CHAPTER 41 – Digestive System/Nutrition
* be able to differentiate carnivore, omnivore, herbivore and some adaptations to their particular diets
* know the four (4) main stages of food processing – ingestion, digestion, absorption, and elimination
* be able to explain proteins, carbohydrates, and lipids and know their building blocks
* know mechanical vs chemical digestion and be able to differentiate between digestive systems of birds and mammals
* know digestive organs and their functions (e.g., small intestine – site of about 90% of absorption of nutrients; large intestine – reabsorption of water)
* know what essential nutrients are
* know how you would obtain proteins if you were a vegetarian
* know what leptin is and its role in lipid storage
* know some adaptations of the vertebrate digestive system (e.g., carnivores with large, expandable stomachs to gorge themselves because next kill could be awhile; herbivores with much longer intestines to deal with plant material, etc.)
* why would a plant be so much more difficult to digest than an animal?
* be able to explain vitamins and minerals, what happens when there are deficiencies, why they are so important (e.g., vitamin K necessary for normal blood clotting, iron an integral component of hemoglobin, selenium an integral component of a detoxifying enzyme, etc.), fat-soluble vs water-soluble vitamins

CHAPTER 42 – Circulatory and Respiratory Systems
* be able to differentiate open vs closed circulatory system
* know structure of vertebrate heart
* know blood vessels and their structure/function
* be able to follow blood flow through the mammalian heart and understand the nodal regulation of the cardiac cycle
* know systole and diastole, heart rate, stroke volume, cardiac output (cardiac cycle)
* know what an EKG is
* know pulmonary and systemic circulation
* understand how the hypothalamus controls pH of the blood by regulating the respiration and cardiac centers of the medulla oblongata (a portion of the brain)
* be familiar with the various components of blood and their functions (e.g., RBCs, WBCs, platelets, plasma
* know what a pluripotent stem cell is and why these could be important in research of human disease
* be familiar with the lymphatic system and why it is important
* know what cardiovascular disease is and be able to differentiate heart attack, stroke, and atherosclerosis
* be able to differentiate between low-density lipoproteins (LDLs) and high-density lipoproteins (HDLs) and why their difference is important
* know respiratory organs and their components for aquatic and terrestrial animals
* know what proportion of air is oxygen (about 21%)
* know that the respiratory systems of mammals and birds are different and how/why
* know what respiratory pigments are and why they are important (e.g., hemoglobin)
* understand how deep-diving air-breathers can stockpile oxygen and stay underwater so long

CHAPTER 43 – Immune System
* know the three lines of defense against infection
* know what a lysozyme is and how it protects against foreign invaders (microbes)
* know what phagocytosis is and why it is important in defense against foreign invaders (microbes)
* know the components of the immune system
* be familiar with the different types of cells involved in the immune system (e.g., different types of WBCs, natural killer (NK) cells, B cells, T cells, etc.)
* know why the thymus gland is so important in immunity at young ages
* understand antibody synthesis by B-lymphocytes and their role in humoral immunity
* be able to explain inflammation, edema, fever, major histocompatibility complex (MHC), and allergic reactions
* know what interferon is and what it does
* understand immunological memory and primary/secondary immune response
* be able to explain immunization and how this works
* be able to differentiate between humoral and cell-mediated immunity
* know what cytokines are and why they are important in immunity
* know what immunoglobulins are and why they are important
* understand why the immune system’s ability to distinguish self from non-self can be a problem in blood transfusions and tissue/organ transplants
* be familiar with HIV/AIDS

CHAPTER 44 – Regulating the Internal Environment (Homeostasis, Thermoregulation, Osmoregulation, Excretion)
* know what thermoregulation, osmoregulation, and excretion are
* know the four (4) physical processes for heat gain or loss (e.g., conduction, radiation, evaporation, convection)
* know body temp and ambient temp relationship in ectotherms vs. endotherms
* know what vasodilation and vasoconstriction are and how these affect heat exchange
* know why desert mammals tend to have long ears
* know what a countercurrent heat exchanger is and how it functions in heat gain and loss
* be able to explain how ectotherms regulate their body temperatures (e.g., physiological and behavioral, such as sitting out on a warm rock)
* be able to explain different mechanisms used by endotherms to warm up and cool down
* know what acclimatization is and why it is important in adjusting to changing ambient temperatures
* know what cryoprotectants and heat-shock proteins are and why they are important
* be able to differentiate between torpor and hibernation
* know what nitrogenous wastes are, the three major forms, which organisms excrete what, and the significance of excretion of each form
* know what osmosis is and that cells require a balance between osmotic gain and loss of water
* know that the water bear (tardigrade) can live for a decade or more after losing almost all of their body water, a process known as anhydrobiosis, and potential role of trehalose
* know how a kangaroo rat deals with water gain and loss
* know the structure of the mammalian kidney
* be able to explain the structure and function of the nephron and its components
* understand the kidney’s function during glomarular filtration, tubular reabsorption, and urine production
* understand the mammalian kidney’s ability to conserve water
* know what antidiuretic hormone (ADH), angiotension II, and aldosterone are and why they are important in regulating water and sodium balance
* know what impacts excess alcohol has on ADH

CHAPTER 45 – Chemical Signaling/Endocrine System
* know local regulators that affect neighboring target cells (e.g., growth factors, nitric oxide, prostaglandins)
* understand the mechanisms of chemical signaling (see Fig. 45.3) and that most local regulators and hormones have receptors
* know all of the endocrine glands and their products (e.g., thyroid gland – products are T3, T4)
* know what diabetes is and be able to differentiate between type I and type II diabetes
* understand short- and long-term stress response involving the adrenal gland and its products

General Hints
(1) do the reading and look it over again
(2) do NOT rely on osmosis from textbook through hands to brain – doesn’t work
(3) read each chapter review
(4) do each self-quiz at the end of chapters
(5) take a look at the lecture notes and go over them in relation with what was covered in class

I am counting on everyone improving their test grade this time (some significantly)
Best of luck with your studying!!!