

ESC 1000: Introduction to Earth Science

Study Guide for Lectures 1-6

Note: this study guide lists topics covered in lectures 1-6 (Aug 23-Sep 3). It is not intended to replace going to lecture or doing the readings, rather, it serves largely to alert you to the important topics covered in these lectures that will likely be covered on the exams. The topics listed are non-exclusive, that is, there will be other material in the lectures that you are likely responsible for learning. Make special note of the vocabulary lists...there is a lot of terminology in this class that you will need to learn. Your textbook has a glossary that should be helpful.

Lecture 1 (Course Introduction; Aug 23):

Make sure you know class policies, location of the course website, etc.

Lecture 2 (The Earth; Aug 25):

Where is the earth?

How old is the earth and how do we know?

What is the diameter/radius/circumference of the earth in km, and how do we know?

What is the mass of the earth, and how do we know?

What is the main difference between the continents and oceans?

How do we know that the interior of the earth is layered and what the layers are?

How thick are each of Earth's layers (Fig. 6.25 in text; see figure below)?

What are the main features of Earth's layers, and how do the physical and chemical layers correlate to each other (Fig 6.25 in text; see figure below)?

What are the two main sources of energy of the earth system, and which processes do they power?

Vocabulary: Milky Way, solar system, gravitational constant, crust, mantle, core, inner core, outer core, mesosphere, asthenosphere, lithosphere, heat, biosphere, atmosphere

Lecture 3 (Physics of Earth; Aug 27):

What is the difference between mass, weight, and density?

How is density related to the layered structure of the earth?

What is the range of temperatures encountered on/within the earth?

What is the hottest natural occurrence at the surface of the earth?

What is pressure?

How do temperature and pressure vary within the earth?

How does density vary with temperature and pressure?

What are the three kinds of energy?

How does energy behave?

What is heat and how is it transported?

Lecture 4 (basic plate tectonics; Aug 30)

What are the basic tenets of plate tectonic theory?

How fast do plates move?

What are the relative density relations between the mantle, oceanic crust, and continental crust?

What are the three main types of plate boundaries, is crust consumed, made, or conserved at them, and what are the different types of each boundary?

What drives plate tectonics?

Vocabulary: plates, volcanoes, earthquakes, divergent, convergent, transform, oceanic spreading centers, continental rifts, ocean-continent convergence, continent-continent convergence, ocean-ocean convergence, subduction, transform faults, ridge push, slab pull

Lecture 5 (chemistry of Earth; Sep 1)

What parts of the atom determine the elemental and isotopic identity of the atom?

What are the basic building blocks of atoms and where in the atom are they found?

What are the eight most abundant elements (by weight) in earth's crust know these in order; see Table 1.2 in text)?

What are the four most abundant elements in the whole earth, in order?

What are the main types of chemical bonds?

Vocabulary: electron, neutron, proton, atom, element, isotope, bond, ion, cation, anion, compound, solid, liquid, gas, mineral, rock, ionic bonds, covalent bonds, metallic bonds, atomic weight, atomic mass, atomic number, mass number, atomic symbol, nucleus

Lecture 6 (minerals; Sep 3):

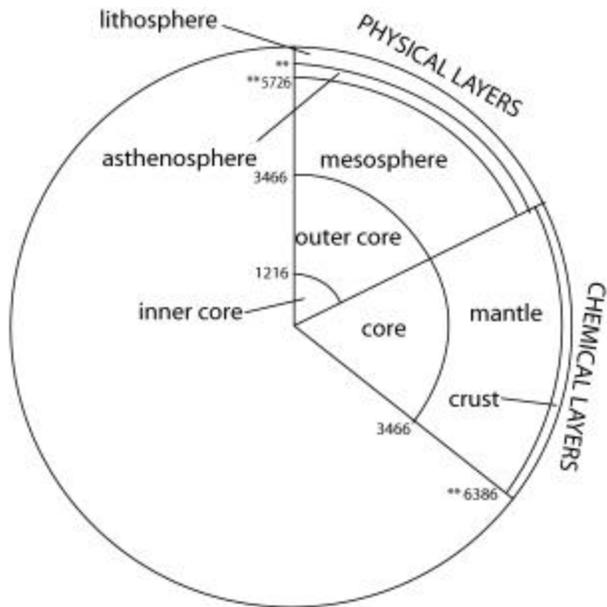
Know the definition of a mineral and how to apply it to figuring out if something is a mineral.

What is the basic building block of silicate minerals?

What are polymorphs?

Know the common minerals discussed in class: calcite, olivine, pyroxenes (augite), amphiboles (hornblende), micas (muscovite and biotite), quartz, feldspars (orthoclase and plagioclase)

Vocabulary: tetrahedron, polymorph, crystal form, silicates



note: distances are in km from center of Earth

**Base of asthenosphere varies-350 to 500 km below surface

Lithosphere thickness: from ~ 5km under mid-ocean ridges to ~ 250 km under mountains on continents

Crust thickness: from ~ 5km under mid-ocean ridges to ~ 75 km under mountains on continents

