

Orange Unified School District
PHYSIOLOGY
Year Course

GRADE LEVEL: 10-12

PREREQUISITES: Biology with a grade of “B” or better and/or teacher recommendation.

INTRODUCTION TO THE SUBJECT:

A study of anatomy and physiology, designed to give students an understanding of the structure and functions of the systems of the body and their relationships which will serve the needs of general education and provide a good background for those interested in careers in the field of nursing, medicine, and public health.

Fundamental topics include structural and functional organization of the human body, cell physiology, integration of skeletal and muscular systems, senses, circulatory system, respiratory system, digestive system, excretory system, endocrine system, reproductive system. Study of other organisms is included to complement an understanding of the human body.

COURSE OBJECTIVES:

BY THE END OF THE COURSE THE STUDENT WILL BE ABLE TO:

Describe the detailed structures and functions of the human body.

Carry on experiments, dissection and microscope study in the laboratory.

Learn correct care of the body, proper hygiene and various diseases.

Acquire further skills in scientific techniques, problem solving, attitudes, and processes.

Provide students who are preparing for careers in the fields of nursing, medicine, public health, and biological sciences in college with the necessary physiology information in terms of subject matter and techniques.

COURSE OVERVIEW AND APPROXIMATE UNIT TIME ALLOTMENTS:

FIRST SEMESTER

WEEKS

- I. Orientation of the Body
 - A. Homeostatic
 - B. Cell - anatomy and physiology
 - C. Structure of the body
 - D. Function
 - E. Genetics
 - F. Vocabulary

2

II.	Tissues	3
	A. Epithelium	
	B. Connective	
	C. Muscle	
	D. Nervous	
	E. Mitosis	
III.	Membranes and Glands	1
	A. Serous	
	B. Synovial	
	C. Mucous	
	D. Cutaneous	
	E. Gland types	
	F. Integumentary system	
IV.	The Skeletal System	5
	A. Bone structure	
	B. Bone formation	
	C. Joints	
	D. Ligaments and tendons	
V.	Physiology of Muscles	2
	A. Skeletal muscles	
	B. Chemistry of muscular contraction	
	C. Muscle twitch analysis	
	D. Muscle exercise	
	E. Fatigue	
VI.	Nervous System	5
	A. Central Nervous System (CNS)	
	B. Peripheral Nervous System (PNS)	
	C. Autonomic Nervous System	
	D. Special senses	

Total Weeks: 18

I.	The Endocrine System	2
A.	Prostaglandins	
B.	Pituitary Gland	
C.	Thyroid Gland	
D.	Parathyroid Gland	
E.	Adrenal Gland	
F.	Islands of Langerhans	
G.	Reproductive	
H.	Pineal	
I.	Thymus	
J.	Hormone interaction with target tissue	
II.	The Circulatory System	5
A.	Composition of blood	
B.	Heart and blood vessels	
C.	Anatomy and physiology of the cardiovascular system	
D.	Lymphatic system	
E.	Immune system	
III.	Respiratory System	1
A.	Anatomy of organs of respiration	
B.	Physiology of respiration	
IV.	The Digestive System	2
A.	Nutrition and digestion	
1.	Food groups	
2.	Enzymes and vitamins	
B.	Organs of digestive system	
C.	Chemistry of enzyme action	
V.	Excretory System	2
A.	Urinary system	
B.	Structure and function of skin and kidneys	
C.	Diseases of the kidneys and skin	
VI.	Genetics	2
A.	Inheritance of characteristics	
1.	DNA	
2.	Laws of heredity	
3.	Mutations	
4.	Deletions and crossovers	
5.	Lethals	
6.	Sex-linked characteristics	
B.	Ethics of genetic issues	
VII.	The Reproduction System	3

- A. Anatomy of reproductive organs
- B. Physiology of reproduction
- C. Abnormalities
- D. Fetal circulation
- E. Meiosis

VIII. Dissection of Fetal Pig or Cat

Total Weeks: $\frac{1}{18}$

DATE OF CONTENT REVISION: May 2009

DATE OF BOARD APPROVAL: October 19, 2000

Addendum

THE CALIFORNIA CONTENT STANDARDS SCIENCE

1. As a result of the coordinated structures and functions of organ systems, the internal environment of the human body remains relatively stable (homeostatic) despite changes in the outside environment. As a basis for understanding this concept:
 - a. *Students know* how the complementary activity of major body systems provides cells with oxygen and nutrients and removes toxic waste products such as carbon dioxide.
 - b. *Students know* how the nervous system mediates communication between different parts of the body and the body's interactions with the environment.
 - c. *Students know* how feedback loops in the nervous and endocrine systems regulate conditions in the body.
 - d. *Students know* the functions of the nervous system and the role of neurons in transmitting electrochemical impulses.
 - e. *Students know* the roles of sensory neurons, interneurons, and motor neurons in sensation, thought, and response.
 - f.* *Students know* the individual functions and sites of secretion of digestive enzymes (amylases, proteases, nucleases, lipases), stomach acid, and bile salts.
 - g.* *Students know* the homeostatic role of the kidneys in the removal of nitrogenous wastes and the role of the liver in blood detoxification and glucose balance.
 - h.* *Students know* the cellular and molecular basis of muscle contraction, including

- the roles of actin, myosin, Ca^{+2} , and ATP.
- i.* *Students know* how hormones (including digestive, reproductive, osmoregulatory) provide internal feedback mechanisms for homeostasis at the cellular level and in whole organisms.
2. Organisms have a variety of mechanisms to combat disease. As a basis for understanding the human immune response:
- a. *Students know* the role of the skin in providing nonspecific defenses against infection.
 - b. *Students know* the role of antibodies in the body's response to infection.
 - c. *Students know* how vaccination protects an individual from infectious diseases.
 - d. *Students know* there are important differences between bacteria and viruses with respect to their requirements for growth and replication, the body's primary defenses against bacterial and viral infections, and effective treatments of these infections.
 - e. *Students know* why an individual with a compromised immune system (for example, a person with AIDS) may be unable to fight off and survive infections by microorganisms that are usually benign.
 - f.* *Students know* the roles of phagocytes, B-lymphocytes, and T-lymphocytes in the immune system.

*These are included in the regular physiology course

