Study Guide for the Earth Science Final Exam

Introduction to Earth Science

1. Describe the 4 main branches of Earth Science.
2. Define Earth Science.
3. List the steps of the scientific method.
4. Define constant and variable.
5. What are the metric units for mass, length, volume, and temperature?
6. Be able to make simple conversions in metric. (ex. how many mm in 1 km?)

Mapping

1. Describe a map legend.
2. Describe contour lines, include the terms relief and contour interval.
3. Differentiate between latitude and longitude. Include reference from the prime meridian and equator.
4. Explain what it means when contour lines are close together or far apart.

Plate Tectonics

1. List the four layers of the earth in order from the outside to the inside.
2. Who proposed continental drift and explain what is meant by Pangaea and Panthalassa?
3. Give three pieces of evidence that support continental drift.
4. Describe the theory of plate tectonics – include the terms lithosphere and asthenosphere.
5. What discovery did scientists make when comparing the age of the seafloor to that of the continents?
6. Explain and give an example of the 3 lithospheric plate boundaries.
7. Approximately how far do crustal plates drift each year?

Crustal Deformation

1. Explain the principal of isostatic adjustment.
2. What is the difference between a dome mountain and a volcanic mountain?
3. The largest mountain system is called a mountain _____.
4. Compare hanging wall and foot wall in comparison the to the fault plane.
5. List the three types of faults and explain the stress that causes each. Remember there are three types of convergent boundaries.
6. What is the difference between an anticline and a syncline?

Earthquakes

1. Define earthquake.
2. Define seismic waves and describe each type.
3. Explain the elastic rebound theory.
4. Explain the difference between a focus and an epicenter.
5. What causes tsunamis?
6. Explain the difference between the P-wave and the S-wave.
7. Explain the number of seismic stations needed to determine the location of the epicenter and why.

Volcanoes

1. Where is the major zone of active volcanoes and what is it called?
2. Define subduction and describe what happens when oceanic and continental crusts collide.
3. Describe a hot spot and give one example.
4. What are the 3 types of volcanic cones and how is each formed? Include the type of eruptions.
5. What is the difference between lava and magma?
6. Compare the difference between a crater and a caldera.
7. Define tephra and compare the size of volcanic ash, lapilli and volcanic bombs.
8. What evidence is there for volcanism on other planets?

Chemistry & Minerals

1. List the difference between a physical property and a chemical property. Give examples of each.
2. Define and know the difference between an atom and an element.
3. List the 3 types of subatomic particles – describe their charge and location.
4. Know how to calculate the number of atoms in a given formula (ex. How many potassium atoms in K_2SO_4?)
5. List the three states of matter and explain the differences in their volume and shape.
6. Define mass number and atomic number and know how to calculate the number of protons, electrons, and neutrons from them.
7. Look at the periodic table and be able to locate the mass number and atomic number for an element. (ex. What is the atomic and mass number for oxygen?)
8. Define the characteristics of a mineral.
9. Explain why coal is or is not a mineral.
10. Describe the streak test and the hardness test and explain how they are used for mineral identification.
11. List the six basic crystal systems and know where halite belongs.

Rocks

1. Explain (in word or diagram) the rock cycle.
2. Describe the process that forms sedimentary rocks.
3. List and explain the three classes of sedimentary rocks and include examples of each.
4. List and compare the two groups of igneous rocks.
5. Define and describe the difference between a sill and a dike.
6. Explain the two different classifications of metamorphic rocks according to their structure.

Resources and Energy

1. What is the difference between a renewable and a nonrenewable resource? Give an example of each.
2. What is a fossil fuel? Name 3 fossil fuels.
3. How is the fossil fuel coal formed?
4. Describe how we harness geothermal, solar, and nuclear energy.

Weathering, Soil, and Erosion

1. Describe the difference between mechanical and chemical weathering. Give an example of each.
2. In which climate does chemical weathering occur fastest?
3. What 4 factors determine the rate at which things weather?
4. Draw a diagram of a soil profile and label the four major horizons/layers. Which layer is unweathered? Which contains all the organic materials?
5. Define erosion and list at least 4 agents of erosion.

Freshwater

1. Draw and label a picture of the water cycle. Which parts are "expenses" to the budget? Which are "income"?
2. What is the area where a river starts called? Where it ends? In which direction do rivers always flow?
3. Explain the difference between a meander and an oxbow lake.
4. What is a stream load? Name the 3 main parts of a stream load. If very fast water begins to slow down, in what order are these 3 parts deposited?

Groundwater

1. What is groundwater?
2. Define porosity and permeability. What happens if a rock is impermeable?
3. What is sorting and what does sorting affect?
4. Draw a diagram of groundwater. Label the zone of aeration, zone of saturation, and the water table.
5. What is the difference between a stalagmite and a stalactite?

6. What kinds of features are common in an area with karst topography?

Wind & Wave Erosion

1. Describe how dunes form and migrate.
2. What is the difference between a shoreline and a beach? What determines what a beach is made of?
3. What is the major cause of shoreline erosion? What can be done to help slow it down?
4. How are barrier islands and lagoons related to each other?

Ocean Basins

1. How much of the earth is covered in ocean water?
2. Diagram and label the major ocean basins of the world. Which is the largest?
3. What is a submersible?
4. What is the study of the ocean called?
5. What happens at the mid-ocean ridge?
6. Where is an abyssal plain found?
7. What is a nodule and why are mining companies interested in them now?

Ocean Water

1. What is the chemical make-up of the ocean water? (what's in it?) How did the ocean get salty?
2. Define salinity. Where in the world are the oceans saltiest? WHY?
3. What 2 factors affect the density of the water?
4. Why is ocean water generally blue?
5. What is a thermocline and why does is exist in all oceans?
6. Define salination.
7. What happens during the process of upwelling? Why is that important?
8. What part of the ocean is in greatest danger of being polluted? WHY?

Movements of the Ocean

1. What is a current?
2. What causes the ocean and wind currents to curve?
3. What is the major current off the east coast of North America?
4. Draw and label the parts of a wave.
5. What gives water the energy to form waves?
6. What 3 factors determine the size of the wave?
7. What causes tides?

The Atmosphere

1. What is the study of the atmosphere, including weather, called?
2. What is climate?
3. What are the top 3 elements in the atmosphere?
4. What is the ozone layer and why is it important?
5. What is atmospheric pressure and what do we use to measure it?
6. Draw and label the 5 layers of the atmosphere. In which layer does our weather occur? In which layer is the ozone layer found? Which layer is the coldest?
7. What is the greenhouse effect and what is the #1 greenhouse gas?

Water in the Atmosphere

1. How does most water make it into the atmosphere?
2. Contrast relative humidity and specific humidity.
3. Relate air temperature to its ability to hold water.
4. What is dew point? What happens if the dew point falls below freezing?
5. Draw and describe the characteristics of the 3 main cloud types.

6. Contrast the formation of rain, sleet, and hail. Which is the most destructive?

Weather

1. What is an air mass?
2. Draw and label the symbols for the 4 main types of fronts.
3. Describe the properties of a hurricane. What is the calm center called?

Geologic Time

1. What are the 3 main divisions of geologic time?
2. List the four eras included in the geologic time scale in order.
3. Which era is the only one to have epochs? WHY?
4. What is the current geologic era?
5. Explain the theory proposed by Charles Darwin.
6. Define geologic time and how it related to the geologic column.
7. During which period did dinosaurs first appear?
8. During which era were few fossils found? (few fossils exist from this era)
9. What is half-life?
10. What is the difference between relative dating and absolute dating?
11. Explain the Law of Superposition and how it is used to date fossils.

Astronomy

1. What is the shape of the earth and why is it this shape?
2. Describe the theory used to explain how the universe began.
3. What is the process that generates energy in a star and which elements are involved?
4. The hottest stars are _____ and the coolest stars are _____. (think colors)
5. Describe the following: nebula, red giant, white dwarf, nova, black hole
6. List the sun's three outer layers. Which one do we see?
7. Describe the following: sunspot, solar flare, aurora
8. Draw and label a picture of a solar eclipse and a lunar eclipse.
9. Draw and label the 8 phases of the moon.
10. List the planets in order, starting from the sun. Give one fact about each.