

# 0 Course Revision

## Revisions are required when a school:

- Changes the course title, transcript abbreviation or course code/number
- Changes grade level
- Reduces course length (i.e. from year to semester)
- Eliminates honors status

## Revisions are NOT required when a school:

- Updates course materials
- Makes minor shifts in course content

[> Begin revision](#)

# Medical Anatomy & Physiology

CORE Butte Charter School (054171)

## Basic Course Information

### Abbreviations:

Abbreviation	Course code
Medical Anatomy & Physiology	
a-g Medical Anatomy & Physiology	

### Length of course:

Full Year (2 semesters; 3 trimesters; 4 quarters)

### Subject area:

Subject area	Discipline
Laboratory Science ("d")	Biology / Life Sciences

### UC honors designation:

None

### Grade levels:

9th	10th	11th	12th

		✓	✓
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Course learning environment:

Classroom	Online
✓	

Is this course an integrated course?

Yes

## Course Description

Overview:

Medical Anatomy and Physiology is a course that actively engages students in investigating and studying the vital structures, systems, and processes that are crucial for sustaining human life. Students learn about the intricate and abstract workings of their own bodies, and the bodies of others, through a variety of investigations, laboratory experiments, readings, discussions, case studies, and reflections on health-related topics in the media and their personal experiences. This yearlong course provides students with a guided journey through the structural and functional features of multiple major organ systems, which gives them deeper insight into the roles of each system and how they work together to maintain whole-body homeostasis. These activities and concepts of study are introduced and completed with a medical focus, as to provide the students with a relatable and applicable lens for viewing these complex topics. A goal of this medical anatomy and physiology course is to expand student scientific and communication skills through the study of these advanced science topics. Students completing a medical course of study need to be able to visualize, identify, and discuss structures and functions of human anatomy and physiology, in order to be able to correct apply these concepts to patient documentation, diagnosis, and care in both patient care and non-patient care settings. This course is a critical requirement for students pursuing the medical field as a course of student or pathway to a career in the medical field.

Prerequisites:

Prerequisite	Required / Recommended
Grade of C or better in Biology	Required
Grade of C or better in Chemistry	Recommended

Co-requisites:

Corequisite	Required / Recommended
None	Required

Course content:

### **Unit 1: The Body as a Whole: Covers Chapters 1-4**

- Topics to be addressed: Students will be introduced to basics of anatomy and physiology, included medical terminology, through the study of the organization of the human body, biochemistry, cells and their functions, and tissues, glands and membranes. They will be looking at real-life situations and case studies and applying their forming knowledge of body systems and medical terminology to describe what is happening to these patients. Students will learn about the importance of maintaining body pH and homeostasis through personal salivary pH testing and analysis. They will also learn about cell structure, tonicity, and histology, in order to be able to understand the building blocks for other tissues in the body. With this knowledge of cells, students will describe and analyze different tissue samples for the various types of tissues and membranes found in the body. At the end of this unit, the students will apply their knowledge of tissues to complete a real-life culminating lab investigation of tissue biopsies.
- One assignment that will be used during this unit is a tissue biopsy. First, students complete a reading and study of the different types of techniques for taking and analyzing tissues that have been biopsied. Then they prepare a “biopsy” tissue sample collected from a patient discussed in their case study, which will include important biopsy techniques and skills. Preparation will include fixation, embedding, sectioning, and staining of the biopsy sample, which is followed by analysis with a microscope. Using the case study and microscope data, students will write a formal lab report with recommendations for their patient in the case study, based on the results that they find.

### **Unit 2: Movement and Support: Covers Chapters 6-8**

- Topics to be addressed: In this unit, students will learn about the intricacies of the integumentary, muscular, and skeletal systems, by investigating the organs, histology, diseases, and characteristics of each system. Students will learn about the skin and integumentary structures and functions, which includes investigations of the structure and function of the system, inflammatory response, and thermoregulation of the skin. Also, a study of sunscreen and skin cancer with a follow up case study and diagnosis of patient moles give students an opportunity to relate the topics to the real-world and their own lives. As part of the study of the muscular system, students will study muscle contraction on real tissue and determining the cause of muscle contraction: glucose or ATP. Lastly, students will study the full skeletal system anatomy and physiology. Using osteoporosis, x-rays, and medical technician skills, students learn to relate the structure and function of the skeletal system to different aspects of the medical field.
- One assignment that will be used during this unit is a case study situation where they work as an EMT and radiologist. Given an emergency situation where a person has a possible fracture, students practice splinting and immobilizing the forearm using the same skills test given on the National EMT Registry exam. After working with long bone immobilization, students are given the x-rays from the patient in the case study and asked for diagnosis. They must complete a dictation report of their findings and transcribe it, just as it would be done in the field. As part of this project, students will demonstrate their growth in understanding of skeletal anatomy, as well as its medical applications.

### **Unit 3: Coordination and Control: Covers Chapters 9-12**

- Topics to be addressed: Through this unit of study, students will learn about the structure and function of the nervous, sensory, and endocrine systems. This covers a deep study of the nervous system in two parts: the spinal cord and nerves, as well as the brain and cranial nerves. Students practice their dissection skills on a sheep brain and assess their personal reflex and acuity skills. The sensory system investigations require students to determine olfactory acuity, observe sense accommodation, relate taste and smell sensations, and describe various disorders of the nerves that affect functionality for patients. Students study the endocrine system by relating and grouping endocrine glands, hormones, and imbalances, experimenting with the stress response, and investigating how hormones affect body temperature regulation.
- One assignment that will be used during this unit is an in-depth study and debate of drugs, addiction, and the brain. Using internet activities and animations, students explore the symptoms and negative effects of several categories of drugs on neurotransmitters and/or receptors of the brain. Further, the causes of addiction and tolerance are explored with a discussion of treatment for them. Along with the understanding students gain from the experience, students will be creating position statements in the debate of a proposed bill to increase treatment for drug addiction and decrease the criminality of drug law offenders. They will complete individual research for the topic and debate, as a class, the pros and cons of the proposed bill and whether it should be passed into law. Students are expected to include discussions of ethics in their position statements.

#### **Unit 4: Circulation and the Cardiovascular System: Covers Chapters 13-15**

- Topics to be addressed: Students learn about blood, the heart and heart disease, and blood vessels and circulation through a variety of activities in this unit. The study of blood requires students to understand the structure and function of blood cells, including their histology, blood clotting, disorders and treatments, diagnostic testing. Students investigate the organs, histology, diseases and characteristics of the cardiovascular system through medical activities and skills, including measuring blood pressure, completing blood cell counts, reading and diagnosing issues with ECG strips, and heart surgery. With this knowledge of the parts of the cardiovascular system, students identify and the structure and describe the function of blood vessels and circulation. They connect all parts of the circulatory and cardiovascular systems with a concept map poster describing the entire process.
- One assignment that will be used during this unit is practice doing an open heart surgery. Students learn about congenital heart defects, heart surgery, and heart anatomy. In the first part, they assemble a surgical team to treat a patient (pig heart) with an atrial septal defect and a ventricular septal defect. Students learn how a surgical team would prepare and suit up, including scrubbing in and wearing sterile protective equipment. During the activity, students use the pig heart to identify major internal heart structures. Finally, they learn about and practice their suturing skills to complete the heart surgery. Students will prepare a formal diagnostic and procedure report, including the safety measures taken, defects and problems found in the heart, and techniques used to treat the patient.

#### **Unit 5: Energy: Supply and Use: Covers Chapters 18, 19, 22**

- Topics to be addressed: In this unit, students learn about the organs, histology, diseases, and characteristics of the respiratory, digestive, and urinary systems. Students learn about the process of deoxygenation and oxygenation of blood in the circulatory system, spirometry and other diagnostic tests, disorders and distress of the respiratory system, and air quality and health. During their study of the digestive system, students will learn about the structure and function of the system, the role of bacteria in its function, diagnostic tests and disorders, and nutrition and energy from food. The study of the urinary system introduces students to the structure and function of the major organs, intricacies of the nephron cells in the kidney, disorders and diagnostics, and the various types and functions of extracellular fluids in the body.
- One assignment that will be used during this unit is a case study and simulation of a patient with respiratory concerns. Students will simulate the medical professional by completing a series of diagnostic tests and explaining the results to the patient experiencing respiratory distress. This includes performing a spirometry test to measure tidal volume, expiratory reserve volume, inspiratory reserve volume, vital capacity, and total lung capacity, Students practice auscultating lung sounds and taking respiratory rates. They construct and use models of constricted airways to educate the patient on the causes and effects of the respiratory distress.

#### **Unit 6: Perpetuation of Life: Covers Chapters 23-24**

- Topics to be addressed: In the final unit of the course, students study the organs, histology, diseases, and characteristics of the reproductive systems of males and females. Included in this study is the topic of fetal development and birth, fertility, and pregnancy tests, as well as heredity and hereditary diseases. Students will learn the structure and function of the organs and tissues in both the male and female reproductive systems. They will discuss and diagram the process of fetal development, as well as the disorders that can occur. Pregnancy tests, their uses, and effectiveness help students learn about the hormones, antibodies, and antigens that are involved and reacting in order to give a positive test. Using family history information, students self-assess themselves for their inherited traits and possible hereditary disorders that could affect their lives.
- One assignment that will be used during this unit is a sequential fertility activity that requires students to act as fertility specialists helping couples conceive. Students will first act as a fertility special for four couples seeking fertility assistance. They will compare medical backgrounds and hormone tests to determine a cause and treatment plan for each couple. Then they will be given ELISA pregnancy test results for all couples to see if they treatment plan is working. Finally, students continue by comparing and graphing data from three couples that were able to conceive to determine whether the fetus is developing at a normal rate. Based on all of this information, the student must give their risk assessment of the fetus for SGA or LGA and give a suggested plan of action for the parents.

## Course Materials

### Textbooks

Title	Author	Publisher	Edition	Website	Primary
Memmler's The Human Body in Health and Disease	Barbara Janson Cohen, Kerry L. Hull	Wolters Kluwer	13e/2015	<a href="http://thepoint.lww.com/MemmlerHumanBody13e">http://thepoint.lww.com/MemmlerHumanBody13e</a>	Yes
Study Guide for Memmler's The Human Body in Health and Disease	Kerry L. Hull, Barbara Janson Cohen	Wolters Kluwer	13e/2015	<a href="http://thepoint.lww.com/MemmlerHBHD_SG13e">http://thepoint.lww.com/MemmlerHBHD_SG13e</a>	No

### Manuals

Title	Author	Publisher	Edition	Website	Read in entirety
Medical Anatomy & Physiology Lab Manual	Heather Peterson	HASPI	2013	<a href="http://www.haspi.org">http://www.haspi.org</a>	No

### Websites

Title	Author(s)/Editor(s)/Compiler(s)	Affiliated Institution or Organization	URL
Anatomy Corner		BiologyCorner.com	<a href="http://anatomycorner.com/">http://anatomycorner.com/</a>
Human Biology Videos		Khan Academy	<a href="https://www.khanacademy.org/science/biology/human-biology">https://www.khanacademy.org/science/biology/human-biology</a>
Medline Plus		U.S. Department of Health and Human Services	<a href="http://www.nlm.nih.gov/medlineplus/videosandcooltools.html">http://www.nlm.nih.gov/medlineplus/videosandcooltools.html</a>
Web Anatomy	Murry Jensen	University of Minnesota	<a href="http://msjensen.cehd.umn.edu/webanatomy/default.asp">http://msjensen.cehd.umn.edu/webanatomy/default.asp</a>