

Orange Unified School District
PHYSIOLOGY HONORS
Year Course

GRADE LEVEL: 10-12

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

INTRODUCTION TO THE SUBJECT:

An in-depth study of anatomy and physiology designed for the honor student. The study of the structure and function of the systems of the body and their relationships will serve the needs of college-bound students who are particularly interested in the health services field.

The structural and functional organization of the systems of the human body will be covered in-depth.

COURSE OBJECTIVES:

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

Read detailed information on the structures and functions of the human body.

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

Acquire skills in using such scientific equipment as the spectrophotometer, stethoscope, sphygmomanometer, and blood typing and counting materials.

Apply the rules for a scientific drawing.

Locate and use current information in the health service field by utilizing the Internet.

COURSE OVERVIEW AND APPROXIMATE UNIT TIME ALLOTMENTS:

FIRST SEMESTER

WEEKS

I.	Organization	2-1/2
	A. Basic chemistry	
	B. Biochemistry	
	C. Body structures and function	
	D. Homeostasis	

	<u>WEEKS</u>
II. Cells	1-1/2
A. Organelles	
B. Transport	
III. Tissues	3
A. Epithelium	
B. Muscle	
C. Connective	
D. Nervous	
E. Mitosis	
IV. Membranes and Glands	1
A. Mucous	
B. Serous	
C. Synovial	
D. Cutaneous	
E. Gland types	
V. Muscle Physiology	2
A. Microscope structure	
B. Molecular structure	
C. Function	
D. Energy for contraction	
VI. The Nervous System	3
A. Cells	
B. Nerve impulse	
C. Somatic Nervous System	
D. Autonomic Nervous System	
VII. 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	

	<u>WEEKS</u>
VIII. The Circulatory System	4
A. Blood	
B. Heart and blood vessels	
C. Physiology of the Cardiovascular System	
IX. Exams	
Total Weeks:	19

SECOND SEMESTER

IV. The Lymphatic System	1
A. Lymph circulation	
B. Thymus	
C. Spleen	
II. Respiratory System	1
A. Organs of respiration	
B. Function	
III. Digestive System	2
A. Organs of digestion	
B. Function	
C. Chemistry of enzyme action	
IV. Dissection of Fetal Pig	2
A. External anatomy	
B. Mouth and Pharynx	
C. Neck organs	
D. Abdominal cavity	
E. Urogenital organs	
F. Thoracic cavity	
G. Brain and spinal cord	
V. Metabolism	2
A. Carbohydrate metabolism	
1. Glucose Catabolism	
A. Glycolysis	
B. Citric acid cycle	
C. Electron Transport System and Oxidative Phosphorylation	

	<u>WEEKS</u>
2. Glucose Anabolism	
B. Fat metabolism	
C. Protein metabolism	
D. Metabolic rates	
VI. The Urinary System	1
A. Organs of Urinary System	
B. Abnormal conditions	
VII. Reproduction	3
A. Study of Deoxyribonucleic Acid (DNA)	
B. Meiosis	
C. Male reproductive system	
D. Female reproductive system	
E. Embryology	
VIII. Genetics	3
A. Chromosomes and genes	
B. Law of heredity	
C. Human genetics	
D. Abnormal genetic conditions	
IX. Skeletal System Unit	2
A. Bone structure	
B. Bone formation	
C. Bone identification	
D. Spectrophotometer	
X. Skeletal Muscles	1
A. Reasons for names	
B. Muscle identification	
Total Weeks:	18

DATE OF CONTENT REVISION: September 6, 2000

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