, Map Quiz 1 locations and text materials.

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 AND be able to answer questions about steady-state equilibrium; dynamic equilibrium

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. Watch video posted on moodle from Penn State Spatial revolution.

Chapter 2

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

Thermo-nuclear energy is created by Hydrogen FUSION which emits energy and mass from sun (EXOGENIC ENERGY)

What is: Solar Wind, Radiation, Insolation

Earth's magnetic field (nova Magnetic Storm notes) (what kinds of data and research methods used?) If you missed it its on YouTube

Aurora Borealis, Aurora Australis (where & why? causes?)

Understand Wave-length and frequency measurements

Know Short wave lengths (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 What causes seasons?

Aphelion Perihelion of earth's orbit

ATMOSPHERE make-up (major gases) NITROGEN, OXYGEN, ARGON,

COMPOSITION- **Fig. 2.18** homosphere heterosphere - where are they? HOW ARE THEY DISTINGUISHED?

TEMPERATURE layers in order (not altitude) HOW ARE THEY DISTINGUISHED?

Lapse rate WHAT IS IT?

FUNCTIONAL layers IONOSPHERE Where? What? and Why?

Ozone = O₃ and ozonosphere. What does it do? How does it react to CFC pollutants?

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

What are some natural and anthropogenic pollutants? Be able to name major ones and their origins.

Chapter 3 Temperature and Global Energy

Flow of Energy and Pathways What are they?

Earth system balance = Transmission IN and OUT

Earth - Atmosphere energy budget in very general figure.

Transmission and different pathways of wavelengths via= direct, diffuse, scattering, refraction reflection. Be able to explain how they work and the resulting energy.

Albedo -What is it? Know causes of high rates vs low rates?

Is solar energy always used to create heat? If not explain?

(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 are they calculated or measured differently and why they are important to know about the differences*

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

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.

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 -watch videos on coriolis

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 and surfaces create friction. Aloft is very little 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 STREAMs Upper Troposphere=direction and characteristics that effect us. Polar Jet vs Sub-tropical jet

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 shift of ITCZ with seasons

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

Know these surface currents and where they occur on a map. North Equatorial Current; South Equatorial Current; Gulf Stream; North Pacific Current; Kuroshi or (Japan Current); Peru Current; California Current; Brazilian Current; Benguela Current (off S W Africa)

DEEP CURENTS Thermohaline currents; Upwelling? Downwelling? Cyclic time?