

**EVPP 110 Lecture - Fall 2003**  
**Instructor: Dr. Largen**  
**Exam #2 Study Summary**

This study summary is provided by your instructor as a courtesy. Your use of this summary is optional. If you do not like the format or you do not find it helpful, then you do not have to use it. You will **NOT** receive extra credit for using this summary.

This study summary is meant to guide your study of the material for the exam. It is not intended to identify for you the exact 50 questions that will be on the exam! So, obviously, there will be more covered in this summary than can be included on a 50 question exam. It does help identify what will not be on the exam: the absence here of a topic or point covered in lecture means that it won't be on the exam. The presence here of a topic or point covered in lecture does not guarantee that there will be a question about it on the exam. There are many more "study questions" here than there will be questions on the exam. Frequently, a single multiple choice question on the exam will require an understanding of many "study questions" from this list.

An "answer sheet" to go with these questions is not provided. **The answers to these questions have been presented in the class lectures, class activities and the lecture notes posted on the website.** You should work through these questions and attempt to answer them as you go. If you encounter a question that you cannot answer, you should search for the answer in your notes. You will notice that, often, several of these questions are asking basically the same thing but from a slightly different angle. This is done to ensure that your understanding of the material goes beyond the simple level of being able to restate a definition. Simply memorizing definitions will not be sufficient to do well on the exam. The exam will include questions that ask you to apply concepts.

**Life: characteristics, origin**

- what are the basic characteristics of life?
- What are the characteristics shared by all forms of life?
- What are three possible explanations for the origin of life on earth and which are considered to fall within the realm of science?
- What were some characteristics of the early Earth's atmosphere?
- What is thought to be responsible for the change in the oxygen concentration of the atmosphere from near zero to the ~21% of today?
- Characterize the temperature of the early Earth?
- Why was the temperature of the early Earth high, what happened that resulted in the temperature dropping, what was the connection with that drop and the appearance of life?
- Summarize the Miler-Urey experiment to test the spontaneous origin hypothesis and its results

**Life: early cells, classification of life**

- What were the characteristics of the earliest cells?
- Were the earliest cells prokaryotic or eukaryotic?
- Compare the characteristics of prokaryotic versus eukaryotic cells
- Is it thought that eukaryotic cells arose from prokaryotic cells?

- What 2 processes are thought to have been involved in the transition from prokaryotic cells to eukaryotic cells?
- What is membrane infolding
- What is endosymbiosis?
- What support exists for endosymbiosis?
- What is taxonomy
- What is a domain?
- What are the three domains into which life is arranged?
- What are the six kingdoms into which life is arranged?
- Which kingdom(s) is(are) placed into the domain Archaea?
- Which kingdom(s) is(are) placed into the domain Bacteria?
- Which kingdom(s) is(are) placed into the domain Eukarya?
- Which domain(s) and which kingdom(s) contain organisms with prokaryotic cells?
- Which domain(s) and which kingdom(s) contain organisms with eukaryotic cells?
- What is the binomial system of classification
- What does it mean to say that taxonomy is hierarchical?
- What are the rules for how the genus and species name of an organism should be written?
- What are the main levels of classification, from the broadest down to the most specific and in what order do they occur?

### **Life: a tour of the kingdoms of life**

- What are some general characteristics of the kingdom archaeobacteria (prokaryotic versus eukaryotic, types of environments, mode of nutrition)
- What are some general characteristics of the kingdom eubacteria (prokaryotic versus eukaryotic, main cell shapes, mode of nutrition, structural features that help with survival)
- What are some general characteristics of the kingdom protista (prokaryotic versus eukaryotic, assemblage, mode of nutrition, habitats)
- In general, why is it likely that the kingdom protista will be split into several kingdoms at some point in the future?
- What are some general characteristics of the kingdom fungi (prokaryotic versus eukaryotic, assemblage, mode of nutrition, habitats, ecological roles)
- What are some general characteristics of the kingdom plantae (prokaryotic versus eukaryotic, assemblage, mode of nutrition, habitats, ecological roles)
- What are some general characteristics of the kingdom animalia (prokaryotic versus eukaryotic, assemblage, mode of nutrition, habitats, ecological roles)

### **Life: levels of organization, cell structure & function, major processes for fueling life's activities**

- what are the levels of organization of life?
- what is meant by "the levels of organization of life are hierarchical"?
- tenets of cell theory
- features common to all cells
- characteristics of eukaryotic cells (in general)
- comparison of plant and animal cell
- membranous organelles, some examples

- types of cells that have chloroplasts (plants vs. animals)
- how many chloroplasts does a cell have
- structure of chloroplast
- energy process that takes place in chloroplasts
- where in chloroplast does photosynthesis take place
- do chloroplasts carry out cellular respiration
- do cells with chloroplasts also have mitochondria
- what types of cells have mitochondria (plants vs. animals)
- how many mitochondria does a cell have
- structure of mitochondria
- parts & components of mitochondria
- energy process that takes place in mitochondria
- where in mitochondria does cellular respiration take place
- do mitochondria carry out photosynthesis
- do cells with mitochondria also have chloroplasts
- what structure inside the mitochondria increase surface area available for reactions
- what are autotrophs, examples
- what are heterotrophs, examples
- do autotrophs carry out photosynthesis, cellular respiration or both
- do heterotrophs carry out photosynthesis, cellular respiration or both
- are respiratory respiration (breathing) the same thing as cellular respiration
- how is your breathing related to your cellular respiration
- know the summary equation for cellular respiration
- what starting food molecule is usually used to study cellular respiration
- what are the reactants for the cellular respiration reaction
- what are the products for the cellular respiration reaction
- can cellular respiration harvest all the energy from glucose in a form that is usable to the cell
- does the full process of cellular respiration require oxygen
- definition of cellular respiration
- definition of aerobic
- definition of anaerobic
- comparison of the efficiency of aerobic cellular respiration of glucose as compared to a yeast cell harvesting energy from glucose under anaerobic conditions
- where in a molecule is the energy stored that a cell harvests
- does cellular respiration dismantle glucose all at once or in a series of small steps
- understand how respiration works by shuttling electrons through a series of energy-releasing reactions
- in this process, do electrons start out in molecules that have more energy and end up in molecules that have less energy or visa versa
- the energy released by dismantling glucose ultimately ends up in what energy-storage molecule
- definition of oxidation-reduction reaction
- definition of redox reaction
- understand that the movement of electrons from one molecule to another is a redox reaction
- is oxidation the gain or loss of electrons from a substance

- is reduction the gain or loss of electrons from a substance
- why do oxidation and reduction always go together
- definition of electron carrier
- what is meant by an electron cascade
- what is the electron transport chain
- in the electron cascade, are electrons falling down an energy hill or moving up an energy hill
- what keeps electrons moving along the electron cascade or electron transport chain
- starting at the top of the electron cascade or electron transport chain and working towards the bottom, how would characterize the electron affinity of each electron carrier along the way
- at what point or points along the electron transport chain is energy released
- is cellular respiration a continuous process or does it stop in between each of the stages
- what are the three stages of cellular respiration
- which of the three stages of cellular respiration are endergonic and which are exergonic
- in which part of the cell does glycolysis take place
- in which part of the cell do the Krebs cycle and electron transport chain take place
- what parts of a plant are capable of carrying out photosynthesis?
- what part of the plant is the major site of photosynthesis?
- in which organelle does photosynthesis occur?
- in what tissue of a leaf are chloroplasts concentrated?
- how many chloroplasts does a plant cell have?
- how many membranes enclose the chloroplast?
- what is the name of the thick fluid that fills the space enclosed by the inner membrane of the chloroplast?
- what is the name of the disk-like membranous sacs that are suspended in the stroma of the chloroplast?
- what are grana?
- what are "autotrophs"?
- are autotrophs also considered to be "producers"?
- which kingdoms contain organisms that are autotrophic?
- what is the equation for photosynthesis (in words)?
- what are the reactants for photosynthesis?
- what are the products of photosynthesis?
- what form of energy is required in order for the process of photosynthesis to occur?
- compare the photosynthesis and cellular respiration equation (in words)
- what are the two stages of photosynthesis?
- photosynthesis converts light energy to what other form of energy?
- do the light reactions capture and convert light energy or do they produce sugars?
- does the Calvin cycle capture and convert light energy or does it produce sugars?
- in what part of the chloroplast do the light reactions occur?
- in what part of the chloroplast does the Calvin cycle occur?
- which of the reactant(s) of photosynthesis are required in the light reactions?
- which of the reactant(s) of photosynthesis are required in the Calvin cycle?
- which of the by-product(s) of photosynthesis are produced in the light reactions?
- which of the by-product(s) of photosynthesis are produced in the Calvin cycle?

- in what form is the energy captured during the light reactions stored?
- can the light reactions occur in the dark?
- can the Calvin cycle occur in the dark?
- is energy required for the Calvin cycle?
- where does the energy for the Calvin cycle come from?

### **Physical environment: Earth origin, age, structure**

- What is the most "popular" theory for the origin of the universe?
- Is the size of the universe thought to be fixed or continually expanding?
- What is the age range for the age of the universe?
- What event is thought to have resulted in the formation of our solar system and our planet?
- What are the two main general categories (excluding Pluto) into which the nine planets of our solar system can be grouped?
- What are some of the characteristics of the earth that make it unique in our solar system?
- What is the current estimate of the age of the earth?
- what were some early ideas about the physical features of the Earth?
- What is stated by the Principle of Superposition
- What is stated by the Principle of Original Horizontality
- What is stated by the Principle of Original Lateral Continuity?
- What is stated by the Principle of Uniformitarianism?
- What are the three basic types of rocks and what is the mode of origin of each?
- What is "relative time" and what is meant by "relative age" of geologic formations and how is relative age determined?
- What is stated by the principle of intrusive relationships?
- What is stated by the principle of cross-cutting relationships?
- What is stated by the principle of inclusions?
- What is stated by the principle of faunal succession
- What are unconformities?
- How may unconformities occur?
- What are the three main types of unconformities?
- What is geologic correlation
- What are index fossils?
- What is meant by "relative dating" of geologic formations and how is it done?
- What is meant by "absolute age" of geologic formations?
- What is meant by "radiometric dating" of geologic formations and what is the principle behind the process?
- What is a radioactive isotope?
- What is a parent isotope?
- What is a daughter isotope?
- What is the exponential law of decay?
- What is half life?
- What are the names of the general categories into which geologic time is divided?
- What are the 5 components of the Earth system (spheres)?
- What are the three layers of earth based on the "chemical-based" description?
  - Where are the three layers located relative to one another?

- How do the densities of the three layers compare to one another?
- How do the sizes (thickness) of the three layers compare to one another in terms of the percent of the earth's mass each represents?
- What are the two divisions into which the crust can be divided?
- What are the three divisions into which the mantle can be divided?
- What are the three divisions into which the core can be divided?
- What element composes the greatest percentage of the mass of the earth's crust?
- What are the five layers of the earth based on the "mechanical-based" description?
  - Where are the five layers located relative to one another?
  - Which of the five layers are solid, plastic, or molten?
  - How do the sizes of the five layers compare to one another in terms of the percent of the earth's mass each represents?
  - How do the five layers compare to one another in terms of temperature?
- How do temperature, pressure and density vary as one moves from the earth's surface toward the earth's interior?

### **Plate tectonics, earthquakes, volcanoes**

- What are the 6 lines of evidence that were used to help formulate the theory of plate tectonics?
- What is continental drift?
- Do the continents and continental shelves on either side of the Atlantic match up in a puzzle-like way?
- What are some geologic features cited in support of continental drift?
- What are some of the fossil features cited in support of continental drift?
- What are some examples of living species cited in support of continental drift?
- Are earthquakes and volcanoes distributed uniformly across surface of earth?
- Prior to ocean exploration in this century, how was the topography of the seafloor described?
- What is the Mid-Atlantic Ridge?
- How does the age of islands in the Atlantic Ocean vary relative to the distance from the Mid-Atlantic Ridge?
- Has the earth's magnetic poles always had the orientation they have today?
- What is a magnetic reversal?
- How can the history of the Earth's magnetic field orientation be recorded in rocks?
- What are magnetic stripes?
- What can magnetic stripes on the ocean floor tell us about the past?
- What is sea floor spreading?
- How does sea floor spreading help account for continental drift?
- What mechanism drives sea floor spreading?
- What is a convection cell?
- Are ocean basins geologically young features?
- What is a plate?
- Are all plates the same thickness?
- What are the three types of plate boundaries?
- What is the movement of plates relative to one another at a divergent plate boundary?
- What are the two types of divergent plate boundaries?

- What is a general and specific example of a feature produced at an oceanic divergent plate boundary?
- What is a general and specific example of a feature produced at a continental divergent plate boundary?
- What is the movement of plates relative to one another at a convergent plate boundary?
- What is subduction?
- What role does rock density play in subduction?
- What are the three types of convergent plate boundaries?
- What type of movement occurs at oceanic-oceanic convergent plate boundaries?
- What is an ocean trench?
- What is a volcanic island arc?
- What is an example of a volcanic island arc?
- What type of movement occurs at oceanic-continental convergent plate boundaries?
- What is a volcanic mountain chain?
- What is an example of a volcanic mountain chain?
- What type of movement occurs at a continental-continental convergent plate boundary?
- What is an interior mountain belt?
- What is a transform plate boundary?
- What type of movement occurs at a transform plate boundary?
- What is an example of a transform plate boundary?
- What is an earthquake?
- What causes an earthquake?
- What is a fault?
- What is the focus of an earthquake?
- How is depth of focus used to classify earthquakes?
- What is the epicenter of an earthquake?
- What are foreshocks?
- What are aftershocks?
- What is a seismograph?
- What is a seismogram?
- How is the severity of earthquakes quantified?
- What is the Richter scale?
- What does the Richter scale measure?
- What is the relationship between one unit on the Richter scale and the increase in the magnitude of an earthquake?
- What is the Mercalli scale?
- What does the Mercalli scale measure?
- What are the primary effects of an earthquake and how are these primary effects caused?
- What are the secondary effects of an earthquake and how are these effects caused?
- What is a tsunami?
- What is a seiche?
- What is a landslide?
- What is liquefaction?
- How can an earthquake lead to increases in disease?
- What is a volcano?
- What is lava?

- What causes volcanoes?
- Where do volcanoes tend to occur?
- What are the three types of releases from volcanoes?
- What is ejecta?
- What are some of the gases that can be released by volcanoes?
- What are some of the effects of volcanoes?
- How can a volcano impact climate?
- How does the movement of plates relative to one another result in the production of earthquakes and volcanoes?