

# **Fair Lawn Public Schools**

**Fair Lawn, NJ**

## **Anatomy & Physiology CP**

**August**

# **2015**

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Anatomy & Physiology CP is a lab science class developed by the Fair Lawn High School science team and aligned to the Next Generation Science Standards which are correlated to the Common Core Standards for Language Arts Literacy and for Math

## **Science Department**

# **Fair Lawn School District**

## **Committee Credits**

### **Written By**

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### **With Input from**

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# Anatomy & Physiology CP

## I. Course Synopsis

This course will address the study of the human body and diseases which affect balance within the human body. The mode of presentation will be of particular interest and importance to students who wish to pursue careers in the allied health fields. The following themes will be addressed for each of the systems of the human body:

1. Structure and function
2. Effects of diseases
3. Exploration of various health related career fields related to anatomy
4. Brief introduction to comparative anatomy and physiology of male and female humans
5. Application anatomy and physiology to personal health and well being

This lab based course is worth five credits. Pre-requisites apply.

## II. Philosophy & Rationale

The purpose of this course is to address a deeper understanding of the human body for personal health and for students who wish to explore a career in the allied health sciences.

This course has been aligned to and developed with the Next Generation Science Standards (NGSS) as its focus. Efforts have been made to integrate aspects of other science standards, particularly the earth and space science standards into this course to assure that students are provided an opportunity to form connections.

All NGSS aligned courses in the Fair Lawn Schools demonstrate a commitment preparing students to become [college and career ready](#) as well as the other guiding assumptions of the [Frameworks for Science Education](#) (NRC, 2011) and the [NGSS](#) including

- Students are born investigators;
- Science instruction should focus on core ideas and practices;
- An understanding of science develops over time;
- Science and engineering require both knowledge and practice;
- Science education must connect to students' interests and experiences; and
- Promoting equity for all students must be a focus of science education.

Additionally, all NGSS aligned courses in the Fair Law Schools integrate the three dimensions discussed in the [Frameworks for Science Education](#) and the NGSS, including

- [Science & Engineering Practices](#) which describe behaviors that scientists engage in as they investigate and build models and theories about the natural world and the key set of engineering practices that engineers use as they design and build models and systems; ([NGSS PDF](#))
- [Cross Cutting Concepts](#) which link all domains of science and provide an organizational schema for interrelating knowledge from various science fields into a coherent and scientifically-based view of the world; ([NGSS PDF](#)) and
- [Disciplinary Core Ideas](#) which focus and unite K-12 science, have a broad importance across multiple sciences or engineering disciplines or are a key organizing concept within a single discipline; provide a key tool for understanding or investigating more complex ideas and solving problems; relate to the interests and life experiences of students; are connected to societal or personal concerns that require scientific or technological knowledge; and are teachable and learnable over multiple grades at increasing depth and sophistication. ([NGSS PDF](#))

Since coherence is a main dimension of the NGSS, consider reviewing the “story line” for the middle school [physical science](#), [life science](#), [earth and space science](#), and [engineering, technology and applications of science](#), as well as the high school [physical science](#), [life science](#), [earth and space science](#), and [engineering, technology and application of science](#) for a full picture of the NGSS philosophy. For a full picture of how these programs are implemented in the Fair Lawn Schools, visit the [district curriculum website](#).

As described in the NGSS, technical writing and reading non-fiction is also a focus of our 6-12 science curricula as required by the [CCSS](#). Students are expected to think critically about data they collect or read about and then express their thoughts through text-based narratives, journal entries, short-constructed response, argument-based writing, and/or in-class discussion.

Differentiated instruction for students at different levels of achievement and specific learning needs (e.g. special education, English Language Learners (ELL), at-risk, and Gifted & Talented) is embedded in targeted scaffolding based on knowledge of each student’s interests, needs, and assessment data, including, but not limited to, in class formative and summative assessments.

When deemed appropriate, department teachers will engage students in purposeful paired discussions to share information more effectively, such as the “turn and talk” (Harvey &

Daniels, 2009). “Text annotation” could be used, for example to optimize reading comprehension (Daniels & Steineke, 2010).

This is an elective lab science class. During this transition from the 2009 NJCCS to the 2013 NGSS, this course will address HS-LS-1 and HS-LS-3 as well as many 2009 NJCCCS.

A particular focus will be made on the [cross cutting concepts](#) and the [science and engineering processes](#)

### III. Scope & Sequence

The Anatomy & Physiology CP program consists of thematic units which focus on major themes and systems of the human body. Within each unit, and understanding of homeostasis, the effects of disease, and careers in science and health are developed. Each unit develops new content with consistent emphasis on the science and engineering processes, disciplinary core ideas, and cross cutting concepts reflective of the Next Generation Science Standards and the Frameworks for Science Education.

#### **Unit 1: Levels of Organization (4 Weeks)**

1. Organisms are organized into various *structures* with different *functions*.
2. The *patterns* of this organization allow for the complexity of the organism.
3. Homeostasis must be maintained for the proper function of the organism.

#### **Unit 2: Support & Movement (6 Weeks)**

1. The integumentary, skeletal, and muscular systems provide for support and movement of the human organism.
2. When homeostasis is disrupted in any of these systems, disease or dysfunction may result.

#### **Unit 3: Integration and Coordination (8 Weeks)**

1. The nervous and endocrine systems provide integration and coordination of the human organism.
2. When homeostasis is disrupted in any of these systems, disease or dysfunction may result.

#### **Unit 4: Transport (3 Weeks)**

1. The blood, cardiovascular system, and lymphatic system help to provide a system of transport of important materials through the human organism.
2. When homeostasis is disrupted in any of these systems, disease or dysfunction may result.

#### **Unit 5: Absorption & Excretion (5 Weeks)**

1. The digestive system provides a system of method of delivery and absorption of important materials through the human organism.
2. When homeostasis is disrupted in this system, disease or dysfunction may result.

#### **Unit 6: Human Life Cycle (4 Weeks)**

1. The reproductive system provides a system of continuity for the human organism.
2. When homeostasis is disrupted in any of these systems, disease or dysfunction may result.

## IV. Unit Descriptions

### Unit 1: Levels of Organization

#### Enduring Understandings

1. Organisms are organized into various *structures* with different *functions*.
2. The *patterns* of this organization allow for the complexity of the organism.
3. Homeostasis must be maintained for the proper function of the organism.

#### Essential Question(s)

1. Why is the study of anatomy and physiology important?
2. How are higher animals organized?
3. How do organisms maintain life through homeostatic mechanisms?
4. Why is chemistry important to the study of anatomy and physiology?
5. What causes atoms to chemically bond in predictable manners?
6. How are major groups (proteins, lipids, carbohydrate, and nucleic acids) of organic compounds utilized in the body?
7. How do cells of the body differ from each other?
8. Why are cell membranes crucial to the maintenance of homeostasis in living things?
9. How does the structure of the cell allow the cell to maintain homeostasis?
10. Why are stem cells important in biological systems?
11. How do metabolic processes allow organisms to maintain homeostasis?
12. What is the importance of DNA in biological systems?
13. Why are proteins crucially important to biological systems?
14. What is the role of proteins in metabolic reactions?
15. What is the importance of epithelial tissues in biological systems?
16. What is the importance of connective tissues in biological systems?
17. Why are different types of muscle tissue utilized throughout the body?
18. What is the function of nervous tissues in the body?

#### Learning Objectives

1. Explain how anatomy and physiology are related.
2. Identify the levels of organization of the body and explain the characteristics of each level.
3. Describe the major characteristics of life.
4. Describe the major process of metabolism in living things.
5. Describe the major requirements that organisms must have in order to survive.

6. Illustrate the critical importance of homeostasis for survival of all organisms.
7. Distinguish the components of homeostatic mechanism and examine how these mechanisms function to allow organisms to maintain homeostasis.
8. Explain why an understanding of chemistry is important to the study of living things.
9. Describe the relationship between matter, atoms, and molecules.
10. Identify how atomic structure determines how atoms interact.
11. Describe the three types of chemical reactions.
12. Define acids, bases, and buffers.
13. Describe and be able to utilize the pH scale.
14. List the major inorganic chemicals found in the body and identify the functions of each.
15. Identify the function of the major groups of organic compounds in the body.
16. Explain how cells differ from one another.
17. Describe the structure of cell membranes and how membranes help cells maintain homeostasis.
18. Explain the structure and function of the organelles of the cell.
19. Describe the structure and function of the nucleus.
20. Explain how substances are moved in and out of the cell.
21. Describe the cell cycle and why it is important.
22. Explain the importance of stem cells and progenitor cells in the growth and repair of tissue.
23. Indicate how cell differentiation allow for cells of different types despite these cells containing the same genetic material.
24. Explain the function of metabolism.
25. Compare and contrast anabolism and catabolism.
26. Describe the importance of the enzymes utilized in metabolic reactions.
27. Identify sources of biological energy for the body.
28. Describe how cellular respiration releases energy that is utilized to manufacture ATP to supply the energy needs of the cell.
29. Describe how DNA molecules are replicated and store the genetic information for organisms.
30. Explain how proteins are manufactured through protein synthesis.
31. Identify the four major types of tissues and the function of each type.
32. Describe the structure and function of epithelial tissues.
33. Name the types of epithelium and identify examples of organs where each is found.
34. Explain how glands are classified.
35. Compare and contrast the ground substance, cells, and fibers in different types of connective tissue.

36. Describe the structure and function of each type of connective tissues.
37. Identify the location in the body of each type of connective tissue.
38. Distinguish among the four types of membranes.
39. Distinguish among the three types of muscle tissue.
40. Describe the structure and function of nervous tissue.

**Suggested Activities & Suggested Modifications for Special Education Students, ELL Students, Students at Risk, and Gifted Students:**

1. Students with special needs and ELL learners may be provided with key vocabulary terms prior to the unit beginning.
2. ELL students may be provided with additional visual aids. For additional modifications, refer to [Classroom Instruction that Works for ELL Learners](#) or the SIOP protocol.
3. Gifted students may be challenged by asking them to form additional connections between biology, chemistry, and physics.

**NGSS Connections:**

**HS – LS1-3**      [Evidence Statement](#)

**Use argument supported by evidence for how the body is a system of interacting subsystems composed of groups of cells.** [Clarification Statement: Emphasis is on the conceptual understanding that cells form tissues and tissues form organs specialized for particular body functions. Examples could include the interaction of subsystems within a system and the normal functioning of those systems.] [Assessment Boundary: Assessment does not include the mechanism of one body system independent of others. Assessment is limited to the circulatory, excretory, digestive, respiratory, muscular, and nervous systems.]

**Cross-Content Connections:**

**CCCS Math:** Click on the link to the High School Evidence Statements to see expectations related to mathematics for this unit.

**CCCS Literacy:** Click on the link to the High School Evidence Statements to see expectations related to literacy for this unit. In addition, a focus of the course will be on the development of the [LAL standards for science & technical subjects](#).

**8.1:** Use technology to collect and analyze data and to communicate findings with local peers and peers from other communities.

**9.2:** Explore careers directly related to health careers.

**Unit 2: Support & Movement**Enduring Understanding

3. The integumentary, skeletal, and muscular systems provide for support and movement of the human organism.
4. When homeostasis is disrupted in any of these systems, disease or dysfunction may result.

Essential Question(s)

1. How do these systems function to provide support and movement for the human organism?
2. What diseases result from a disruption of homeostasis?

Learning Objectives

1. Identify the five components that compose the integumentary system.
2. Describe the function of the epidermis.
3. Explain the importance of the epidermis in Vitamin D production.
4. Identify the two layers of the skin.
5. Explain the importance of the dermis to the epidermis.
6. Identify what connects the dermis connects the epidermis.
7. Describe the importance of the subcutaneous layer.
8. Describe the importance of the stratum basale.
9. Explain why the cells of the stratum corneum are dead.
10. Describe ceratinocytes, explain where they are found, and identify their importance.
11. Explain the formation of a corn.
12. Explain the formation of a callus.
13. Describe what a melanocyte is and identify their importance.
14. Explain why people have different color skin and identify what determines skin color.
15. Describe what determines fingerprints.
16. Identify the components of the dermis.
17. Describe cutaneous carcinomas, identify what individuals are most susceptible, where they typically occur, and explain the typical treatment measures.
18. Describe cutaneous melanomas, identify what individuals are most susceptible, where they typically occur, and explain the typical treatment measures.
19. Indicate ways to reduce the chance of developing carcinomas and melanomas.
20. Explain in detail how nails form.
21. Explain in detail how hair forms.
22. Describe why hair is different colors.

23. Describe the glands of the skin (sebaceous, merocrine sweat, apocrine sweat, ceruminous, mammary) and explain the function of each.
24. Explain in detail how the body regulates temperature to maintain homeostasis.
25. Describe why inflammation occurs at the site of a wound.
26. Explain why inflammation is important to the healing of a wound.
27. Describe the healing of shallow wounds.
28. Describe the healing of dermal and subcutaneous wounds.
29. Explain how scabs form and their importance.
30. Describe the formation of scars.
31. Describe the healing of large, open wounds.
32. Describe the function of bone.
33. Identify the parts of a long bone.
34. Compare and contrast spongy and compact bone.
35. Describe the microscopic structure of spongy and compact bone.
36. Explain the process of endochondral bone development.
37. Describe what an epiphyseal plate is and why epiphyseal plates are important.
38. Describe how endochondral bones grow both in length and diameter.
39. Compare and contrast osteoblast vs. osteoclast vs. osteocytes.
40. Explain the importance of bone remodeling.
41. Evaluate the importance of bone remodeling in the maintenance of homeostasis in both bone and the homeostasis of the body.
42. Describe how the body moves through the use of the skeleton (bar, fulcrum, resistance force).
43. Explain how bones function in the formation of blood.
44. Explain how bone remodeling maintains calcium homeostasis in the body.
45. Describe the general and specific reason why bones fracture.
46. Explain compound fractures.
47. Describe how bones heal following a fracture.
48. Describe bone marrow transplants and the circumstances under which a bone marrow transplant would be important.
49. Identify and label the major bones of the body.
50. Describe a joint.
51. Identify the three types of joints, based on movement, and provide examples.
52. Identify the three types of joints, based on type of binding tissue, and provide examples.
53. List and understand the difference between each of the synovial joints and provide an example of each.
54. Describe a sprain.

55. Describe bursitis and arthritis.
56. Explain rheumatoid arthritis, lyme arthritis, and osteoarthritis, including symptoms and treatment.
57. Explain how movement occurs at joints.
58. Describe arthroscopic medical procedures.
59. Understand the difference between different types of joint movements.
60. Discuss the importance of resistance training in muscle maintenance.
61. Identify four benefits of resistance training.
62. Understand and be able to describe the structure of a skeletal muscle (fascia to filaments).
63. Label a diagram of a skeletal muscle.
64. Label a micro-scale diagram of a skeletal muscle.
65. Describe tendonitis and treatment options for tendonitis.
66. Explain how muscle contractions occur.
67. Describe a neuron-muscular junction.
68. Explain the importance of neurotransmitters and their role in muscle contraction.
69. Describe the role of the neurotransmitter acetylcholine and its function at motor nerve endings.
70. Explain the role of neurons in muscle contraction.
71. Describe the symptoms of ALS.
72. Describe why skeletal muscles are striated.
73. Explain what a cross-bridge is and the role of cross-bridges in muscle contraction.
74. Describe the function and importance of acetylcholinesterase.
75. Identify a sarcomere and its role in muscle contraction.
76. Describe muscle strains and why they occur.
77. Explain the sliding filament model.
78. Explain the role of ATP, sodium, and calcium in muscle contraction.
79. Identify the sources of energy for muscles.
80. Describe how muscles get oxygen (hemoglobin).
81. Explain why oxygen is important to muscles.
82. Describe what occurs when oxygen is depleted in muscles.
83. Explain oxygen debt and why it occurs.
84. Describe how oxygen debt in the body is rectified.
85. Evaluate how exercise intensity influences the availability of oxygen and energy in muscle cells.
86. Describe muscle fatigue and its causes.
87. Describe muscle cramps and their causes.

88. Explain rigor mortis.
89. Describe steroids and compare & contrast the advantages and disadvantages of steroid use.
90. Explain threshold stimulus.
91. Describe muscle twitch and identify types of muscle twitch. Describe the forms of exercise that favor each type of muscle based on twitch.
92. Describe summation and recruitment in muscles.
93. Interpret how summation and recruitment are related for practical use of muscles.
94. Compare and contrast muscle atrophy and hypertrophy and explain the causes of each.
95. Compare and contrast slow twitch versus fast twitch muscle development and identify the types of exercises that would develop each.
96. Explain a muscle pull.
97. List the characteristics of smooth muscle.
98. List the types of smooth muscle.
99. Identify the location and function of smooth muscle throughout the body.
100. List the characteristics of cardiac muscle.
101. Identify the location and function of cardiac muscle.
102. Compare and contrast the differences between skeletal vs smooth vs cardiac muscle.
103. Identify the major muscles of the body.

**Suggested Activities & Suggested Modifications for Special Education Students, ELL Students, Students at Risk, and Gifted Students:**

1. Students with special needs and ELL learners may be provided with key vocabulary terms prior to the unit beginning.
2. ELL students may be provided with additional visual aids. For additional modifications, refer to [Classroom Instruction that Works for ELL Learners](#) or the SIOP protocol.
3. Gifted students may be challenged by asking them to form additional connections between biology, chemistry, and physics.

**NGSS Connections:**

The focus of this unit will be on the [cross cutting concepts](#) of the NGSS including cause and effect, scale, proportion, energy and matter, form and and function, and stability and change.

**Cross-Content Connections:**

**CCCS Math:** Students will be expected to perform measurement, [modeling](#), apply [algebra](#), and [geometry](#) and [statistics](#).

**CCCS Literacy:** Click on the link to the High School Evidence Statements to see expectations related to literacy for this unit. In addition, a focus of the course will be on the development of the [LAL standards for science & technical subjects](#).

**8.1:** Use technology to collect and analyze data and to communicate findings with local peers and peers from other communities.

**9.2:** Explore careers directly related to health careers.

### **Unit 3: Integration & Coordination**

#### Enduring Understanding

1. The nervous and endocrine systems provide integration and coordination of the human organism.
2. When homeostasis is disrupted in any of these systems, disease or dysfunction may result.

#### Essential Question(s)

1. How do these systems function to maintain integration and coordination for the human organism?
3. What diseases result from a disruption of homeostasis?

#### Learning Objectives

1. Identify the specific functions of the nervous system.
2. Identify the parts of a neuron and the function of each.
3. Describe the composition of nervous tissue.
4. Identify the two major subdivisions of the nervous system.
5. Describe the three general functions of the nervous system.
6. Describe the two categories that the motor functions of the nervous system are divided into.
7. List the five types of neuroglial cells and the function of each.
8. Label the parts of a neuron.
9. Describe myelin and explain its function and production in neurons.
10. Identify the three classifications of neurons based on structure.
11. Describe the three types of neurons based on function.
12. Describe synapses and label the parts of a synapse.
13. Describe neurotransmitters, their function, origin, and degradation.
14. Explain in detail the conduction of nerve impulses.
15. Describe the factors that are important in the speed of impulse conduction.
16. Explain all-or-none response.

17. Explain why refractory periods are important.
18. Describe synaptic transmission, excitatory and inhibitory neurotransmitters, the release and decomposition (or uptake) of neurotransmitters, and the importance of decomposition and/or uptake of neurotransmitters.
19. Describe impulse processing, including the importance of neural pools, facilitation, and divergent vs. convergence.
20. Compare and contrast motor vs. sensory vs. mixed nerves.
21. Explain reflexes.
22. Compare and contrast a simple reflex and a withdrawal reflex.
23. List the three layers of meninges found in the central nervous system and describe the importance of each.
24. Explain why blows to the head resulting in concussions and subdural hematomas are dangerous.
25. Describe the structure of the spinal cord and explain its function.
26. Compare and contrast ascending and descending tracts.
27. Compare and contrast central and peripheral nervous system.
28. Describe spinal reflexes.
29. Label the parts of the brain.
30. List the parts of the brain and describe the functions of each.
31. Describe cranial nerves, providing examples and functions of each (motor or sensory).
32. Describe spinal nerves, providing examples, organization, and function of each.
33. Compare and contrast the somatic and autonomic nervous systems.
34. Compare and contrast the sympathetic and parasympathetic divisions of the autonomic nervous system.
35. Explain how autonomic nervous system activity is controlled.
36. Identify the senses and explain the important structures & functions of each.
37. Identify and describe the locations of the major endocrine glands and list the hormones they secrete.
38. Compare and contrast endocrine and exocrine glands.
39. Identify common hormones and the function of each.
40. Explain how steroid and non-steroid hormones affect target cells.
41. Discuss how negative feedback mechanisms regulate hormone secretion.
42. Explain how the nervous system controls the secretion of hormones.

**Suggested Activities & Suggested Modifications for Special Education Students, ELL Students, Students at Risk, and Gifted Students:**

1. Students with special needs and ELL learners may be provided with key vocabulary terms prior to the unit beginning.
2. ELL students may be provided with additional visual aids. For additional modifications, refer to Classroom Instruction that Works for ELL Learners or the SIOP protocol.
3. Gifted students may be challenged by asking them to form additional connections between biology, chemistry, and physics.

**NGSS Connections:**

The focus of this unit will be on the [cross cutting concepts](#) of the NGSS including cause and effect, scale, proportion, energy and matter, form and and function, and stability and change.

**Cross-Content Connections:**

**CCCS Math:** Students will be expected to perform measurement, [modeling](#), apply [algebra](#), and [geometry](#) and [statistics](#).

**CCCS Literacy:** Click on the link to the High School Evidence Statements to see expectations related to literacy for this unit. In addition, a focus of the course will be on the development of the [LAL standards for science & technical subjects](#).

**8.1:** Use technology to collect and analyze data and to communicate findings with local peers and peers from other communities.

**9.2:** Explore careers directly related to health careers.

**Unit 4: Transport**Enduring Understanding

3. The blood, cardiovascular system, and lymphatic system help to provide a system of transport of important materials through the human organism.
4. When homeostasis is disrupted in any of these systems, disease or dysfunction may result.

Essential Question(s)

1. How do these systems function to provide a means for transportation within the human organism?
2. What diseases result from a disruption of homeostasis?

Learning Objectives

1. Explain the function of the heart.
2. Compare and contrast the pulmonary and systemic circuits.

3. Create a flow chart that illustrates the path of blood through the circulatory system.
4. Explain the difference between arteries, veins, and capillaries.
5. List the components of blood and the function of each.
6. Identify the location of the heart.
7. List the three layers of the heart wall and explain the composition of each.
8. Compare and contrast cardiac muscle with smooth & skeletal muscle.
9. Explain how the heart maintains homeostasis in the body.
10. List and describe five major disorders associated with the circulatory system.
11. Describe the general functions of the lymphatic system.
12. Identify the locations of major lymphatic pathways.
13. Describe a lymph node and its major functions.
14. Discuss location and functions of the thymus and spleen.
15. Distinguish between innate (nonspecific) and adaptive (specific) defenses.
16. Distinguish between active and passive immunity.
17. Explain how allergic reactions, tissue rejections, and autoimmunity arise from the immune system.

**Suggested Activities & Suggested Modifications for Special Education Students, ELL Students, Students at Risk, and Gifted Students:**

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2. ELL students may be provided with additional visual aids. For additional modifications, refer to [Classroom Instruction that Works for ELL Learners](#) or the SIOP protocol.
3. Gifted students may be challenged by asking them to form additional connections between biology, chemistry, and physics.

**NGSS Connections:**

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**HS-LS1-7 [Evidence Statements](#)**

**Develop a model to describe how food is rearranged through chemical reactions forming new molecules that support growth and/or release energy as this matter moves through an organism. [Clarification Statement: Emphasis is on describing that molecules are broken apart and put back together and that in this process, energy is released.] [Assessment Boundary: Assessment does not include details of the chemical reactions for photosynthesis or respiration.]**

**Cross-Content Connections:**

**CCCS Math:** Students will be expected to perform measurement, [modeling](#), apply [algebra](#), and [geometry](#) and [statistics](#). Click on the link to the High School Evidence Statements to see expectations related to mathematics for this unit.

**CCCS Literacy:** Click on the link to the High School Evidence Statements to see expectations related to literacy for this unit. In addition, a focus of the course will be on the development of the [LAL standards for science & technical subjects](#). Click on the link to the High School Evidence Statements to see expectations related to literacy for this unit. In addition, a focus of the course will be on the development of the [LAL standards for science & technical subjects](#).

**8.1:** Use technology to collect and analyze data and to communicate findings with local peers and peers from other communities.

**9.2:** Explore careers directly related to health careers.

**Unit 5: Absorption & Excretion**Enduring Understanding

3. The digestive system provides a system of method of delivery and absorption of important materials through the human organism.
4. When homeostasis is disrupted in this system, disease or dysfunction may result.

Essential Question(s)

1. How does this system provide a means for delivery and absorption within the human organism?
2. What diseases result from a disruption of homeostasis?

Learning Objectives

1. Describe the process of digestion.
2. Explain the difference between mechanical and chemical digestion.
3. Describe the structure of the wall of the alimentary canal.
4. Describe the process of peristalsis.
5. List and describe the parts of the digestive system.
6. Label the digestive system.
7. Explain composition and function of saliva, gastric juice, pancreatic juice, and bile.
8. Describe the function of the mesentery.
9. Describe the structure and function of villi.
10. List the major sources of carbohydrates, lipids, and proteins.
11. Describe how cells use carbohydrates, lipids, and proteins.

12. Evaluate current diet and extrapolate how positive changes in diet can result in improved health.
13. Explain absorption in the stomach, small intestines, and large intestines.
14. Explain the elimination of solid waste from the body.
15. List the general functions of the organs of the urinary system.
16. Describe the location, structure, and function of the kidneys.
17. Describe the structure, function, and location of ureters, urinary bladder, and urethra.
18. Explain why you breathe.
19. Describe the stages of breathing.
20. Label the respiratory system.
21. List and describe the organs of the respiratory system, including function.
22. Explain the exchange of gases between the blood and lungs at the alveoli.
23. Explain the respiratory cycle.
24. List and explain the malfunctions and diseases of the respiratory system.
25. List and explain the four respiratory processes.

**Suggested Activities & Suggested Modifications for Special Education Students, ELL Students, Students at Risk, and Gifted Students:**

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2. ELL students may be provided with additional visual aids. For additional modifications, refer to [Classroom Instruction that Works for ELL Learners](#) or the SIOP protocol.
3. Gifted students may be challenged by asking them to form additional connections between biology, chemistry, and physics.

**NGSS Connections:**

The focus of this unit will be on the [cross cutting concepts](#) of the NGSS including cause and effect, scale, proportion, energy and matter, form and and function, and stability and change.

**Cross-Content Connections:**

**CCCS Math:** Students will be expected to perform measurement, [modeling](#), apply [algebra](#), and [geometry](#) and [statistics](#).

**CCCS Literacy:** Click on the link to the High School Evidence Statements to see expectations related to literacy for this unit. In addition, a focus of the course will be on the development of the [LAL standards for science & technical subjects](#).

**8.1:** Use technology to collect and analyze data and to communicate findings with local peers and peers from other communities.

**9.2:** Explore careers directly related to health careers.

**Unit 6: Human Life Cycle**Enduring Understanding

3. The reproductive system provides a system of continuity for the human organism.
4. When homeostasis is disrupted in any of these systems, disease or dysfunction may result.

Essential Question(s)

1. How does this system provide for continuity within the human organism?
2. What diseases result from a disruption of homeostasis?

Learning Objectives

1. Describe the general functions of the male reproductive system.
2. Describe the function of each part of the male reproductive system.
3. Create a flow chart outlining the process of spermatogenesis.
4. Describe the production and release of semen from the body.
5. Explain how hormones control the activities of the male reproductive organs including the development of male secondary sexual characteristics.
6. Describe the general functions of the female reproductive system.
7. Describe the function of each part of the female reproductive system.
8. Create a flow chart outlining the process of oogenesis.
9. Explain how hormones control the activities of the female reproductive organs, including the development of female secondary sexual characteristics.
10. Outline the stages of the female reproductive cycle.
11. Describe the process of fertilization.
12. Identify milestones in development of a human embryo and fetus.
13. Describe the process of human delivery and birth.
14. Describe several methods of birth control, including the relative effectiveness of each method.
15. List the symptoms of common sexually transmitted infections.

**Suggested Activities & Suggested Modifications for Special Education Students, ELL Students, Students at Risk, and Gifted Students:**

1. Students with special needs and ELL learners may be provided with key vocabulary terms prior to the unit beginning.
2. ELL students may be provided with additional visual aids. For additional modifications, refer to Classroom Instruction that Works for ELL Learners or the SIOP protocol.

3. Gifted students may be challenged by asking them to form additional connections between biology, chemistry, and physics.

**NGSS Connections:**

The focus of this unit will be on the [cross cutting concepts](#) of the NGSS including cause and effect, scale, proportion, energy and matter, form and and function, and stability and change.

**Cross-Content Connections:**

**CCCS Math:** Students will be expected to perform measurement, [modeling](#), apply [algebra](#), and [geometry](#) and [statistics](#).

**CCCS Literacy:** Click on the link to the High School Evidence Statements to see expectations related to literacy for this unit. In addition, a focus of the course will be on the development of the [LAL standards for science & technical subjects](#).

**CCCS Health & Physical Education:** This unit will also help students to form connections with the Health & Physical Education standards [2.1, Personal Growth](#)

**8.1:** Use technology to collect and analyze data and to communicate findings with local peers and peers from other communities.

**9.2:** Explore careers directly related to health careers.

**V. Course Materials**

[Hole's Essentials of Astronomy & Physiology w/ Connect Online \(2013\)](#) is the official course textbook which was adopted by the FLBOE in June 2014.

**VI. Assessments**

Classroom assessments are included to primarily guide instruction (formative assessment) and to support decisions made beyond the classroom (summative assessment).

Sample assessments and classroom activities aligned to the NGSS can be found on the [NGSS website](#).

Assessments in this course measure students' performance of scientific and engineering practices in the context of crosscutting concepts and disciplinary core ideas. These may include quizzes, tests, lab reports, lab questions, experimental design projects, engineering design projects, project-based assessments and other assessments with multiple components. ([NRC, 2014](#))

## [NJDOE Science Related Assessment Resources](#)

All Fair Lawn High School grading procedures will be followed.

### **VII. Interdisciplinary Connections and Alignment to Technology standards**

Science classes in the Fair Lawn Public schools promote career-readiness skills related to Personal Financial Literacy (9.1) and Career Awareness, Exploration, and Presentation (9.2). Some course concepts from the Career and Technical Education Standards (9.3), but these are not directly correlated since our district is not a CTE program.

The Fair Lawn Public Schools District fosters an environment that promotes career-readiness skills in all content areas. Whereas [Career Ready Practices](#) are explored consistently, specific alignment to [Personal Finance Literacy \(9.1\)](#) and [Career Awareness, Exploration, and Presentation Standards \(9.2\)](#) are included in the district level document (below). When appropriate, the [Career and Technical Education Standards \(9.3\)](#) have been reviewed and aligned as well.

Examples: 9.2B: Career exploration in each unit of study.

In addition, every effort is made to integrate technology and engineering into our science classes. [Educational Technology \(8.1\)](#) and [Technology Education, Engineering, Design, and Computational Thinking – Programming \(8.2\)](#) standards are cross connected throughout our science programs.

Examples: 8.1A: Use spreadsheets to analyze & interpret data from laboratories, 6-12.  
Use the internet to increase productivity and efficiency, 9-12.  
8.1B,C: Use data to solve real-world problems, 6-12.  
Use online platforms to collaborate & address global issues, 9-12.  
8.1F: Collect and analyze data using internet and data simulations, 6-12.  
8.2A: Become aware of the invention process, 3-5.  
8.2B: Become aware of the global impacts on technology, 6-12.  
8.2C: Apply the design process to pushes & pulls, K-2.  
8.2D: Use tools to reduce work, K-2.

For additional detail on how these standards are integrated throughout the Fair Lawn Schools curriculum, review the Fair Lawn Public Schools District Alignment to Technology & Career Readiness & 21st Century Skills Standards Curriculum Appendix.