Intro. to Environmental Earth Science

Study Outline – for Exam 1 – Approx. 80 points, 1st September 29, 2021

Part 1 approx. 50 points
Format = Closed 'book': Multiple choice, matching, short answer
Part 2 approx. 30 points
Format = Open 'book', Teamwork encouraged: Multiple choice, matching, short answer

Things that could show up on the test appear below, but to fully prepare - review all class notes, handouts, podcasts, discussions etc.

1. Be able to discuss your environmental alter ego AND match common characteristics of your classmate's alter egos to the real people. E.g. Edward Abbey = writer of the desert southwest USA e.g. Desert Solitaire, social anarchist but also a champion of nature. Continue to research and learn from your alter egos.

2. Similarities and differences between environmental science and studies… Be able back up your discussion with information from the www.understandingscience.org website that I provided. *E.g. Hypotheses vs Theories*, *Linear vs Non-linear scientific methods*

3. Be familiar with the Geology's and Climate's Big Ideas, found in your syllabus.

4. The Earth's Systems, Energy Sources and Change
    A. Geosphere, Hydrosphere, Biosphere and Atmosphere
    Focus in this class will be on the Geo and Hydrosphere. The Geosphere centers on lithology or rock types (Igneous, Metamorphic and Sedimentary). Plate tectonics is important because it sets the stage for environments, ecology and the distribution of land and water on Earth.
    B. Energy that drives processes on Earth (External/Exogenic, Internal/endogenic, and Human/anthropogenic)
    C. Processes that create changes on Earth.
    D. Time and equilibrium, plus fundamental concepts that characterize change on Earth.
    E. Equilibrium types
    F. Box model components and usefulness
    G. General circulation Model (GCMs)

5. Think through and discuss concepts related to changes in energy.
    A. Change vs time
    B. Equilibrium (types)
    C. Residence Time
    D. Carrying capacity
    E. Box models / models in general
    F. Feedbacks (positive and negative)

6. Energy and life on Earth

A. Be able to discuss how we know about the Earth's environmental History.
B. Principle of Unity
C. Gaia Hypothesis
D. Open vs. closed systems with examples for each
E. Feedbacks within systems along with key concepts of modeling (carrying capacity, residence time, etc.)
F. Exponential growth, biodiversity and Keystone species

7. Climate

A. Know the different components/systems within climate change
B. Be able to discuss how solar energy leads to a series of processes in the Earth's systems Sea surface temps, differing pressures, Hadley cell, tropics vs desert belts, wind, ocean surface currents to deep ocean currents, ecosystem prevalence….
C. Potential impacts on U.S.A. and Global infrastructure systems
D. Know the differences between the three Miliankovitch Cycles and why they are important.
E. How does the Tragedy of the Commons relate to Climate Change, how can it be used to help move us forward?

7. Mineral and rock as resources

A. Know the basic mineral and rock types, and their potential uses.
B. The basic types of mining
C. Regulation and oversight of mining activities
D. Iowa's primary rock and mineral resources
E. Benefits and hazards of using the Earth's mineral and rock resources
F. Role of energy throughout the development, production, use and disposal of mineral and rock resources.

Be able apply developing knowledge of the following 'current' events toward all content within Test 1. The readings and podcasts we have covered….

1. Minnesota and Ocean mining content

2. Tragedy of Commons

3. What Happens If Atlantic Ocean Currents Cease To Churn?

4. NPR Marketplace 'Black Rock' podcast