The final exam point breakdown:  
100 pts will cover new material on body systems  
50 pts will cover all of the other material covered during the semester  
150 pts total

The new material exam questions will be: multiple choice, matching and true/false (50 questions/ 2pts each)

The old material exam questions will be given in one of two ways:  
1) All multiple choice, matching and true/false (25 ques./2 pts each)  or  
2) 5 essay questions (10 pts each)  
On the day of the exam, I will give you both choices and you will complete either choice one or two. It’s your choice!

New Material on Body Systems:
Circulation & Respiration:
1. Components of blood, functions of each component, and blood disorders.  
2. Blood vessel types and functions of each.  
3. Basic flow of blood through the chambers of the heart  
4. How heart coordinates its contractions and how certain chemicals affect heart rate.  
5. What blood pressure is, the difference between systolic pressure and diastolic pressure, and causes of high blood pressure.  
6. What a heart attack is and what causes it.  
7. How respiration and circulation work together to transport gases in the body.  
8. What happens to your blood when there is too much CO₂ in it and how the brain reacts to this.

The Nervous System & the Senses:
1. Difference between the central and peripheral nervous systems  
2. Parts of a neuron and their functions  
3. How the signal from one neuron passes to the next neuron or another cell  
4. What a reflex is and why it occurs so quickly  
5. Main parts of the brain, their locations, and their functions  
6. What your sleeping brain is doing for you  
7. Receptor cell types used to detect chemicals, sound, and light  
8. Location and function of cornea, pupil, lens, retina, rods, cones, and fovea  
9. Cause of your blind spot  
10. Why taste depends on ability to smell

The Immune System:
1. Function and examples of nonspecific external and internal defenses  
2. What mast cells release and what this chemical does  
3. Issues regarding taking aspirin to reduce fever  
4. Where lymphocytes are produced and stored  
5. How immune cells recognize invaders  
6. Differences between antibody mediated response and cell mediated response  
7. Function of different types of cells involved in antibody mediated immunity and cell mediated immunity  
8. How antibiotics and vaccinations work to assist the immune response  
9. The issues surrounding vaccinations  
10. What allergies are, the stages of an allergy, and what we use to treat them.  
11. What virus causes AIDS, how this virus can negatively affect one’s immune system, and what AIDS is.  
12. Why it has been difficult to produce an effective vaccine for AIDS

Possible essay questions covering the old material:
Exam 1:  
1. A) State three of the four life supporting properties of water that we discussed.  
B) Describe why water is so good at providing each property that you previously stated.  
C) Give one specific example describing why each property is important to life.  

2. Name the four types of large organic molecules found in cells. For each large organic molecule type state:  
A) its specific monomer (if it has a specific monomer).  
B) two functions that it provides to a cell.  
C) one specific example that we discussed.  

3. A) Name the two main types of cells and state four ways that they are different from each other.  
B) Using what you learned about surface area to volume ratios, explain why cells are so small and limited to how large they can be.  

4. Name the five structures involved in the production of a protein in a eukaryotic cell and describe the step in protein production that occurs within each structure.
5. Name the three structures that plant cells have but animal cells do not and describe the main function of these three structures.

Exam 2:

1. A) Define the two forms of energy (potential and kinetic energy) and give an example of each.
   B) Using the 2nd Law of Thermodynamics, explain why no process involving energy conversion is 100% efficient.
   C) Explain how the loss of energy to heat has affected Arctic peoples. To do this, state what Arctic peoples produce more of than non-Arctic peoples and why this is an advantage and a disadvantage for them.

2. Aerobic Cellular Respiration (getting energy from food) involves four steps: Glycolysis, the Prep Reaction, the Citric Acid (Krebs) Cycle, and the Electron Transport Chain. State:
   A) where each step takes place in a cell
   B) what inputs enter into each step and
   C) what outputs come out of each step.

3. A) Describe what photosynthesis is by stating the three main inputs that are needed for the process to occur and the two main outputs that are produced by the process.
   B) Photosynthesis involves two stages the Light Reactions and the Calvin Cycle. Describe each stage by stating the inputs that go into and the outputs that are produced in each stage. Also, state where in the chloroplast each stage takes place.

4. Describe how energy flows in living things. Use the figure in your outline to help you and make sure you describe each step completely. Start by describing how the sun’s energy is used and transformed.

5. A) Describe what happens in each of the two steps of protein synthesis: Transcription and Translation. Also state where in the cell each step occurs.
   B) Describe two reasons, that we discussed in class, why the discovery of the universal genetic code is so important to science. And state one good and one bad consequence of this universality.

Exam 3:

1. Describe A) what an organism’s genome is, B) what chromosomes are, C) what sister chromatids are, D) what homologous chromosomes are and E) how each of us obtains our homologous chromosomes.

2. Compare and contrast the two types of cell division, mitosis and meiosis, by A) stating what type of cells each cell division type produces, B) stating if the cells before each type of cell division are haploid or diploid C) stating if the cells after each type of cell division are haploid or diploid and by D) describing the condition that occurs when each type of division malfunctions or goes wrong.

3. A) Define the two types of reproduction: sexual and asexual.
   B) State one advantage and one disadvantage that organisms that use each type of reproduction would experience.
   C) Give an example of an organism that uses each type.

4. A) Name and describe the two types of cloning that we discussed and the goal of each type.
   B) Name and describe the two types of stem cells that we discussed.
   C) Describe one advantage and one disadvantage of stem cell research.

5. Genetically speaking, what is an organism’s genotype and phenotype? Also, describe what it means when an organism is homozygous or heterozygous for a given trait.

Exam 4:

1. A) Describe the two principles of evolution that Charles Darwin proposed: 1) Common Descent with Modification and 2) Natural Selection.
   B) Describe what microevolution and macroevolution are.

2. Explain how 1) the fossil record, 2) evidence from comparing anatomy, 3) evidence from comparing embryos 4) evidence from molecular biology, and 5) evidence from quickly evolving organisms support the occurrence of evolution.

3. A) Describe the three reasons, that we discussed, that explain why predator/prey interactions are important to have in a community.
   B) Give an example of a predator that we discussed. And describe the cascading effects that occur when the predator is present versus no longer present in the community.

4. A) Name and describe the two outcomes of competition.
   B) Name and describe the three types of symbiosis that interacting organisms display.

5. Using what you know about how energy is transferred through an ecosystem:
   A) Describe why there is a stepwise decline of energy as it is transferred up the food chain.
   B) Describe why there are more herbivores (lower level consumers) than carnivores (higher level consumers).
   C) State which type of consumer is more “expensive” for an ecosystem to support and describe why that is.
   D) Describe why certain animals at lower trophic levels can be much larger in size than carnivores.