

ENV-SCI 110R

Understanding the Earth: Introduction to Environmental Science and Laboratory

Midterm #2 (11/01/2022) review sheet

Our midterm exam #2 covers all material from in-class lecture notes, assignments, quizzes, and Chapters 4,5, and 6 from the Geosystems textbook (10th edition). This review sheet is meant to provide a minimum guideline of concepts, terms, and applications to be covered in the Midterm. The exam will be multiple answer questions, short answer, and/or application problems, i.e. calculations or graphical problems. Don't forget the questions at the end of each Chapter in our textbook: ***Key Learning Concepts Review***.

The review sheet is organized with the following structure:

Major Concepts: understand the big picture theories and concepts

Terms: specific themes, ideas, definitions, and vocabularies

Applications: be able to apply the above concepts and simple equations to solve problems, draw spatial relationships, graphs, etc.

Atmospheric Energy Balance and Global Temperature (Chapter 4)

Major Concepts: energy and heat, heat transfer, energy pathways and principles, greenhouse effect and atmospheric warming, global energy balance, energy distribution and patterns, global temperature controls, measuring temperature, temperature unit conversions (Celsius, Fahrenheit, Kelvin), global temperature patterns, temperature trends and human responses, urban heat island, air temperature and human body.

Terms: radiation, convection, conduction, advection, sensible heat, latent heat, reflection and albedo, scattering, Rayleigh scattering principle, refraction, absorption, energy surplus & deficit, continentality, specific heat capacity of land and water, thermal equator, temperature range, annual temperature patterns, wind chill, heat index.

Applications: polar amplification (albedo & feedback), blue sky, red sunset/sunrise, rainbow.

Atmospheric & Oceanic Circulation (Chapter 5)

Major Concepts: general pictures of atmospheric and oceanic circulations, driving forces of winds within the atmosphere, geostrophic wind, characteristics of global atmospheric circulation (three-cell), wind-driven surface oceanic circulation, deep-ocean thermohaline circulation

Terms: gravity, pressure gradient force, Coriolis force, friction force, Global Pressure belts, Hadley Cell, Ferrel Cell, Polar Cell, ITCZ, desert and distribution, Tropical Low, Subtropical High, Subpolar Low, Polar High, Northeasterly (northern hemisphere) & Southeasterly (southern hemisphere), Trade winds, Mid-latitude Westerlies, Polar Easterlies, Rossby waves, Polar & Subtropical Jet Streams, monsoons, land-sea breeze, mountain-valley breeze, semi-permanent pressure cells, wind-driven vs. density (temperature & salinity)-driven oceanic circulation, gyre, cold California Current, warm Gulf Stream.

Applications: Atmospheric three-cell Circulation map, Oceanic circulations (around N. America continent)

Water and Atmospheric Moisture (Chapter 6)

Major Concepts: global hydrological cycle, water properties, three-phase changes (six processes) and related heat exchange (absorption & release), humidity measurements, relationship between temperature and humidity, cloud formation processes, cloud seeding

Terms: water vapor pressure, relative humidity (RH), RH vs. temperature, maximum specific humidity, saturation, dew-point temperature, cloud condensation nuclei (CCN), condensation and cloud/fog formation, precipitation processes in warm and cold clouds

Applications: calculation of RH, reading and understanding the temperature vs. maximum specific humidity diagram.



: Be well. Do good work. Wish you all the best!

