

# Anatomy and Physiology 2

## Course Outcome Summary

### Course Information

<b>Developers</b>	Gary Johnson, Victor Johnson, Deborah Wiepz
<b>Development Date</b>	3/28/2000
<b>Revised Date</b>	5/15/2000
<b>Course Number</b>	20-806-208
<b>Instructional Level</b>	College Parallel
<b>Potential Hours of Instruction</b>	90
<b>Total Credits</b>	4

### Description

Features lectures and laboratory exercises dealing with the human body as an integrated structural and functional unit including the -cardiovascular system, lymphatic system and immunity, respiratory system, digestive system and metabolism, urinary system, fluid/ electrolyte balance and acid/base balance, and reproductive system. Includes dissection of a cat as well as examination of a human -cadaver. Note: this is the second semester course of a two-semester sequence and is not acceptable where a one-semester Anatomy and Physiology course is required.

### Target Population

Students enrolled or planning to enroll in programs such as nursing, respiratory therapy, occupational therapy and other allied health fields that involve direct patient care. College transfer students needing a 4-credit Natural Science course with a laboratory.

### Types of Instruction

<b>Instruction Type</b>	<b>Contact Hours</b>	<b>Credits</b>
Classroom Presentation	54	4
On Campus Laboratory	36	

### Textbooks

Tortora & Grabowski. *Principles of Anatomy & Physiology*. **Edition:** 8th. **Source:** MATC Bookstore.

Staff. *Lecture Handouts (806-208) -Anatomy & Physiology II*. **Edition:** Current. **Source:** MATC Bookstore.

Staff. *Laboratory Manual (806-208) - Anatomy & Physiology II*. **Edition:** Current. **Source:** MATC Bookstore.

Twietmeyer & McCracken. *Coloring Guide to Regional Human Anatomy*. **Edition:** 2nd. **Source:** MATC Bookstore.

### Learner Supplies

True/False Self-Testing Program. **Manufacturer:** ---. **Source:** MATC Bookstore.

Lecture Tapes (806-208) - Anatomy & Physiology 2. **Manufacturer:** ---. **Source:** MATC Bookstore.

## **Prerequisites**

Anatomy & Physiology 1 (20-806-207)

OR consent of instructorCrLf

## ***Exit Learning Outcomes***

### **Core Abilities**

- A. Communication
- B. Critical thinking
- C. Science and Technology

## ***Competencies***

### **Unit 1. Cardiovascular System**

#### **A. Relate the major gross and microscopic anatomical components of the cardiovascular system to their functions**

##### **Linked Core Abilities**

Communication

Critical thinking

Science and Technology

##### **Competence will be demonstrated:**

A.1. in the evaluation of written answers to study questions

A.2. in the evaluation of a multiple choice exam

A.3. in the evaluation of a lab practical exam

##### **Criteria - Performance will be satisfactory when:**

A.1. you diagram and label a human heart

A.2. you identify the major gross anatomical components of the human heart on both models and dissected specimens

A.3. you summarize the flow pattern of blood through the heart relating this flow pattern to systemic and pulmonic circulation through the body

A.4. you distinguish between the terms systole and diastole

A.5. you name and diagram the location of the specialized tissues of the heart

A.6. you summarize in proper order the sequence of events in a single heartbeat cycle

A.7. you diagram and label a typical EKG stating the specific event recorded by each wave form

A.8. you differentiate between intensity and duration of the various EKG wave forms

A.9. you identify the wave forms demonstrating how heart rate can be estimated on an EKG strip

A.10. you summarize the location and function of the four heart valves

A.11. you relate valve opening and closing to systole and diastole and to the normal heart sounds

A.12. you summarize valve abnormalities that could cause heart murmurs

A.13. you use the terms end-diastolic volume, end-systolic volume, stroke volume, and cardiac output and state an average resting value for each

- A.14. you identify the factors that would affect stroke volume by affecting filling of the ventricles explaining how each would affect stroke volume
- A.15. you identify the factors that would affect stroke volume by affecting emptying of the ventricles explaining how each would affect stroke volume
- A.16. you explain why high stroke volume at rest is generally believed to be an advantage
- A.17. you identify the two components of the cardiac control center relating them to the sympathetic and parasympathetic nervous systems
- A.18. you name and diagram the locations where there are pressoreceptors that influence heart rate
- A.19. you summarize how input from pressoreceptors affects the cardiac control centers and how the cardiac control centers affect the heart
- A.20. you identify other types of sensory input that may affect heart rate describing the affect that each would have
- A.21. you identify the role of the vagus nerve in heart rate control
- A.22. you identify the three major types of blood vessels stating the major role of each
- A.23. you distinguish between the anatomy of the three major types of blood vessels
- A.24. you relate the structure of each of the three major types of blood vessels to the role, the blood pressure range, and the blood flow mechanism(s) of that type of vessel
- A.25. you summarize aneurysm, atherosclerosis, and varicosity and the problems each might cause
- A.26. you summarize what is unique or special about blood vessels serving the brain, lungs, and heart
- A.27. you identifies the major blood vessels of the body
- A.28. you summarize variations in the circulatory system of a fetus
- A.29. you defines the terms ischemia, infarction, and angina
- A.30. you lists the major danger factors that most commonly contribute to myocardial infarction
- A.31. you defines the terms systolic pressure, diastolic pressure, and pulse pressure
- A.32. you summarize the pattern of sounds indicative of systolic and diastolic pressure when taking blood pressure via a pressure cuff and stethoscope technique and explain the origin of these sounds
- A.33. you identify the typical pressure for the different chambers of the heart relating the systolic pressure of each chamber to the musculature and function of the chamber
- A.34. you identify the typical pressure reading for the aorta and the vena cava
- A.35. you summarize how and explain why blood pressure changes as blood flow through systemic arterioles
- A.36. you summarize how and explain why blood pressure changes as blood flow through systemic capillaries
- A.37. you identify two main methods by which the body can regulate blood pressure rapidly on a minute to minute basis explaining how each affects blood pressure
- A.38. you summarize specific examples of other factors that may influence blood pressure
- A.39. you identify the dangers of hypertension
- A.40. you identify the usual method of medicating for essential hypertension

## **Unit 2. Lymphatic System**

- A. Relate the major gross and microscopic anatomical components of the lymphatic system to their functions**

**Linked Core Abilities**

Communication

Critical thinking

Science and Technology

**Competence will be demonstrated:**

A.1. in the evaluation of written answers to study questions

A.2. in the evaluation of a multiple choice exam

**Criteria - Performance will be satisfactory when:**

A.1. you summarize functions of the lymphatic system other than immunity

A.2. you compare and contrast the composition of lymph to interstitial fluid and to blood

A.3. you summarize the structure of lymphatic vessels and their arrangement in the body

A.4. you compare and contrast the structure and functions of the lymphatic system and the circulatory system

A.5. you summarize the structure of a lymph node relating structure to functional roles

**B. Relate the various specific and nonspecific disease defense mechanisms of the body to their functions**

**Linked Core Abilities**

Communication

Critical thinking

Science and Technology

**Competence will be demonstrated:**

B.1. in the evaluation of written answers to study questions

B.2. in the evaluation of a multiple choice exam

**Criteria - Performance will be satisfactory when:**

B.1. you explain the possible pathways of HIV transmission from one individual to another

B.2. you relate HIV to AIDS explaining how HIV affects a person's immune system

B.3. you relate allergies, autoimmune diseases, and tissue rejection to the normal process of immunity

B.4. you summarize antibody mediated immunity including the development and maturation of B-cells and plasma cells, the roles of helper t-cells, and the categories and functions of antibodies

B.5. you summarize cell mediated immunity including the development and maturation of T-cells, the different types of T-cells and their specific roles, and the roles of interleukins

B.6. you relate the basic steps in an immune response to the symptomatic and recovery periods of the patient

B.7. you summarize the basic steps in an immune response relating these steps to a typical bacterial growth curve

B.8. you summarize herd immunity

B.9. you distinguish between natural and artificial immunity

B.10. you distinguish between active and passive immunity

B.11. you identify the two broad categories of lymphocytes that respond to antigens to produce immunities

B.12. you identify the two distinguishing aspects of a true immunity

- B.13. you use the term immunity
- B.14. you use the term antigen discussing their chemical composition
- B.15. you summarize how fever helps provide disease resistance
- B.16. you summarize how inflammation helps provide disease resistance
- B.17. you summarize how natural killer cells work
- B.18. you identify specific examples of phagocytes describing how phagocytes work
- B.19. you identify specific examples of internal antimicrobial substances describing how each works
- B.20. you identify specific examples of chemical barriers describing how each works
- B.21. you identify specific examples of mechanical barriers describing how each works
- B.22. you identify the different categories of nonspecific disease resistance

### **Unit 3. Digestive System**

#### **A. Relate the major gross and microscopic anatomical components of the digestive system to their functions**

##### **Linked Core Abilities**

Communication

Critical thinking

Science and Technology

##### **Competence will be demonstrated:**

A.1. in the evaluation of written answers to study questions

A.2. in the evaluation of a multiple choice exam

A.3. in the evaluation of a lab practical exam

##### **Criteria - Performance will be satisfactory when:**

A.1. you identify in order the structures of the alimentary canal

A.2. you identify the major gross anatomical components of the digestive system on both models and dissected specimens

A.3. you identify the different digestive processes relating each process to the portion(s) of the GI tract where the process happens

A.4. you diagram and label a human tooth

A.5. you explain the two sets of human dentition

A.6. you identify the factors that interact in the formation of dental caries

A.7. you summarize caries formation and possible methods of prevention

A.8. you use the terms hunger, satiation, and appetite relating them to specific regions of the brain

A.9. you identify the kinds of sensory input that result in hunger

A.10. you identifies the various openings leading into/out of the pharynx explaining where each leads

A.11. you describes the process of swallowing

A.12. you defines the term rugae listing advantages of rugae

A.13. you diagrams and labels the stomach

A.14. you lists the secretion site of the various enzymatic and non-enzymatic components that play a role in chemical digestion

A.15. you describes how pH and temperature can affect enzyme activity using salivary amylase as a specific example,

A.16. you identify the kinds of sensory input that result in satiation

- A.17. you identify the chemical components of saliva, gastric juice, bile, and pancreatic juice describing the specific role(s) of each component in chemical digestion
- A.18. you explain the role(s) of intestinal cell enzymes in chemical digestion
- A.19. you identify the hormones that are produced by cells of the stomach and small intestine lining specifying target organ(s) and affect(s) for each hormone
- A.20. you explain how the small intestine is adapted for the process of nutrient absorption
- A.21. you summarize the main mechanism and absorption pathway for the various end-products of chemical digestion
- A.22. you summarize the role(s) of the colon in chemical digestion and absorption
- A.23. you use the term mass peristalsis
- A.24. you explain the defecation reflex
- A.25. you distinguish between elimination and excretion
- A.26. you summarize the total volume and normal composition of the feces
- A.27. you summarize the roles of the liver in blood clotting, detoxification, storage, chemical digestion, calcium balance, and phagocytic cleaning of the blood
- A.28. you use the terms bilirubin and jaundice relating these terms to liver function
- A.29. you relates gall stones to liver function
- A.30. you describes each of the following processes as they relate to the body's use of carbohydrates, lipids, or proteins: glycogenesis, glycogenolysis, gluconeogenesis, lipogenesis, beta oxidation, deamination, and transamination
- A.31. you lists the criteria a substance must meet to be considered a vitamin
- A.32. you names the two major categories of vitamins listing the vitamins in each category
- A.33. you lists the basic roles that vitamins play
- A.34. you defines basal metabolic rate listing the conditions under which it must be measured
- A.35. you summarize the hepatic portal system and how it is significant to liver function

**Unit 4. Metabolism**

**A. Relate the nutrients consumed by the body to the basic concepts of nutrition and metabolism and to the metabolic uses of those nutrients**

**Linked Core Abilities**

Communication

Critical thinking

Science and Technology

**Competence will be demonstrated:**

A.1. in the evaluation of written answers to study questions

A.2. in the evaluation of a multiple choice exam

**Criteria - Performance will be satisfactory when:**

A.1. you write the overall chemical equation that summarizes each of the three major substages of cellular respiration relating the endproducts to the reactants

A.2. you compare and contrast each of the three major substages of cellular respiration with respect to location and ATP formation and use

A.3. you contrast aerobic and anaerobic respiration

A.4. you explain how in lactic acid fermentation glycolysis is able to continue in the

absence of oxygen

A.5. you explain the advantage of lactic acid fermentation to skeletal muscle tissue

A.6. you explain each of the following processes as they relate to the body's use of carbohydrates, lipids, or proteins: glycogenesis, glycogenolysis, gluconeogenesis, lipogenesis, beta oxidation, deamination, and transamination

A.7. you identify the criteria a substance must meet to be considered a vitamin

A.8. you identify the two major categories of vitamins listing the vitamins in each category

A.9. you identify the basic roles that vitamins play

A.10. you use the term basal metabolic rate listing the conditions under which it must be measured

A.11. you identify factors which may cause individual variations in basal metabolic rate

A.12. you contrast basal metabolic rate with total metabolic rate

A.13. you relate total metabolic rate to weight gain or loss

A.14. you explain how blood thyroxine levels are controlled relating the functions of thyroxine to metabolic rate

A.15. you distinguish between stunted growth due to thyroxine deficiency and stunted growth due to growth hormone deficiency

## **Unit 5. Respiratory System**

### **A. Relate the major gross and microscopic anatomical components of the respiratory system to their functions**

#### **Linked Core Abilities**

Communication

Critical thinking

Science and Technology

#### **Competence will be demonstrated:**

A.1. in the evaluation of written answers to study questions

A.2. in the evaluation of a multiple choice exam

A.3. in the evaluation of a lab practical exam

#### **Criteria - Performance will be satisfactory when:**

A.1. you identify the major processes of respiration

A.2. you relate the capture and ultimate use of molecular oxygen to each of the major processes of respiration

A.3. you relate the production and ultimate excretion of molecular carbon dioxide to each of the major processes of respiration

A.4. you identify the major gross anatomical components of the respiratory system on both models and dissected specimens

A.5. you explain the functions of the nasal cavity

A.6. you relate the various structural modifications of the nasal cavity to the functions of the nasal cavity

A.7. you explain the functions of the epiglottis, arytenoid cartilages, and vocal cords

A.8. you identify the anatomical branches of the respiratory tree in sequence describing anatomical changes from trachea to alveoli

A.9. you explain alveolar anatomy relating anatomy to the functional roles of an alveolus

A.10. you compare and contrast the microscopic appearance of healthy lung tissue

with emphysemic lung and lung carcinoma

- A.11. you explain the role of surfactant and the significance to respiratory function
- A.12. you summarize the external appearance, innervation, and position in the thoracic cavity of the lungs, including the pleural membranes and space
- A.13. you identify the average values for the various lung volumes
- A.14. you contrast the information provided by a timed vital capacity with that given by a simple vital capacity
- A.15. you use the carbonic acid/sodium bicarbonate buffer system as an example identifying some diseases that could cause an abnormally low FEV-1
- A.16. you summarize the gas law that is of primary relevance to pulmonary ventilation (Boyle's Law) explaining why it is relevant
- A.17. you explain the process of pulmonary ventilation
- A.18. you use the term pneumothorax explaining how this condition interferes with pulmonary ventilation
- A.19. you use the term partial pressure stating the gas law that is of primary relevance (Dalton's Law)
- A.20. you explain the relationship between partial pressure and percent concentration of a gas in a mixture of gases
- A.21. you explain the processes of pulmonary and systemic gas exchange
- A.22. you identify three ways that carbon dioxide can become a chemical component of the blood for transport purposes
- A.23. you summarize two ways that oxygen can become a chemical component of the blood for transport purposes
- A.24. you explain the oxygen/hemoglobin dissociation curve
- A.25. you explain with regard to gas transport why carbon monoxide is such a dangerous gas
- A.26. you identify the different components of the respiratory center in the brain
- A.27. you explain the roles of inspiratory and expiratory neurons in both normal quiet breathing and deeper than normal breathing
- A.28. you summarize the actions of the pneumotaxic and apneustic areas of the respiratory center
- A.29. you explain the Hering-Breuer reflex and its significance to pulmonary ventilation
- A.30. you explore how changes in blood partial pressures, blood pH, and proprioceptor activity influence pulmonary ventilation
- A.31. you relate the roles of the vagus and phrenic nerves to pulmonary ventilation

## **Unit 6. Urinary System**

### **A. Relate the major gross and microscopic anatomical components of the urinary system to their functions**

#### **Linked Core Abilities**

Communication

Critical thinking

Science and Technology

#### **Competence will be demonstrated:**

- A.1. in the evaluation of written answers to study questions
- A.2. in the evaluation of a multiple choice exam
- A.3. in the evaluation of a lab practical exam

**Criteria - Performance will be satisfactory when:**

- A.1. you diagram and label the gross anatomy of the urinary system
- A.2. you identify the body systems that have excretory functions naming the excretory product of each system
- A.3. you identify the major gross anatomical components of the urinary system on both models and dissected specimens
- A.4. you explain how the urinary bladder is structured to allow for both urine storage and urine elimination
- A.5. you use the term nephron
- A.6. you diagram and label the microscopic anatomy of a juxtamedullary nephron unit
- A.7. you identify the three main processes involved in urine formation by a nephron unit giving an average volume for each in both ml/min and liters/24hrs
- A.8. you identify an average urine volume in both ml/min and liters/24 hrs relating these volumes to glomerular filtration and selective reabsorption volumes
- A.9. you identify an average value of the major pressures that interact in Bowmans capsule to determine glomerular filtration rate explaining how these pressures combine to produce a net filtration pressure
- A.10. you identify the structure and function of the juxtaglomerular apparatus, including a specific example of how this structure can regulate glomerular blood pressure independently of general systemic blood pressure
- A.11. you identify the components of the blood that usually cannot pass into the capsular fluid (ie are usually impermeable in Bowmans capsule)
- A.12. you identify the components of the blood that can usually pass into the capsular fluid and that nephron units typically treat as non-wastes
- A.13. you identify the components of the blood that can usually pass into the capsular fluid and that nephron units typically treat as wastes
- A.14. you compare and contrast nephron unit selective reabsorption of wastes and non-wastes, including specific examples
- A.15. you explain the processes of selective reabsorption of salt and water in the proximal convoluted tubule stating whether these processes are hormone dependent or hormone independent
- A.16. you explain the processes of selective reabsorption of salt and water in Henles loop stating whether these processes are hormone dependent or hormone independent
- A.17. you explain how the activity of Henles loop creates the potential for the formation of a large volume of hypotonic urine
- A.18. you explain how the activity of Henles loop creates the potential for the formation of a small volume of hypertonic urine
- A.19. you explain the processes of selective reabsorption of salt and water in the distal convoluted tubule stating whether these processes are hormone dependent or hormone independent
- A.20. you explain the processes of selective reabsorption of salt and water in the collecting duct stating whether these processes are hormone dependent or hormone independent
- A.21. you identify two hormones that are most often associated with nephron unit reabsorption of water
- A.22. you explain the renin-angiotensin pathway response to a lowered blood volume and blood pressure
- A.23. you relate aldosterone activity to blood sodium and potassium levels

- A.24. you explain how ADH influences urine volume
- A.25. you explain characteristics of renal circulation that make it unusual or unique relating them to the functions of the kidney
- A.26. you identify components that would be typical of normal urine
- A.27. you use the terms pyuria, hematuria, ketonuria, & proteinuria giving a specific example of how each of these conditions could occur
- A.28. you use the term glycosuria explaining the effect of this condition on urine output
- A.29. you explain what is meant by the term tubular maximum, including a specific example
- A.30. you relate renal glycosuria to the concept of tubular maximum
- A.31. you explain the hormone problem that results in diabetes mellitus
- A.32. you relate diabetes mellitus to the concept of tubular maximum
- A.33. you summarize a condition other than renal diabetes or diabetes mellitus that could lead to glycosuria
- A.34. you examine the hormone problem that results in diabetes insipidus explaining the effect of diabetes insipidus on urine output
- A.35. you use the term diuretic describing ways that diuretics can influence the kidneys to increase urine output

**Unit 7. Fluid/Electrolyte & Acid/Base Balance**

**A. Relate fluid/electrolyte and acid/base balance to the homeostatic mechanisms responsible for their control**

**Linked Core Abilities**

Communication

Critical thinking

Science and Technology

**Competence will be demonstrated:**

A.1. in the evaluation of written answers to study questions

A.2. in the evaluation of a multiple choice exam

**Criteria - Performance will be satisfactory when:**

A.1. you identify the major mechanisms of water intake by the body stating average twenty-four hour values for each

A.2. you identify the major mechanisms of water loss from the body stating average twenty-four hour values for each

A.3. you explain how burns, vomiting, and diarrhea can severely influence water loss

A.4. you explain the general symptoms of dehydration and water intoxication

A.5. you identify the major fluids of the body

A.6. you compare and contrast the major fluids of the body with respect to location, average volumes, percent body weight, and chemical composition

A.7. you diagram the relationships between the major fluids of the body with respect to formation and exchange patterns

A.8. you identify the minor body fluids and specifies their compartments

A.9. you identify an average value of the major pressures that interact in systemic capillaries to result in tissue fluid formation explaining how these pressures combine to produce a net filtration pressure

A.10. you compare and contrast net filtration pressure at the arteriole end of a systemic capillary with net filtration pressure at the venule end of a systemic capillary

- A.11. you state the normal range of blood pH
- A.12. you use the term buffer as it relates to pH
- A.13. you identify the components of a buffer system, including a specific example of each
- A.14. you explain how a buffer system can function to regulate blood pH using the carbonic acid/sodium bicarbonate buffer system as an example
- A.15. you explain how the respiratory system can function to regulate blood pH
- A.16. you explain how the urinary system can function to regulate blood pH
- A.17. you use the terms acidosis, acidemia, alkalosis, and alkalemia
- A.18. you explain situations or conditions that represent respiratory acidosis stating how they tend to make the blood acidic
- A.19. you explain situations or conditions that represent metabolic acidosis stating how they tend to make the blood acidic
- A.20. you explain situations or conditions that represent respiratory alkalosis stating how they tend to make the blood alkaline
- A.21. you identify situations or conditions that represent metabolic alkalosis explaining how they tend to make the blood alkaline
- A.22. you analyze hypothetical blood values for pH, pCO<sub>2</sub>, bicarbonate, and pO<sub>2</sub> to determine acidosis or alkalosis, respiratory or metabolic, compensated or non-compensated

## **Unit 8. Reproductive Systems**

### **A. Relate the major gross and microscopic anatomical components of the reproductive systems to their functions**

#### **Linked Core Abilities**

Communication

Critical thinking

Science and Technology

#### **Competence will be demonstrated:**

- A.1. in the evaluation of written answers to study questions
- A.2. in the evaluation of a multiple choice exam
- A.3. in the evaluation of a lab practical exam

#### **Criteria - Performance will be satisfactory when:**

- A.1. you list the basic functions of the reproductive systems
- A.2. you identify the major gross anatomical components of the reproductive systems on both models and dissected specimens
- A.3. you use the term gonad appropriately
- A.4. you use the term gamete including naming the process that produces gametes
- A.5. you explore the cells that divide to produce the gametes including the process that produces these cells
- A.6. you use the terms homologous and non-homologous as they relates to chromosomes
- A.7. you contrast the chromosomal makeup of a gamete with that of a normal body cell relating the differences to the differences between mitosis and meiosis
- A.8. you contrast the number of viable gametes produced in human males with the number produced in human females as a result of the meiotic division of a single germ cell
- A.9. you construct models representing the various stages of division in a cell dividing by mitosis

- A.10. you construct models representing the various stages of division in a cell dividing by meiosis
- A.11. you compare and contrast the active stages of division in a cell dividing by mitosis with the active stages of division in a cell dividing by meiosis
- A.12. you use the term allele, including specific examples
- A.13. you use the terms dominant, recessive, and codominant as they you relates to alleles, including specific examples
- A.14. you use the terms homozygous, heterozygous, genotype, and phenotype as they you relates to gene pairs, including specific examples
- A.15. you demonstrate the solution to genetics problems involving monohybrid and dihybrid crosses
- A.16. you compare and contrast the male gamete and the female gamete
- A.17. you examine the structure and functions of the major organs of the female reproductive tract
- A.18. you examine the structure and functions of the major organs of the male reproductive tract
- A.19. you identify the fluids that compose ejaculated semen stating the percent volumes and functions of each
- A.20. you identify the releasing hormone that controls secretion of the gonadotropic hormones stating where it is produced and its major target organ
- A.21. you identify the gonadotropic hormones and states where they are produced and their major target organs in both males and females
- A.22. you explain the effects of the gonadotropic hormones in males
- A.23. you identify the male sex hormone and states where it is produced, its major target organs, and its effects
- A.24. you identify the female sex hormones and states where they are produced and their major target organs
- A.25. you draw a graph showing the changes of the gonadotropic hormones and the sex hormones during a typical 28-day human female menstrual cycle
- A.26. you explain the changes that take place in the ovaries during the various stages of the menstrual cycle relating these changes to changing blood hormone levels
- A.27. you explain the changes that take place in the uterus during the various stages of the menstrual cycle relating these changes to changing blood hormone levels
- A.28. you explain the hormonal changes associated with pregnancy that interrupt the normal menstrual cycle and allow the pregnancy to proceed
- A.29. you explain how oral contraceptives act to interfere with the normal menstrual cycle
- A.30. you compare and contrast pre-puberty, post-puberty, and post-climacteric blood levels of gonadotropic releasing hormone, gonadotropic hormones, and sex hormones in both males and females
- A.31. you identify the hormones associated with mammary gland development stating the production site, stimulus for production, and effects on the mammary glands for each hormone
- A.32. you identify signs that can be indicative of the onset of active labor commenting on the reliability of these signs
- A.33. you identify the posterior pituitary hormone that stimulates uterine contractions stating where this hormone is synthesized and factors that can initiate its release into the blood
- A.34. you use the terms effacement and dilation as they relate to labor

A.35. you identify the major stages of labor and delivery describing the major events of each stage