

# **Academy for Allied Health and Sciences at Plainfield High School**



**Plainfield High School  
in partnership with  
JFK-Muhlenberg-Snyder Schools  
Union County College  
Lincoln Technical Institute  
Rutgers University**

## **Anatomy and Physiology II**

### **Curriculum**

IDST 1222

## Table of Contents

	<b><u>Page #</u></b>
1. Course Philosophy	1
2. Course Goals	2
3. Outline of Content Area	3
I.    The Endocrine System	4-5
II.   Blood and The Cardiovascular System	5-7
III.  Lymphatic System	7-8
IV.  The Respiratory System	8-10
V.   The Digestive System	10-11
VI.  The Urinary System	11-12
VII. Water, Electrolyte, and Acid/Base Balance	12-13
VIII. Female Reproductive System	13-14
IX.  Male Reproductive System	15-16

## **Course Philosophy**

Anatomy and Physiology II is the study of the structure and function of the human body. This course follows a sequential development of the major body systems in an organized and structured curriculum. The course is designed to give the students a selective overview of human anatomical structure and an analysis of human physiological principles. Labs will include slide work, dissection of various animals and studies of the human skeleton. The course may also use computer simulated dissection.

Anatomy and Physiology II is a continuation of the Anatomy and Physiology I course focusing on different body systems that were not covered in the first course. This course is designed to provide an in depth study of the human body with an emphasis on the interrelationships between form and function at the gross and microscopic levels of organization. The essential principles that will be presented include: review of basic anatomical, directional and medical terminology, principles of cell biology and a detailed examination of several important body systems. Given the breadth of knowledge available on these topics, it is common to get overwhelmed by details. However, as the course progresses, students should integrate all parts into the whole, reflecting on the unifying themes of homeostasis, structure relating to functions, and evolution.

To facilitate learning and depict relevance of the information, pathophysiology and clinical aspects will be discussed with each system so that students can apply their learning. To encourage a view of the human body as a dynamic and continually changing organism, developmental aspects of youth, adulthood, and old age are included.

There is no better way to study the human body than with a human subject. Where applicable, the students will be their own source of laboratory exploration and information. In other cases, animals that most closely represent the human anatomy will be utilized, such as in dissecting. Where necessary, video and computer images will also be implemented.

*\*\*Refer to Appendix A for description of learning styles that are addressed in the activities listed in the curriculum (e.g., AR, AS, CR, CS).*

## **Course Goals**

### ***The Students will be able to:***

1. Identify systems of interacting components and understand how their interactions combine to produce the overall behavior of the system.
2. Explore the ways in which the study of anatomy and physiology may serve as a foundation for many career opportunities.
3. Develop an understanding of how people of various cultures and genders have contributed to major biological discoveries and the advancement of science and technology.
4. Evaluate the impact of new biological discoveries on current health and medical issues and society.
5. Describe the structures and levels of organization of the human body and how the parts interact determining how the whole acts.
6. Understand the dynamic interrelationship and control mechanisms involved in homeostasis.
7. Explain the structure and function of each body system.
8. Distinguish abnormal structure and function of each body system.
9. Discuss the ethics that arise with new technology in reference to the humans.
10. Demonstrate proficient use of the microscope and dissecting tools.

## **Outline of Content Area**

- I. The Endocrine System
- II. Blood and The Cardiovascular System
- III. Lymphatic System
- IV. The Respiratory System
- V. The Digestive System
- VI. The Urinary System
- VII. Water, Electrolyte, and Acid/Base Balance
- VIII. Female Reproductive System
- IX. Male Reproductive System

**I. Endocrine System:** (This system can be taught as its own unit, but should also be integrated into the other units in the course)

**A. Objectives: *The Student Will Be Able To***

1. Identify the endocrine glands and their locations in the body. (9.4.12.H.3-4)
2. Compare the major structural classes of hormones.
3. Explain the general mechanisms of hormonal action. (5.3.12.A1, 5.3.12.A6)
4. Describe how endocrine activity is controlled. (5.3.12.A1, 5.3.12.A6)
5. Describe the structure and function of the pituitary gland. (5.3.12.A1, 5.3.12.A6)
6. Explain the relationship between the pituitary gland and the hypothalamus.
7. Summarize the targets, effects, and regulation of the major hormones produced by the pituitary gland. (5.3.12.A1, 5.3.12.A6, 8.1.12.D.1)
8. Describe the structure and function of the thyroid gland. (5.3.12.A1, 5.3.12.A6)
9. Identify and describe the functions of hormones produced by the thyroid gland. (5.3.12.A1, 5.3.12.A6)
10. Describe the structure and function of the parathyroid glands. (5.3.12.A1, 5.3.12.A6)
11. Explain the effects of parathyroid hormone on the body. (5.3.12.A1, 5.3.12.A6)
12. Explain the homeostatic regulation of calcium ion concentrations in the body.
13. Describe the structure and function of the adrenal glands. (5.3.12.A1, 5.3.12.A6)
14. Identify and describe the functions of hormones produced by the adrenal cortex and medulla. (5.3.12.A1, 5.3.12.A6)
15. Describe the structure and function of the pineal gland. (5.3.12.A1, 5.3.12.A6)
16. Explain the effects of melatonin on the body.
17. Describe the structure and function of the pancreas. (5.3.12.A1, 5.3.12.A6)
18. Identify and describe the functions of hormones produced by the pancreas. (5.3.12.A1, 5.3.12.A6)
19. Explain the homeostatic regulation of blood glucose concentration. (5.3.12.A3)
20. Describe the function of the thymus. (5.3.12.A1, 5.3.12.A6)
21. Compare antagonistic, synergistic, permissive, and integrative effects of hormones on a target cell. (5.3.12.A1, 5.3.12.A6)
22. Identify and explain the hormones involved in growth. (5.3.12.A1, 5.3.12.A6)
23. Explain the stages of a stress response.
24. List and describe the four major types of hormonal interactions
25. Describe the effects of aging on the endocrine system. (5.3.12.A4)
26. Research and present information about the cause, symptoms, and treatment for common disorders of the endocrine system. (5.3.12.A1, 5.3.12.A6; 5.3.12.A3-4; 2.1.12.C.1-4; 9.4.12.H.4; 9.4.12.H.5-15; 9.4.12.H.20-29; 9.4.12.H.38-44; 9.4.12.H.60-61; 8.1.12.A.2-3, 8.1.12.D.2)

**B. Activities:**

1. Teacher lecture, demonstrations, and class discussions pertaining to the objectives listed above. (AS, CS)
2. Students will work in small groups to construct a concept map to critically analyze the components of the Endocrine system. (AR, CS)

3. In pairs, students will investigate disorders and diseases of the endocrine system using the Internet and the textbook. They will create a brief presentation according to the discussed rubric (causes, symptoms, treatments and resources used). (AR, AS)
4. Using "Anatomy 360°", students will examine digital representations of the human body from various perspectives and complete analysis questions about the endocrine system. (AS)
5. Using "Interactive Physiology" and the computers, students will complete the endocrine system module. (AS)
6. In groups, students will research and present a major endocrine organ and explain its function to the class, then check for understanding using an activity or assessment of their choice. (AR, CR, CS).
7. Students will create a board game or interactive online game that will help small groups of students in the class to remember the important hormones in the body, their functions, and the organs/glands where each hormone originates. (AR, CR, CS)

**C. Evaluations:**

1. "Anatomy 360°" analysis questions will count towards the lab grade.
2. A quiz will be administered to assess understanding of gland location and secretion.
3. Concept maps will be graded according to the distributed rubric.
4. Student presentations will be graded according to the distributed rubric.
5. A test will be administered assessing comprehension of the unit objectives.
6. The games created will be graded according to a specific rubric distributed at the time of assignment.

**D. Resources:**

1. Martini, Fundamentals of Human Anatomy & Physiology, 7<sup>th</sup> edition
  2. PowerPoint presentations, CD-ROM images, transparencies
  3. "Anatomy 360°" CD-ROM
  4. "Interactive Physiology" CD-ROM 5.
- Computer lab with Internet access
6. Marieb, Anatomy & Physiology Coloring Workbook
  7. Kapit and Elson, The Anatomy Coloring Book
  8. Kapit, Macey, and Meisami, The Physiology Coloring Book
  9. Board game creation materials
  10. Videos downloaded from United Streaming, Netflix, or Youtube

**II. Blood and the Cardiovascular System**

**A. Objectives: The Student Will Be Able To**

1. Describe the principal characteristics of blood and its functions in the body. (5.3.12.A1; 9.4.12.H.3-4)
2. Describe the components of plasma and their importance. (5.3.12.A1, 5.3.12.A6)
3. Compare the origins, characteristics, and functions of the formed elements in blood. (5.3.12.A1, 5.3.12.A6)
4. Summarize the process of recycling of red blood cell components in the body.
5. Explain the factors that determine blood type. (5.3.12.A1, 5.3.12.A6)

6. Explain the significance of a differential blood count.
7. Describe the surface and internal anatomy of the heart.
8. Describe the structure and function of the pericardium. (8.1.12.A.1)
9. Trace the flow of blood through the heart. (5.3.12.A1, 5.3.12.A6, 8.1.12.A.1)
10. Identify and describe the histology of the heart wall. (5.3.12.A1, 5.3.12.A6, 8.1.12.A.1)
11. Describe the structure of cardiac muscle cells. (5.3.12.A1, 5.3.12.A6)
12. Explain the function of the fibrous skeleton of the heart. 13. Discuss the route of blood in coronary circulation. 14. Identify the components of the Conducting System.
15. Explain the steps involved in impulse conduction through the heart.
16. Explain the activities associated with parts of a normal electrocardiogram.
17. Distinguish between systole and diastole. 18. Diagram the phases of the cardiac cycle.
19. Compare and contrast the structure and function of arteries, arterioles, capillaries, venules, and veins. (5.3.12.A1, 5.3.12.A6)
20. Distinguish between continuous capillaries, fenestrated capillaries, and sinusoids.
21. Describe the structure and function of capillary beds. 22. Explain the mechanisms for regulating blood flow.
23. Identify the principal arteries and veins of systemic and pulmonary circulation.
24. Contrast fetal and adult circulation.
25. Describe the effects of aging on the cardiovascular system. (5.3.12.A6)
26. Identify the risk factors associated with heart disease. (5.3.12.A6)
27. Research and present information about the cause, symptoms, and treatment for common disorders of the cardiovascular system. (5.3.12.A1, 5.3.12.A6; 5.3.12.A3-4; 2.1.12.C.1-4; 9.4.12.H.4; 9.4.12.H.5-15; 9.4.12.H.20-29; 9.4.12.H.38-44; 9.4.12.H.60-61; 8.1.12.A2-3, 8.1.12.D.2)

**B. Activities:**

1. Teacher lecture, demonstrations, and class discussions pertaining to the objectives listed above. (AS, CS)
2. Students will perform a dissection of a sheep heart. (AR, CR, CS).
3. Students will work in small groups to construct a concept map to critically analyze the components of the cardiovascular system. (AR, CS)
4. Students will utilize a stethoscope, sphygmomanometer and the calculators to record measurements for their own cardiovascular system. (AR, CR, CS).
5. In pairs, students will investigate disorders and diseases of the cardiovascular and circulatory systems using the Internet and the Applications Manual. They will create a brief presentation according to the discussed rubric (causes, symptoms, treatments and resources used). (AR, AS)
6. Using "Anatomy 360°" and the computers, students will examine digital representations of the human body from various perspectives and complete analysis questions about the cardiovascular system. (AS)
7. Using "Interactive Physiology" and the computers, students will complete the cardiovascular system module. (AS)

8. LAB: students will perform a lab in which they use microscopes to examine various slides of veins, arteries, and blood cells and then compare and contrast each cell type and the veins from the arteries (CR, CS)
9. LAB: Examine the 5 different types of white blood cells under the microscope, then label and draw each type of cell as well as any red blood cells or platelets that may be present on the slides (CR, CS)
10. LAB: Students will perform a dissection of a sheep heart and identify the various structures of the heart as well as trace the flow of blood throughout the heart. A short quiz featuring a picture of a real sheep heart will follow (CR, CS)
11. LAB: Students will build a human heart using the Build a Model Heart Kit from Flinn Scientific (AR, CR, CS)

**C. Evaluations:**

1. "Anatomy 360°" analysis questions will count towards the lab grade.
2. A quiz will be administered to assess understanding of heart anatomy and physiology.
3. Concept maps will be graded according to the distributed rubric.
4. Student presentations will be graded according to the distributed rubric.
5. A test will be administered assessing comprehension of the unit objectives. 6. Lab practical. Label the parts of the heart.

**D. Resources:**

1. Martini, Fundamentals of Human Anatomy & Physiology, 7<sup>th</sup> edition
2. PowerPoint presentations, CD-ROM images
3. "Anatomy 360°" CD-ROM
4. "Interactive Physiology" CD-ROM 5.  
Computer lab with Internet access
6. Marieb, Anatomy & Physiology Coloring Workbook
7. Kapit and Elson, The Anatomy Coloring Book
8. Kapit, Macey, and Meisami, The Physiology Coloring Book
9. Sheep hearts and other appropriate lab materials
10. Videos downloaded from United Streaming, Netflix, or YouTube.

**III.Lymphatic System**

**A. Objectives:** The Student Will Be Able To:

1. Describe the functions of the lymphatic system. (9.4.12.H.3-4)  
Explain how the lymphatic system is functionally related to the cardiovascular and lymphatic systems. (9.4.12.H.3-4)
2. Describe the location of the major lymphatic pathways.
3. Describe the formation and composition of lymph and explain how it is transported through the lymphatic system.
4. Describe a lymph node and its major functions. 5.  
Locate the major chains of lymph nodes.
6. Describe the functions of the thymus and the spleen.
7. Explain the differences between specific and nonspecific body defenses and provide examples of each defense. (5.3.12.A5)
8. Define immunity and describe how T and B cells arise. (5.3.12.A1; A3-6)

9. Explain the relationship between an antigen and an antibody. (5.3.12.A3)
10. Explain how allergic reactions and tissue rejection reactions are related to immune mechanisms.
11. List and describe disease/disorders associated with the lymphatic system. (5.3.12.A1, 5.3.12.A6; 5.3.12.A3-4; 2.1.12.C.1-4; 9.4.12.H.4; 9.4.12.H.5-15; 9.4.12.H.20-29; 9.4.12.H.38-44; 9.4.12.H.60-61; 8.1.12.A2-3, 8.1.12.D.2)
12. Define important terminology of the lymphatic system. (9.4.12.H.3-4)

**B. Activities:**

1. Teacher lecture, demonstrations, and class discussions pertaining to the objectives listed above. (AS, CS)
2. Students will create a game about the lymphatic system. They will work in groups of four and the games will be tested by other groups. (AR, CR, CS).
3. Students will work in small groups to construct a concept map to critically analyze the connections between the different types of defenses that make up the Lymphatic System. (AR, CS)
4. In pairs, students will investigate 4 different types of disorders of the lymphatic system using the Internet and the Applications Manual. They will create a brief presentation according to the discussed rubric (causes, symptoms, treatments and resources used). (AR, AS)
5. Using "Anatomy 360°" and the computers, students will examine digital representations of the human body from various perspectives and complete analysis questions about the lymphatic system. (AS)
6. Using "Interactive Physiology" and the computers, students will complete the lymphatic system module. (AS)
7. Students will color in various lymphatic structures from the Anatomy and Physiology Coloring Book to show the anatomy of the lymphatic system (AR, AS)
8. Students will complete a short project in which they create a product detailing a fictional scenario featuring the invasion of some type of pathogen and then an explanation of the types of defenses the body has to protect itself from this threat and how they work (AR, CR, CS)

**C. Evaluations:**

1. "Anatomy 360°" analysis questions will count towards the lab grade.
2. A quiz will be administered to assess understanding of major organ location and function.
3. Concept maps will be graded according to the distributed rubric.
4. Student presentations will be graded according to the distributed rubric.
5. A test will be administered assessing comprehension of the unit objectives.
6. The games created will be graded according to a specific rubric distributed at the time of assignment.

**D. Resources:**

1. Martini, Fundamentals of Human Anatomy & Physiology, 7<sup>th</sup> edition
2. PowerPoint presentations, CD-ROM images, transparencies
3. "Anatomy 360°" CD-ROM
4. "Interactive Physiology" CD-ROM

5. Computer lab with Internet access
6. Marieb, Anatomy & Physiology Coloring Workbook
7. Kapit and Elson, The Anatomy Coloring Book
8. Kapit, Macey, and Meisami, The Physiology Coloring Book
9. Videos downloaded from United Streaming, Netflix, or Youtube

#### **IV. The Respiratory System**

##### ***A. Objectives: The Student Will Be Able To***

1. Summarize the primary functions of the respiratory system. (9.4.12.H.3-4)
2. Describe the structure and function for each component of the respiratory system. (5.3.12.A1, 5.3.12.A6)
3. Explain how the exposed respiratory surfaces are protected. 4. Explain how we produce sounds.
5. Explain the structure of the alveolar-capillary membrane and its function in the diffusion of respiratory gases. (5.3.12.A1, 5.3.12.A6)
6. Describe the mechanisms of inhalation and exhalation.
7. Identify the factors that influence the respiration rate. (5.3.12.A3)
8. Describe the effects of aging on the respiratory system. (5.3.12.A6)
9. Research and present information about the cause, symptoms, and treatment for common disorders of the respiratory system such as Chronic Obstructive Pulmonary Disease and lung cancer. (5.3.12.A1, 5.3.12.A6; 5.3.12.A3-4; 2.1.12.C.1-4; 9.4.12.H.4; 9.4.12.H.5-15; 9.4.12.H.20-29; 9.4.12.H.38-44; 9.4.12.H.60-61; 8.1.12.A2-3, 8.1.12.D.2)
10. Describe the protective mechanisms in the respiratory system. (5.3.12.A6)
11. Describe the events involved in inspiration and preparation. 12. List and describe each of the respiratory air volumes.
13. Explain how the respiratory muscles cause volume changes that lead to air flow into and out of the lungs.
14. List three factors that influence respiratory rate. (5.3.12.B6)
15. Explain the major events that occur during cellular respiration. (5.3.12.B6; 8.1.12.A.1)
16. Explain how oxygen is used by cells. (5.3.12.B6)
17. Trace the breath of air through the respiratory system from nose to alveoli. (5.3.12.B6; 9.4.12.H.4)

##### ***B. Activities:***

1. Teacher lecture, demonstrations, and class discussions pertaining to the objectives listed above. (AS, CS)
2. Students will examine a preserved sheep pluck demonstrating the mechanisms involved in respiration and use a spirometer to test respiratory volumes of individual students. (AR, CR, CS).
3. Students will work in small groups to construct a concept map to critically analyze the components of the respiratory system. (AR, CS)
4. In pairs, students will investigate disorders and diseases of the respiratory system using the Internet and the Applications Manual. They will create a brief

presentation according to the discussed rubric (causes, symptoms, treatments and resources used). (AR, AS)

5. Using "Anatomy 360°" and the computers, students will examine digital representations of the human body from various perspectives and complete analysis questions about the respiratory system. (AS)
6. Using "Interactive Physiology" and the computers, students will complete the respiratory system module. (AS)
7. LAB: Students use the "Mitochondria in Action" lab kit to investigate the role of mitochondria in cellular respiration and explain how cellular respiration relates to the respiratory system. (AS, AR, CS, CR)
8. Students will conduct breathing exercises to identify the different types of breathing and the muscles that are used in each type (AS, CS, CR)
9. Students will physically identify the different structures in their own body that are used in each step of inhalation and exhalation (CS, CR)
10. Students will role play judges on a singing audition reality show such as American Idol and explain the physiology behind how the larynx is used to create beautiful or unpleasant sounding music. (AS, AR, CS, CR)

**C. Evaluations:**

1. "Anatomy 360°" analysis questions will count towards the lab grade. 2. Dissection labs will be collected and graded.
3. Concept maps will be graded according to the distributed rubric.
4. Student projects and presentations will be graded according to the distributed rubric.
5. A test will be administered assessing comprehension of the unit objectives.

**D. Resources:**

1. Martini, Fundamentals of Human Anatomy & Physiology, 7<sup>th</sup> edition
2. PowerPoint presentations, CD-ROM images
3. Dissection materials
4. Spirometers
5. "Anatomy 360°" CD-ROM
6. "Interactive Physiology" CD-ROM 7. Computer lab with Internet access
8. Marieb, Anatomy & Physiology Coloring Workbook
9. Kapit and Elson, The Anatomy Coloring Book
10. Kapit, Macey, and Meisami, The Physiology Coloring Book
11. Videos downloaded from United Streaming, Netflix, or Youtube

**V. The Digestive System**

**A. Objectives: The Student Will Be Able To**

1. Summarize the functions of the digestive system. (9.4.12.H.3-4)
2. Describe the location, structure, and function of the gastrointestinal and accessory organs of the digestive system. (5.3.12.A1)
3. Identify the major mesenteries of the peritoneal cavity.
4. Describe the histological organization of the gastrointestinal tract. (5.3.12.A1) 5. Explain how food moves through the digestive tract from mouth to excretion.

6. Summarize the mechanisms that control digestive function.
7. Identify the parts of a typical tooth.
8. Summarize the four types of teeth.
9. Compare deciduous and permanent dentitions.
10. Summarize the steps involved in the swallowing process.
11. Identify and describe the secretions produced during digestion.
12. Describe the effects of aging on the digestive system. (5.3.12.A6)
13. Identify the chemical events responsible for the digestion of carbohydrates, lipids, and proteins.
14. Describe and distinguish between fat- and water- soluble vitamins.
15. Differentiate between LDLs and HDLs relative to their structures and major roles in the body. (5.3.12.A6)
16. Define basal metabolic rate and total metabolic rate and depict several factors that influence metabolic rate. (5.1.12.A2; 5.3.12.B2)
17. Research and present information about the cause, symptoms, and treatment for common disorders of the digestive system. (5.3.12.A1, 5.3.12.A6; 5.3.12.A3-4; 2.1.12.C.1-4; 9.4.12.H.4; 9.4.12.H.5-15; 9.4.12.H.20-29; 9.4.12.H.38-44; 9.4.12.H.60-61)

**B. Activities:**

1. Teacher lecture, demonstrations, and class discussions pertaining to the objectives listed above. (AS, CS)
2. In pairs, students will investigate disorders and diseases of the digestive system using Anatomy and Physiology books and the internet. They will create a brief presentation according to the discussed rubric (causes, symptoms, treatments and resources used). (AR, AS)
3. Using "Anatomy 360°" and the computers, students will examine digital representations of the human body from various perspectives and complete analysis questions about the digestive system. (AS)
4. Using "Interactive Physiology" and the computers, students will complete the digestive system module. (AS)
5. In groups of 2-4, students create a game, book, musical, script, or interactive simulation or animation of the major processes that occur in the lower digestive system
6. Students will write a story similar to "The Magic School Bus" explaining what would happen to someone's lunch from the time it is put into the mouth to the time when it exits the digestive track. (AR, CS, AS)

**C. Evaluations:**

1. "Anatomy 360°" analysis questions will count towards the lab grade.
2. Concept maps will be graded according to the distributed rubric.
3. Student presentations will be graded according to the distributed rubric.
4. Anatomy quiz on major parts of the digestive system
5. A test will be administered assessing comprehension of the unit objectives.

**D. Resources:**

1. Martini, Fundamentals of Human Anatomy & Physiology, 7<sup>th</sup> edition
  2. PowerPoint presentations, CD-ROM images
  3. "Anatomy 360°" CD-ROM
  4. "Interactive Physiology" CD-ROM 5.
- Computer lab with Internet access
6. Marieb, Anatomy & Physiology Coloring Workbook
  7. Kapit and Elson, The Anatomy Coloring Book
  8. Kapit, Macey, and Meisami, The Physiology Coloring Book
  9. Videos downloaded from United Streaming, Netflix, or Youtube

**VI. The Urinary System**

**A. Objectives: The Student Will Be Able To**

1. Identify the parts of the urinary system and explain their roles. (9.4.12.H.3-4)
2. Describe the external, gross, and microscopic anatomical features of the kidneys. (5.3.12.A1)
3. Describe the processes involved in urine formation as filtrate passes through the nephron.
4. Describe the effects of aging on the urinary system. (5.3.12.A6)
5. Research and present information about the cause, symptoms, and treatment for common disorders of the urinary system. (5.3.12.A1, 5.3.12.A6; 5.3.12.A3-4; 2.1.12.C.1-4; 9.4.12.H.4; 9.4.12.H.5-15; 9.4.12.H.20-29; 9.4.12.H.38-44; 9.4.12.H.60-61)
6. Explain how a nephron works and describe how the major parts function.
7. Describe the structure of the ureters, urinary bladder, and urethra.

**B. Activities:**

1. Teacher lecture, demonstrations, and class discussions pertaining to the objectives listed above. (AS, CS)
2. In pairs, students will investigate disorders and diseases of the urinary system using the Internet and the Applications Manual. They will create a brief presentation according to the discussed rubric (causes, symptoms, treatments and resources used). (AR, AS)
3. Using "Anatomy 360°" and the computers, students will examine digital representations of the human body from various perspectives and complete analysis questions about the urinary system. (AS)
4. Using "Interactive Physiology" and the computers, students will complete the urinary system module. (AS)
5. LAB: Students will perform a dissection of a sheep kidney in order to identify the major parts of the urinary system and explain how each part functions. (AS, CS, AR, CR)
6. LAB: Students will show how kidneys filter blood by creating kidney models using dialysis tubing and fake blood and then observe over several days as filtration takes place and "urine" is produced.
7. Project: Students complete one of the following projects: a) Create a nephron model b) Write a journal detailing their own urine for a week and explain why they found

the results that they did c) Create a detailed poster showing the major events of urine formation d) Create rap or song about urine production

**C. Evaluations:**

1. "Anatomy 360°" analysis questions will count towards the lab grade.
2. A quiz will be administered to assess understanding of nephron anatomy and physiology.
3. Concept maps will be graded according to the distributed rubric.
4. Student presentations will be graded according to the distributed rubric.
5. A test will be administered assessing comprehension of the unit objectives.
6. Lab practical. Label the parts of the kidney.

**D. Resources:**

1. Martini, Fundamentals of Human Anatomy & Physiology, 7<sup>th</sup> edition
  2. PowerPoint presentations, CD-ROM images
  3. "Anatomy 360°" CD-ROM
  4. "Interactive Physiology" CD-ROM 5.
- Computer lab with Internet access
6. Marieb, Anatomy & Physiology Coloring Workbook
  7. Kapit and Elson, The Anatomy Coloring Book
  8. Kapit, Macey, and Meisami, The Physiology Coloring Book
  9. Kidneys and other appropriate lab materials

**VII. Water, Electrolyte, and Acid/Base Balance**

**A. Objectives: The Student Will Be Able To**

1. Define important terminology related to fluid, electrolyte, and acid/base homeostasis. (9.4.12.H.3-4)
2. Describe the various fluid compartments of the body.
3. Explain what is meant by water and electrolyte balance and discuss the importance of this balance. (5.3.12.B2; 5.3.12.A3)
4. Explain how electrolytes enter and leave the body and how the input and output of electrolytes are regulated. (5.3.12.A3)
5. Explain what is meant by acid/base balance. (5.3.12.B2; 5.2.12.A6-7)
6. Explain the functions of sodium, chloride, potassium, calcium, phosphate, and magnesium and regulation of their concentrations. (5.3.12.A3)
7. List the major sources of hydrogen used in the body. (5.2.12.A6)
8. Compare the role of buffers, exhalation of carbon dioxide, and kidney excretion of  $H^+$  in maintaining pH of body fluids. (5.3.12.A3; 5.2.12.A6-7)
9. List and describe disease/disorders associated with fluid, acid/base and electrolyte balance. (5.3.12.A1, 5.3.12.A6; 5.3.12.A3-4; 2.1.12.C.1-4; 9.4.12.H.4; 9.4.12.H.5-15; 9.4.12.H.20-29; 9.4.12.H.38-44; 9.4.12.H.60-61)

**B. Activities:**

1. Teacher lecture, demonstrations, and class discussions pertaining to the objectives listed above. (AS, CS)
2. In pairs, students will investigate disorders and other health issues that may arise by imbalance of water, electrolyte, and acid/base chemistry using the Internet and the

- Applications Manual. They will create a brief presentation according to the discussed rubric (causes, symptoms, treatments and resources used). (AR, AS)
3. Using "Anatomy 360°" and the computers, students will examine digital representations of the human body from various perspectives and complete analysis questions about the urinary system. (AS)
  4. Using "Interactive Physiology" and the computers, students will complete the urinary system module. (AS)
  5. LAB: Students will perform pH/buffer lab showcasing how buffers in the body contribute to homeostasis (AR, AS, CR, CS)

**C. Evaluations:**

1. "Anatomy 360°" analysis questions will count towards the lab grade.
2. A quiz will be administered to assess understanding of acids/bases/buffers 3. Concept maps will be graded according to the distributed rubric.
4. Student presentations will be graded according to the distributed rubric.
5. A test will be administered assessing comprehension of the unit objectives.

**D. Resources:**

1. Martini, Fundamentals of Human Anatomy & Physiology, 7<sup>th</sup> edition
2. PowerPoint presentations, CD-ROM images
3. "Anatomy 360°" CD-ROM
4. "Interactive Physiology" CD-ROM 5. Computer lab with Internet access
6. Marieb, Anatomy & Physiology Coloring Workbook
7. Kapit and Elson, The Anatomy Coloring Book
8. Kapit, Macey, and Meisami, The Physiology Coloring Book

## **VIII. Female Reproductive System**

**A. Objectives: The Student Will Be Able To**

1. State the functions of the female reproductive system.
2. List the parts of the female reproductive system and describe the functions of each part. (9.4.12.H.3-4)
3. Describe the structure of the ovary and how egg cells and follicles are formed. (5.3.12.A4-5)
4. Describe the role that hormones play in control of the female reproductive system and in the development of secondary sexual characteristics. 5. List the major events that occur during the menstrual cycle.
6. Describe the process of fertilization and identify the time of the menstrual cycle at which sexual intercourse is most likely to result in pregnancy. (5.3.12.A4-5)
7. Describe the major events of pregnancy. (5.3.12.A4-5; 2.4.12.C.1) 8. Describe the functions of the amnion and placenta.
9. Describe the stages of birth and role that hormones play in this process. (2.4.12.C.1)
10. Describe the structure and function of mammary glands.
11. Identify several methods of birth control and evaluate the effectiveness of each method. (2.4.12.B.5)

12. Explain the symptoms and causes of sexually transmitted diseases. (2.1.12.C.1; 2.4.12.B.5)
13. List and describe diseases/disorders associated with the female reproductive system. (5.3.12.A1, 5.3.12.A6; 5.3.12.A3-4; 2.1.12.C.1-4; 9.4.12.H.4; 9.4.12.H.5-15; 9.4.12.H.20-29; 9.4.12.H.38-44; 9.4.12.H.60-61)
14. Define important terminology of the female reproductive system.

**B. Activities:**

1. Teacher lecture, demonstrations, and class discussions pertaining to the objectives listed above. (AS, CS)
2. In pairs, students will investigate disorders and other health issues that may arise relating to the female reproductive system by using the Internet and the Applications Manual. They will create a brief presentation according to the discussed rubric (causes, symptoms, treatments and resources used). (AR, AS)
3. Using "Anatomy 360°" and the computers, students will examine digital representations of the human body from various perspectives and complete analysis questions about the female reproductive system. (AS)
4. Using "Interactive Physiology" and the computers, students will complete the female reproductive system module. (AS)
5. Students create a poster and present the major events of the menstrual cycle (AS, CS)
6. Students participate in a jigsaw activity in which they become experts on a given topic and then teach this topic to their classmates in small learning groups. (AS, CS)
7. Students check slides of the major reproductive organs using microscopes (AS, CS, AR)

**C. Evaluations:**

1. "Anatomy 360°" analysis questions will count towards the lab grade.
2. A quiz will be administered to assess understanding of female reproductive anatomy and physiology.
3. Concept maps will be graded according to the distributed rubric.
4. Student presentations will be graded according to the distributed rubric.
5. A test will be administered assessing comprehension of the unit objectives.

**D. Resources:**

1. Martini, Fundamentals of Human Anatomy & Physiology, 7<sup>th</sup> edition
2. PowerPoint presentations, CD-ROM images
3. "Anatomy 360°" CD-ROM
4. "Interactive Physiology" CD-ROM 5.  
Computer lab with Internet access
6. Marieb, Anatomy & Physiology Coloring Workbook
7. Kapit and Elson, The Anatomy Coloring Book
8. Kapit, Macey, and Meisami, The Physiology Coloring Book
9. Poster paper and art supplies

## **IX. Male Reproductive System**

### **A. Objectives: The Student Will Be Able To**

1. State the functions of the male reproductive system.
2. List the parts of the male reproductive system and describe the function of each part. (9.4.12.H.3-4)
3. Name the endocrine and exocrine products of the testes.
4. Discuss the importance of semen and name the glands that produce it. 5. Describe the structure of sperm and relate the structure to its function.
6. Trace the pathway followed by sperm from the testes to the exterior of the body. (5.3.12.A3)
7. Explain the symptoms and causes of sexually transmitted diseases. (2.1.12.C.1; 2.4.12.B.5)
8. List and describe diseases/disorders associated with the male reproductive system. (5.3.12.A1, 5.3.12.A6; 5.3.12.A3-4; 2.1.12.C.1-4; 9.4.12.H.4; 9.4.12.H.5-15; 9.4.12.H.20-29; 9.4.12.H.38-44; 9.4.12.H.60-61)
9. Define important terminology related to the male reproductive system.

### **B. Activities:**

1. Teacher lecture, demonstrations, and class discussions pertaining to the objectives listed above. (AS, CS)
2. In pairs, students will investigate disorders and other health issues that may arise in the male reproductive system using the Internet and the Applications Manual. They will create a brief presentation according to the discussed rubric (causes, symptoms, treatments and resources used). (AR, AS)
3. Using "Anatomy 360°" and the computers, students will examine digital representations of the human body from various perspectives and complete analysis questions about the urinary system. (AS)
4. Using "Interactive Physiology" and the computers, students will complete the urinary system module. (AS)
5. Trace the path of sperm after it is created from the testis to the external environment (AS, AR)
6. Students participate in a jigsaw activity in which they become experts on a given topic and then teach this topic to their classmates in small learning groups. (AS, CS)

### **C. Evaluations:**

1. "Anatomy 360°" analysis questions will count towards the lab grade.
2. A quiz will be administered to assess understanding of male reproductive anatomy and physiology.
3. Concept maps will be graded according to the distributed rubric.
4. Student presentations will be graded according to the distributed rubric.
5. A test will be administered assessing comprehension of the unit objectives.

### **D. Resources:**

1. Martini, Fundamentals of Human Anatomy & Physiology, 7<sup>th</sup> edition
2. PowerPoint presentations, CD-ROM images
3. "Anatomy 360°" CD-ROM

4. "Interactive Physiology" CD-ROM
5. Computer lab with Internet access
6. Marieb, Anatomy & Physiology Coloring Workbook
7. Kapit and Elson, The Anatomy Coloring Book
8. Kapit, Macey, and Meisami, The Physiology Coloring Book

## **APPENDIX A**

### *Acronyms for Learning Styles*

#### **The Concrete Random Learner (CR)**

The concrete random learning preference is characterized by an experimental attitude and accompanying behavior. CR learners get the gist or ideas quickly and demonstrate the ability to make intuitive leaps in exploring unstructured problem solving experience sometimes they also have insights and make leaps in structured situations. Then they are chided for not showing their work of jumping to conclusions.

Concrete random learners utilize the trial-and-error in acquiring information. They do not like cut-and-dries procedures that deny them opportunities to find answers in their own ways. They do not respond well to teacher intervention in their dependent efforts. They work well independently or in small groups.

*CR instructional preferences-* mini-lecture, games, simulation, open ended activities, brainstorming.

#### **The Concrete Sequential Learner (CS)**

The concrete sequential learning preference is characterized by the propensity to derive information through direct, hands on experience. CS learners exhibit extraordinary development of their five senses. They appreciate order and logical sequence of the if-then, premise-conclusion variety. They like touchable, concrete materials. In a biology class, a plaster model handled by the teacher would be insufficient for these learners. They want to have the real thing to take apart themselves. The CS learners prefer step-by-step directions when confronted with a learning situation. They not only look for directions but they follow them. They like clearly ordered presentations and a quiet atmosphere.

*CR instructional preferences- Checklists,* charts, practical problems, computer programs, outlines, demonstrations

#### **The Abstract Sequential Learner (AS)**

The abstract sequential learning preference is characterized by excellent decoding abilities with written, verbal, and image symbols. AS learners have a wealth of conceptual "pictures" in their minds against which they read, hear, or see in graphic and pictorial form. They possess and like to use reading, listening, and visual translation skills. A symbol or picture is worth a thousand words to them.

These learners prefer a presentation that has substance, is rational and is sequential in nature. They are able to extract the main ideas from a logical presentation. They learn well from authorities and like vicarious experiences.

AS instructional preferences - lecture, note taking, writing reports, individualized study, instructional media

### **The Abstract Random Learner (AR)**

Abstract random learners are distinguishable by their attention to human behavior and a capacity to sense and interpret "vibrations". They are attuned to nuances of atmosphere and mood. They associate the medium with the message and tie a speaker's manner, delivery, and personality to the message being conveyed. In doing so, they evaluate a learning experience as a whole.

Abstract act random learners prefer to receive information in an unstructured manner and therefore like group discussions, activities which involve multi-sensory experiences, and busy environments. They prefer freedom from rules and guidelines. They seem to gather information and delay reaction; they organize material through reflection to get what they want.

AR instructional preferences- group work, music, poetry, short reading or lecture with discussion, personalized examples role play, journals.