

ARTICULATION AGREEMENT

DATE DRAFTED: February 10, 2020

VALID ACADEMIC YEAR(S): 2019-21

LMC COURSE: BIOS-030 Introduction to Anatomy and Physiology

HIGH SCHOOL COURSE: Physiology

School: Dozier-Libbey Medical High School

Address: 4900 Sand Creed Road, Antioch, CA 94531

COLLEGE COURSE DESCRIPTION: This course is designed to cover basic anatomy and physiology. Fundamentals of body structure and function and the elegant interrelationships between body organs and how they perform will be explored. All of the systems of the body, including very basic microscopic anatomy and simple physiological chemistry will be covered in this one semester course.

A. UNITS: 4

B. PRE-REQUISITES: NA

C. REQUIRED CONTENT FOR ARTICULATION:

1 – The Human Body: An Orientation

3. Describe the anatomical position.
4. Define homeostasis and explain its significance.
5. Describe how negative and positive feedback maintain body homeostasis.
6. List the functional characteristics necessary to maintain life in humans.
7. Describe the relationship between homeostatic imbalance and disease.

2 – Chemistry Comes Alive

1. List the four elements that form the bulk of body matter
2. Explain the importance of water and salts to body homeostasis.
3. Describe and compare the building blocks, general structures and biological functions of carbohydrates, lipids, proteins and nucleic acids.

3 – Cells: The Living Units

1. Relate plasma membrane structure to active and passive transport mechanisms.
Differentiate between these transport processes relative to energy source, substances transported, direction and mechanism.
2. List the major organelles of a generalized cell and indicate the function of each.

4 – Tissues: The Living Fabric

1. List several structural and functional characteristics of epithelial tissue.
2. Name, classify and describe the various types of epithelia; also indicate their chief function(s) and location(s).

3. Indicate common characteristics of connective tissue, and list and describe its structural elements.
4. Describe the types of connective tissue found in the body and indicate their characteristic functions.
5. Indicate the general characteristics of nervous tissue.
6. Compare and contrast the structures and body locations of the three types of muscle tissue.

5 – The Integumentary System

1. Name the tissue types composing the epidermis and dermis. List the major layers of each and describe the functions of each layer.
2. Describe how the skin accomplishes at least five different functions.
3. Describe the factors that normally contribute to skin color. Briefly describe how changes in skin color may be used as clinical signs of certain disease states.
4. Explain why serious burns are life threatening. Describe how to determine the extent of a burn and differentiate first, second and third-degree burns.

6 – Bones and Skeletal Tissues

7 – The Skeleton

8 - Joints

1. List and describe five important functions of bones.
2. Describe the process of long bone growth that occurs at the epiphyseal plates.
3. Describe the steps of fracture repair.
4. Describe the differences between an open fracture and a closed fracture.
5. Compare and contrast the three types of joints, both structurally and functionally. Include examples of each type.
6. Name and describe the common body movements.
7. Name the most common sports injuries and discuss the symptoms and problems associated with each.
8. Identify the bones of the appendicular skeleton (upper and lower limb) and their important markings.
9. Name and describe the bones of the axial skeleton, including skull, ribs, and vertebra.

9 – Muscles and Muscle Tissue

10 – The Muscular System

1. List four important functions of muscle tissue.
2. Describe the gross structure of a skeletal muscle.
3. Explain how muscle fibers are stimulated to contract by describing the events that occur at the neuromuscular junction.
4. Describe the sliding filament mechanism of muscle contraction.
5. Describe factors that influence the force, velocity and duration of skeletal muscle contraction.
6. Define motor unit and muscle twitch, and describe the events occurring during the three phases of a muscle twitch.

7. Name and identify the superficial muscles of the body used in locomotion. State the origin, insertion and action of each.

11 – Fundamentals of the Nervous System and Nervous Tissue

12 – The Central Nervous System

13 – The Peripheral Nervous System and Reflex Activity

14 – The Autonomic Nervous System

15 – The Special Senses

1. Explain the structural and functional divisions of the nervous system.
2. Name the major lobes, fissures, functional areas and structures of the brain and spinal cord.
3. Explain how action potentials are generated and propagated along neurons.
4. Define resting membrane potential and describe its electrochemical basis.
5. Define absolute and relative refractory periods.
6. Name the components of a reflex arc and distinguish between autonomic and somatic reflexes.
7. Compare and contrast the functions of the parasympathetic and sympathetic divisions.
8. Describe the structure and function of the eye and its associated accessory structures.
9. Trace the pathway of light through the eye to the retina.
10. Describe the structure and general function of the outer, middle and inner ears.
11. Explain how the balance organs of the semicircular canals and the vestibule help maintain dynamic and static equilibrium.

16 – The Endocrine System

1. Indicate important differences between hormonal and neural controls of body functioning.
2. Describe the two major mechanisms by which hormones bring about their effects on their target tissues.
3. List and describe the chief effects of the hormones released from the pituitary gland. (Be sure to indicate which are anterior and which are posterior)
4. List hormones produced by the thyroid and parathyroid glands and cite their physiological effects.
5. List hormones produced by the adrenal gland and cite their physiological effects.
6. Compare and contrast the effects of the two major pancreatic hormones.
7. Explain how the endocrine system contributes to maintaining homeostasis.
8. Describe how too little or too much of a hormone can lead to a homeostatic imbalance (use a specific example in your explanation).

17 – Blood

18 – The Cardiovascular System: The Heart

19 – The Cardiovascular System: Blood Vessels

1. Describe the six functions of blood and identify the components of blood.
2. Describe the ABO and Rh blood groups and explain the basis of transfusion reaction.
3. Give an example of a hemostatic (blood) disorder and indicate the cause of the condition.
4. Describe the structure and functions of the four heart chambers. Name each chamber and provide the name and general route of its associated great vessels.
5. Trace the pathway of blood through the heart.

6. Describe the general functions of the systemic circuit. Name and give the location of the major arteries and veins in the systemic circulation.
7. Briefly describe the events of cardiac muscle contraction, including ECG events.
8. Define blood flow, blood pressure and resistance, and explain the relationships between these factors.
9. Explain how blood flow is regulated in the body in general and in its specific organs.

22 – The Respiratory System

1. List and describe several protective mechanisms of the respiratory system.
2. Explain and compare the various lung volume and capacities. Indicate type of information that can be gained from pulmonary function tests.
3. Trace a molecule of oxygen through the respiratory system from the external environment to the alveoli.
4. Describe how oxygen is transported in the blood and explain how oxygen loading and unloading is affected by temperature and pH.
5. Describe the process and effects of acclimatization to high altitude.

20 – The Lymphatic System and Lymphoid Organs and Tissues

21 – The Immune System: Innate and Adaptive Body Defenses

1. Describe the basic structure and cellular population of lymphoid tissue and name the major lymphoid organs.
2. Describe the source of lymph and mechanisms of lymph transport.
3. Describe the inflammatory process. Identify several inflammatory chemicals and indicate their specific roles.
4. Explain how fever helps protect the body.
5. Define antigen and describe how antigens affect the immune system.
6. Compare and contrast the origin, maturation process and general function of B and T lymphocytes.
7. Compare and contrast active and passive immunity

23 – The Digestive System

24 – Nutrition, Metabolism and Energy Balance

1. List and define the major processes occurring during digestive system activity.
2. Identify structural modifications of the wall of the stomach and small intestine that enhance the digestive process in these regions.
3. List the six major nutrient categories. Note important sources and main cellular uses.
4. Define metabolism. Explain how catabolism and anabolism differ.
5. Explain what is meant by body energy balance.
6. Trace the path of food through the digestive system, beginning with the mouth and ending with the anus.

25 – The Urinary System

26 – Fluid, Electrolyte and Acid-Base Balance

1. Describe the anatomy of a nephron.
2. List several kidney functions that help maintain body homeostasis.
3. Identify nephron parts responsible for filtration, reabsorption, and secretion and describe the mechanisms underlying each of these functions.

4. Explain formation of dilute versus concentrated urine.
5. Describe feedback mechanisms that regulate water intake and hormonal controls of output in urine.

27 – The Reproductive System

28 – Pregnancy and Human Development

1. Describe the common function of male and female reproductive systems.
2. Describe the structure and function of the testes and explain the importance of their location in the scrotum.
3. Describe the location, structure and function of the ovaries.
4. Describe the process of oogenesis and compare it to spermatogenesis.
5. Indicate the duration of the fetal period, and note the major events of fetal development.
6. Describe changes in maternal reproductive organs and in cardiovascular, respiratory and urinary system functioning during pregnancy.
7. Explain how labor is initiated and describe the three stages of labor.

D. REQUIRED COMPETENCIES (PERFORMANCE OBJECTIVES) FOR ARTICULATION

This course is an advanced life science geared to give an introductory background to students interested in careers in nursing, dentistry, medicine, pharmacy, veterinary medicine, and the life sciences in general. A concentrated study of the human body includes the following areas: cytology, histology, skeletal and muscular systems, the nervous system and special senses, nutrition and the digestive system, the circulatory system, the respiratory system, the endocrine system, and the reproductive system. When possible, an integral part of the course is devoted to work in the laboratory.

Overarching Learning Objectives for the Year

1. Use correct anatomical terms to describe body directions, regions, and body planes or sections.
2. Describe the relationship between homeostatic imbalance and disease.
3. Identify the bones of the axial and appendicular skeleton.
4. Name and identify the major superficial muscles.
5. Name the major human body systems and relate their functions.
6. Synthesize ideas to make a connection between knowledge of anatomy and physiology and real-world situations, including healthy lifestyle

E. METHODS FOR END OF COURSE ASSESSMENT:

Grading Policies:

Students will earn grades based on the percentage of the total points they accumulate over the course of the semester, weighted within the following categories:

Quizzes 65%, Labs & Classwork 10%, Projects 10% and Final Exam 15%

A ≥90.00%, B = 80.00 to 89.99%, C = 70.00 to 79.99%, D = 60.00 to 69.99%, F ≤ 59.99%.

Quizzes will be given according to the class schedule and you are expected to take them even if you are absent the class or classes before the quiz is given. If you are absent on the day of a quiz you will be expected to make up the quiz by the end of the school day on Wednesday (since quizzes are almost always scheduled for Monday), unless you receive specific permission from the teacher for an extended deadline. All quizzes are scaled to 10 points in Aeries, regardless of the number of questions on the quiz. Students scoring less than 70% on a quiz may make up the quiz for a higher score, as long as the learning objectives for the quiz were submitted at the time the quiz was taken. Retaking a quiz requires the completion of a makeup assignment and a second test, usually of different format. Upon retaking the quiz, the minimum score a student will receive is a 50%.

F. PROCEDURES AND/OR CRITERIA FOR COURSE ARTICULATION:

1. Complete the Physiology course at Dozier-Libbey Medical High School with a grade of "B" or better.
2. Receive a "B" or better on the agreed upon college/high school final exam procedure.
3. Be recommended for credit by your high school teacher.
4. Apply for admission at Los Medanos College.
5. Register for CATEMA for electronic submission of college credit **OR** obtain copy of high school transcript and articulation agreement and submit to the LMC Office of Admissions & Records **within the academic year in which credit was earned.**
6. Upon completion of the above, the student will receive on his/her LMC and CCCC (California Community College District) transcripts the units of credit for LMC's BIOSC-030 "Intro to Anatomy & Physiology" course.
7. College transcripts will reflect the **FINAL EXAM GRADE** earned and will be notated as *Credit by Exam.

G. TEXTBOOKS OR OTHER SUPPORTING MATERIALS

1. Human Anatomy and Physiology 7th Edition by Elaine Marieb and Katja Hoehn
2. PhysioEx 7.0 for A&P by Zao, Stabler, Smith, Peterson and Lukuta.
3. Stiff: The curious Life of Human Cadavers by Mary Roach
4. Additional class readings come from Scientific America, The Deadly Dinner Party by Jonathan Edlow and Why Geese Don't Get Obese (and We Do) by Eric Widmaier
5. Students Read one of the following stories of human survival: Into Thin Air, Alive, Mawson's Will, Adrift or The Hot Zone

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COLLEGE SIGNATURES

HIGH SCHOOL/ROP/DISTRICT SIGNATURES

Nancy Ybarra Date
Interim LMC Vice President of Instruction

Scott Osterholt Date
Principal, Dozier-Libbey High School

Ryan Pedersen Date
LMC Dean of Math & Physical Sciences

Mike Santos Date
AUSD Director of Program Improvement

Roy Hanks Date
LMC Biology Department Chair

Christine Ibarra Date
AUSD Associate Superintendent, Educational Services

James Clark Date
Faculty, Los Medanos College

Amy Bettencourt Date
AUSD Director of Educational Services, Instruction Support

Robert Young Date
Faculty, Dozier-Libbey Medical High School