Kansas CTE

Anatomy & Physiology (2025-2026)

Body Plan and Organization 1

1 **Upon completion of this section the student will be able to demonstrate measurable understanding of descriptive anatomical and directional terminology including the following topics.** 1.1

1 anatomical position 1.1.1

2 body planes, sections 1.1.2

3 body cavities & regions 1.1.3

4 directional terms 1.1.4

5 basic terminology 1.1.5

6 levels of organization 1.1.6

7 survey of body systems 1.1.7

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histology 1

1 **Upon completion of this section the student will be able to demonstrate measurable understanding of the basic tissues of the body, their location, and functions, including the following topics.** 2.1

1 overview of histology & tissue types 2.1.1

2 microscopic anatomy, location, & functional roles of epithelial, connective, muscular and nervous tissues 2.1.2

3 membranes (mucous, serous, cutaneous & synovial) 2.1.3

4 glands (exocrine & endocrine) 2.1.4

5 tissue injury & repair 2.1.5

Integumentary system 3

1 **Upon completion of this section the student will be able to demonstrate measurable understanding of major gross and microscopic anatomical components of the integumentary system and describe the functions of the system, including the following topics.** 3.1

1 general functions of the skin & the subcutaneous layer 3.1.1

2 gross & microscopic anatomy of the skin 3.1.2

3 roles of the specific tissue layers of the skin & subcutaneous layer 3.1.3

anatomy & functional roles of accessory structures 3.1.4

application of homeostatic mechanisms 3.1.5

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6 predictions related to homeostatic imbalance, including disease states & disorders 3.1.6

skeletal system 4

1 **Upon completion of this section the student will be able to demonstrate measurable understanding of major gross and microscopic anatomical components of the skeletal system and explain their functional roles in osteogenesis, repair, and body movement, including the following topics.** 4.1

1 general functions of bone & the skeletal system 4.1.1

2 structural components – microscopic anatomy 4.1.2

3 structural components – gross anatomy 4.1.3

4 physiology of embryonic bone formation (ossification, osteogenesis) 4.1.4

5 physiology of bone growth, repair & remodeling 4.1.5

6 organization of the skeletal system 4.1.6

7 gross anatomy of bones 4.1.7

8 classification, structure & function of joints (articulations) 4.1.8

9 application of homeostatic mechanisms 4.1.9

10 predictions related to homeostatic imbalance, including disease states & disorders 4.1.10

muscular system 5

1 **Upon completion of this section the student will be able to demonstrate measurable understanding of major gross and microscopic anatomical components of the muscular system and explain their functional roles in body movement, maintenance of posture, and heat production, including the following topics.** 5.1

1 general functions of muscle tissue 5.1.1

2 identification, general location, & comparative characteristics of skeletal, smooth, & cardiac muscle tissue 5.1.2

3 detailed gross & microscopic anatomy of skeletal muscle 5.1.3

4 physiology of skeletal muscle contraction 5.1.4

5 skeletal muscle metabolism 5.1.5

6 principles & types of whole muscle contraction 5.1.6

7 nomenclature of skeletal muscles 5.1.7

8 location & function of skeletal muscles 5.1.8

9 group actions of skeletal muscles 5.1.9

10 lever systems 5.1.10

11 application of homeostatic mechanisms 5.1.11

2 predictions related to homeostatic imbalance, including disease states & disorders 5.1.12

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Nervous system 6

6 **Upon completion of this section the student will be able to demonstrate measurable understanding of the major gross and microscopic anatomical components of the nervous system and explain their functional roles in communication, control, and integration, including the following topics.** 6.1

1 general functions of the nervous system 6.1.1

2 organization of the nervous system from both anatomical & functional perspectives 6.1.2

3 gross & microscopic anatomy of the nerve tissue 6.1.3

4 neurophysiology, including mechanism of resting membrane potential, production of action potentials & impulse transmission 6.1.4

5 neurotransmitters & their roles in synaptic transmission 6.1.5

6 sensory receptors & their roles 6.1.6

7 division, origin, & function of component parts of the brain 6.1.7

8 protective roles of the cranial bones, meninges, & cerebrospinal fluid 6.1.8

9 structure & function of cranial nerves 6.1.9

10 anatomy of the spinal cord, spinal nerves, & cranial nerves 6.1.10

11 reflexes & their roles in nervous system function 6.1.11

12 physiology of sensory & motor pathways in the brain & spinal cord 6.1.12

13 functions of the autonomic nervous system 6.1.13

14 comparison of somatic & autonomic nervous systems 6.1.14

15 application of homeostatic mechanisms 6.1.15

16 predictions related to homeostatic imbalance, including disease states & disorders 6.1.16

Special senses 7

1 **Upon completion of this section the student will be able to demonstrate measurable understanding of the major gross and microscopic anatomical components of the eye and ear and explain their functional roles in vision, hearing, and equilibrium. Students should also be able to identify and locate the receptors responsible for olfaction and gustation and briefly describe the physiology of smell and taste, including the following topics.** 7.1

1 gross & microscopic anatomy of the eye & ear 7.1.1

2 roles of specific tissues of the eye in vision 7.1.2

3 roles of specific tissues of the ear in hearing & equilibrium 7.1.3

4 olfactory receptors & their role in smell 7.1.4

5 gustatory receptors & their role in taste 7.1.5

6 general gross & microscopic anatomy of hearing & accessory structures of the ear 7.1.6

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roles of specific tissues of the ear in hearing 7.1.7

8 roles of the accessory structures 7.1.8

9 role of the ear in equilibrium 7.1.9

10 application of homeostatic mechanisms 7.1.10

11 predictions related to homeostatic imbalance, including disease states & disorders 7.1.11

endocrine system 8

1 **Upon completion of this section the student will be able to demonstrate measurable understanding of the major gross and microscopic anatomical components of the endocrine system and explain the functional roles of their respective hormones in communication, control, and integration, including the following topics.** 8.1

1 general functions of the endocrine system 8.1.1

2 chemical classification of hormones & mechanism of hormone actions at receptors 8.1.2

3 control of hormone secretion 8.1.3

4 control by the hypothalamus & pituitary gland 8.1.4

5 identify, source, secretory control, & functional roles of the major hormones produced by the body 8.1.5

6 local hormones (paracrine & autocrine) & growth factors 8.1.6

7 hormonal response to stress 8.1.7

8 application of homeostatic mechanisms 8.1.8

9 predictions related to homeostatic imbalance, including disease states & disorders 8.1.9

Cardiovascular System 9

1 **Upon completion of this section the student will be able to demonstrate measurable understanding of the major gross and microscopic anatomical components of the cardiovascular system and explain their functional roles in transport and hemodynamics, including the following topics.** 9.1

1 general functions of the cardiovascular system 9.1.1

2 composition of blood plasma 9.1.2

3 identity, microscopic anatomy, numbers, formation, & functional roles of the formed elements of the blood 9.1.3

4 hemostasis, including coagulation of the blood 9.1.4

5 ABO & Rh blood grouping 9.1.5

6 gross & microscopic anatomy of the heart, including the conduction system 9.1.6

7 physiology of cardiac muscle contraction 9.1.7

8 blood flow through the heart 9.1.8

9 conduction system of the heart & the electrocardiogram 9.1.9

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0 cardiac cycle 9.1.10

11 regulation of cardiac output, stroke volume & heart rate 9.1.11

12 anatomy & functional roles of the different types of blood vessels 9.1.12

13 pattern of blood circulation throughout the body, including systemic and pulmonary circuits 9.1.13

14 pulmonary, coronary, hepatic portal, & fetal circulations 9.1.14

15 blood pressure & its functional interrelationships with cardiac output, peripheral resistance, & hemodynamics 9.1.15

16 application of homeostatic mechanisms 9.1.16

17 predictions related to homeostatic imbalance, including disease states & disorders 9.1.17

Lymphatic System and Immunity 10

1 **Upon completion of this section the student will be able to demonstrate measurable understanding of the major gross and microscopic anatomical components of the lymphatic system and explain their functional roles in fluid dynamics and immunity, including the following topics.** 10.1

1 general functions of the lymphatic system 10.1.1

2 lymph & lymphatic vessels 10.1.2

3 lymphatic cells, tissues, & organs 10.1.3

4 introduction to innate (nonspecific) defenses & adaptive (specific) defenses 10.1.4

5 innate (nonspecific) defenses 10.1.5

6 overview of adaptive (specific) defenses 10.1.6

7 antigens & antigen processing 10.1.7

8 lymphocytes & their role in adaptive immunity 10.1.8

9 antibodies & their role in adaptive immunity 10.1.9

10 applied immunology 10.1.10

11 application of homeostatic mechanisms 10.1.11

12 predictions related to homeostatic imbalance, including disease states & disorders 10.1.12

Respiratory System 11

1 **Upon completion of this section the student will be able to demonstrate measurable understanding of the major gross and microscopic anatomical components of the respiratory system and explain their functional roles in breathing/ventilation and in the processes of external and internal respiration, including the following topics.** 11.1

1 general functions of the respiratory system 11.1.1

2 gross & microscopic anatomy of the respiratory tract & related organs 11.1.2

3 mechanisms of pulmonary ventilation 11.1.3

` pulmonary air volumes & capacities 11.1.4

mechanisms of gas exchange in lungs & tissues 11.1.5

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6 mechanisms of gas transport in the blood 11.1.6

7 control of pulmonary ventilation 11.1.7

8 application of homeostatic mechanisms 11.1.8

9 predictions related to homeostatic imbalance, including disease states & disorders 11.1.9

digestive system 12

1 **Upon completion of this section the student will be able to demonstrate measurable understanding of the major gross and microscopic anatomical components of the digestive system and explain their functional roles in digestion, absorption, excretion, and elimination, including the following topics.** 12.1

1 general functions of the digestive system 12.1.1

2 gross & microscopic anatomy of the alimentary canal 12.1.2

3 gross & microscopic anatomy of the accessory glands & organs 12.1.3

4 peritoneum & mesenteries 12.1.4

5 motility in the alimentary canal 12.1.5

6 mechanical & chemical processes of digestion 12.1.6

7 processes of absorption 12.1.7

8 hormonal & neural regulation of digestive processes 12.1.8

9 application of homeostatic mechanisms 12.1.9

10 predictions related to homeostatic imbalance, including disease states & disorders 12.1.10

urinary system 13

1 **Upon completion of this section the student will be able to demonstrate measurable understanding of the major gross and microscopic anatomical components of the urinary system and explain their functional roles, including the following topics.** 13.1

1 general functions of the urinary system 13.1.1

2 gross & microscopic anatomy of the urinary tract, including detailed histology of the nephrons 13.1.2

3 functional processes of urine formation, including filtration, reabsorption, secretion, & excretion system and the roles of aldosterone & antidiuretic hormone 13.1.3

4 factors regulating & altering urine volume & composition, including the renin-angiotensin system and roles of aldosterone & antidiuretic hormone. 13.1.4

5 endocrine activities of the kidneys, such as vitamin D activation & secretion of erythropoietin 13.1.5

6 innervation & control of the urinary bladder 13.1.6

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reproductive system 14

1 **Upon completion of this section the student will be able to demonstrate measurable understanding of the major gross and microscopic anatomical components of the reproductive system and explain their functional roles in reproduction and inheritance, including the following topics.** 14.1

1 general functions of the male & female reproductive systems 14.1.1

2 gross & microscopic anatomy of the male & female reproductive systems 14.1.2

3 gametogenesis 14.1.3

4 specific roles of the female reproductive organs 14.1.4

5 specific roles of the male reproductive organs 14.1.5

6 regulation of reproductive functions 14.1.6

7 conception, pregnancy, & embryological & fetal development parturition & labor 14.1.7

8 mammary gland anatomy & physiology 14.1.8