a. hypotheses are tentative and testable statements that must be capable of being supported or not supported by observational evidence. Hypotheses of durable explanatory power that have been tested over a wide variety of conditions are incorporated into theories; and

b. scientific theories are based on natural and physical phenomena and are capable of being tested by multiple independent researchers. Unlike hypotheses, scientific theories are well established and highly reliable explanations, but they may be subject to change as new areas of science and new technologies are developed.

6. Scientific inquiry is the planned and deliberate investigation of the natural world using scientific and engineering practices. Scientific methods of investigation are descriptive, comparative, or experimental. The method chosen should be appropriate to the question being asked. Student learning for different types of investigations include descriptive investigations, which involve collecting data and recording observations without making comparisons; comparative investigations, which involve collecting data with variables that are manipulated to compare results; and experimental investigations, which involve processes similar to comparative investigations but in which a control is identified.

   a. Scientific practices. Students should be able to ask questions, plan and conduct investigations to answer questions, and explain phenomena using appropriate tools and models.

   b. Engineering practices. Students should be able to identify problems and design solutions using appropriate tools and models.

7. Scientific decision making is a way of answering questions about the natural world involving its own set of ethical standards about how the process of science should be carried out. Students should be able to distinguish between scientific decision-making methods (scientific methods) and ethical and social decisions that involve science (the application of scientific information).

8.

(ii) apply scientific practices to plan comparative investigations

(iii) apply scientific practices to plan experimental investigations

(iv) apply scientific practices to conduct descriptive investigations

(v) apply scientific practices to conduct comparative investigations

(vi) apply scientific practices to conduct experimental investigations

(vii) use engineering practices to design solutions to problems

(C) use appropriate safety equipment and practices during laboratory, classroom, and field investigations as outlined in Texas Education Agency-approved safety standards;

(i) use appropriate safety equipment during laboratory investigations as outlined in Texas Education Agency-approved safety standards

(ii) use appropriate safety equipment during classroom investigations as outlined in Texas Education Agency-approved safety standards

(iii) use appropriate safety equipment during field investigations as outlined in Texas Education Agency-approved safety standards

(iv) use appropriate safety practices during laboratory investigations as outlined in Texas Education Agency-approved safety standards

(v) use appropriate safety practices during classroom investigations as outlined in Texas Education Agency-approved safety standards

(vi) use appropriate safety practices during field investigations as outlined in Texas Education Agency-approved safety standards

(D) use appropriate tools such as lab notebooks or journals, calculators, spreadsheet software, data-collecting probes, computers, standard laboratory glassware, microscopes, various prepared slides, stereoscopes, metric rulers, meter sticks, electronic balances, micro pipettors, hand lenses, Celsius thermometers, hot plates, timing devices, Petri dishes, agar, lab incubators, dissection equipment, reflex hammers, pulse oximeters, stethoscope, otoscope, blood pressure monitors (sphygmomanometers), pen lights, ultrasound equipment, and models, diagrams, or samples of biological specimens or structures;

(i) use appropriate tools

(E) collect quantitative data using the International System of Units (SI) and United States customary units and qualitative data as evidence;

(i) collect quantitative data using the International System of Units (SI) as evidence

(ii) collect quantitative data using the United States customary units as evidence

(iii) collect qualitative data as evidence

(F) organize quantitative and qualitative data using lab reports, labeled drawings, graphic organizers, journals, summaries, oral reports, and technology-based reports;

(i) organize quantitative data using lab reports

(ii) organize quantitative data using labeled drawings

(iii) organize quantitative data using graphic organizers

(iv) organize quantitative data using journals

(v) organize quantitative data using summaries

(vi) organize quantitative data using oral reports

(vii) organize quantitative data using technology-based reports

(viii) organize qualitative data using lab reports

(ix) organize qualitative data using labeled drawings

(x) organize qualitative data using graphic organizers

(xi) organize qualitative data using journals

(xii) organize qualitative data using summaries

(xiii) organize qualitative data using oral reports

(xiv) organize qualitative data using technology-based reports

(G) develop and use models to represent phenomena, systems, processes, or solutions to engineering problems; and

(i) develop models to represent phenomena, systems, processes, or solutions to engineering problems

(ii) use models to represent phenomena, systems, processes, or solutions to engineering problems

(H) distinguish among scientific hypotheses, theories, and laws.

(i) distinguish among scientific hypotheses, theories, and laws

(3) Scientific and engineering practices. The student analyzes and interprets data to derive meaning, identify features and patterns, and discover relationships or correlations to develop evidence-based arguments or evaluate designs. The student is expected to:

(A) identify advantages and limitations of models such as their size, scale, properties, and materials;

(i) identify advantages of models

(ii) identify limitations of models

(B) analyze data by identifying significant statistical features, patterns, sources of error, and limitations;

(i) analyze data by identifying significant statistical features

(ii) analyze data by identifying patterns

(iii) analyze data by identifying sources of error

(iv) analyze data by identifying limitations

(C) use mathematical calculations to assess quantitative relationships in data; and

(i) use mathematical calculations to assess quantitative relationships in data

(D) evaluate experimental and engineering designs.

(i) evaluate experimental designs

(ii) evaluate engineering designs

(iv) analyze scientific explanations and solutions by using observational testing so as to encourage critical thinking by the student

(v) evaluate scientific explanations and solutions by using empirical evidence so as to encourage critical thinking by the student

(vi) evaluate scientific explanations and solutions by using logical reasoning so as to encourage critical thinking by the student

(vii) evaluate scientific explanations and solutions by using experimental testing so as to encourage critical thinking by the student

(viii) evaluate scientific explanations and solutions by using observational testing so as to encourage critical thinking by the student

(ix) critique scientific explanations and solutions by using empirical evidence so as to encourage critical thinking by the student

(x) critique scientific explanations and solutions by using logical reasoning so as to encourage critical thinking by the student

(xi) critique scientific explanations and solutions by using experimental testing so as to encourage critical thinking by the student

(xii) c

(xiv) relate the impact of current research on society including cost-benefit analysis

(xv) relate the impact of current research on society including contributions of diverse scientists as related to the content

(xvi) relate the impact of current research on society including contributions of diverse engineers as related to the content

(C) research and explore resources such as museums, libraries, professional organizations, private companies, online platforms, and mentors employed in a science, technology, engineering, and mathematics (STEM)s5 ((ST)10 1-8Enceo1.7 (e) tmb(as)2st (t)]TJ[(i0 (E)e)3 (n)6y:n5 (c)-.tnx p

(vii) identify the major characteristics of living organisms, including the ability to adapt to the environment

(viii) describe the major characteristics of living organisms, including response to stimuli

(ix) describe the major characteristics of living organisms, including growth and developd aract(ix)

(iii) describe the general metabolic pathways of proteins

(8) Skeletal system. The student analyzes the relationships between the anatomical structures and physiological functions of the skeletal system. The student is expected to:

(A) identify and differentiate between the axial skeleton and appendicular skeleton;

(i) identify the axial skeleton

(ii) identify the appendicular skeleton

(iii) differentiate between the axial skeleton and appendicular skeleton

(B) identify the types of joints, including gliding, hinge, pivot, saddle, and ball and socket, and describe the movements of each;

(i) identify the types of joints, including gliding

(ii) identify the types of joints, including hinge

(iii) identify the types of joints, including pivot

(iv) identify the types of joints, including saddle

(v) identify the types of joints, including ball and socket

(vi) describe the movements of each [joint, including gliding]

(vii) describe the movements of each [joint, including hinge]

(viii) describe the movements of each [joint, including pivot]

(ix) describe the movements of each [joint, including saddle]

(x) describe the movements of each [joint, including ball and socket]

(C) identify and locate the anatomy of bone, including spongy and compact tissue, epiphysis, diaphysis, medullary cavity, periosteum, bone marrow, and endosteum;

(i) identify the anatomy of bone, including spongy [bone]

(ii) identify the anatomy of bone, including spongy compact [bone]

(iii) identify the anatomy of bone, including epiphysis

(iv) identify the anatomy of bone, including diaphysis

(v) identify the anatomy of bone, including medullary cavity

(vi) identify the anatomy of bone, including periosteum

(vii) identify the anatomy of bone, including bone marrow

(viii) identify the anatomy of bone, including endosteum

(ix) locate the anatomy of bone, including spongy [bone]

(x) locate the anatomy of bone, including compact [bone]

(xi) locate the anatomy of bone, including medullary cavity

(xii) locate the anatomy of bone, including epiphysis

(xiii) locate the anatomy of bone, including diaphysis

(xiv) locate the anatomy of bone, including periosteum

(xv) locate the anatomy of bone, including bone marrow

(xvi) locate the anatomy of bone, including endosteum

(D) explain the major physiological functions of the skeletal system;

(i) explain the major physiological functions of the skeletal system

(E) describe the role of osteoblasts, osteocytes, and osteoclasts in bone growth and repair;

(i) describe the role of osteoblasts in bone growth

(ii) describe the role of osteocytes in bone growth

(iii) describe the role of osteoclasts in bone growth

(iv) describe the role of osteoblasts in bone repair

(v) describe the role of osteocytes in bone repair

(vi) describe the role of osteoclasts in bone repair

(F) identify and describe the different types of fractures such as compoun

(iv) examine common characteristics of muscle tissue, including elasticity

(D) identify and describe the appearance, innervation, and function of the three muscle types, including cardiac, skeletal, and smooth;

(i) identify the appearance of the three muscle types, including cardiac

(ii) identify the appearance of the three muscle types, including skeletal

(iii) identify the appearance of the three muscle types, including smooth

(iv) identify the innervation of the three muscle types, including cardiac

(v) identify the innervation of the three muscle types, including skeletal

(vi) identify the innervation of the three muscle types, including smooth

(vii) identify the function of the three muscle types, including cardiac

(viii) identify the function of the three muscle types, including skeletal

(ix) identify the function of the three muscle types, including smooth

(x) describe the appearance of the three muscle types, including cardiac

(xi) describe the appearance of the three muscle types, including skeletal

(xii) describe the appearance of the three muscle types, including smooth

(xiii) describe the innervation of the three muscle types, including cardiac

(xiv) describe the innervation of the three muscle types, including skeletal

(xv) describe the innervation of the three muscle types, including smooth

(xvi) describe the function of the three muscle types, including cardiac

(xvii) describe the function of the three muscle types, including skeletal

(xviii) describe the function of the three muscle types, including smooth

(E) examine the microscopic anatomy of a muscle fiber, including sarcomere, actin, and myosin;

(i) examine the microscopic anatomy of a muscle fiber, including sarcomere

(ii) examine the microscopic anatomy of a muscle fiber, including actin

(iii) examine the microscopic anatomy of a muscle fiber, including myosin

(F) describe the mechanisms of muscle contraction at the neuromuscular junction;

(i) describe the mechanisms of muscle contraction at the neuromuscular junction

(G) name, locate, and describe the action of major voluntary muscles in regions of the body, including the head and neck, trunk, upper extremity, and lower extremity;

(i) name the action of major voluntary muscles in regions of the body, including the head and neck

(ii) name the action of major voluntary muscles in regions of the body, including the trunk

(iii) name the action of major voluntary muscles in regions of the body, including the upper extremity

(iv) name the action of major voluntary muscles in regions of the body, including the lower extremity

(v) locate the action of major voluntary muscles in regions of the body, including the head and neck

(vi) locate the action of major voluntary muscles in regions of the body, including the trunk

(vii) locate the action of major voluntary muscles in regions of the body, including the upper extremity

(viii) locate the action of major voluntary muscles in regions of the body, including the lower extremity

(ix) describe the action of major voluntary muscles in regions of the body, including the head and neck

(x) describe the action of major voluntary muscles in regions of the body, including the trunk

(xi) describe the action of major voluntary muscles in regions of the body, including the upper extremity

(xii) describe the action of major voluntary muscles in regions of the body, including the lower extremity

(H) identify and describe common diseases and disorders of the muscular system such as muscle strains and muscular dystrophy; and

(i) identify common diseases of the muscular system

(ii) identify common disorders of the muscular system

(iii) describe common diseases of the muscular system

(iv) describe common disorders of the muscular system

(I) analyze and describe the effects of pressure, movement, torque, tension, and elasticity on the human body.

(i) analyze the effects of pressure on the human body

(ii) analyze the effects of movement on the human body

(iii) analyze the effects of torque on the human body

(iv) analyze the effects of tension on the human body

(v) analyze the effects of elasticity on the human body

(vi) describe the effects of pressure on the human body

(vii) describe the effects of movement on the human body

(viii) describe the effects of torque on the human body

(ix) describe the effects of tension on the human body

(x) describe the effects of elasticity on the human body

(11) Nervous system. The student analyzes the relationship between the anatomical structures and physiological functions of the nervous system. The student is expee ohe (u)--2.3 1.9 (u)-4 (s 0 Tv20 1 Tf (3 Tv20 8 (cr)3.7 (i1.5 (Th)-3.9 (e)-1 (st)-2.3 3 ( )6.4 (t)1

(H) distinguish between the types of neurons and explain the initiation of a nerve impulse during resting and action potential;

(i) distinguish between the types of neurons

(ii) explain the initiation of a nerve imp

(ix) describe the anatomical structures of the urinary system, including the kidney

(x) describe the anatomical structures of the urinary system, including the ureters

(xi) describe the anatomical structures of the urinary system, including the bladder

(xii) describe the anatomical structures of the urinary system, including the urethra

(xiii) describe the anatomical functions of the urinary system, including the kidney

(xiv) describe the anatomical functions of the urinary system, including the ureters

(xv) describe the anatomical functions of the urinary system, including the bladder

(xvi) describe the anatomical functions of the urinary system, including the urethra

(B) compare and contrast the anatomical structures and describe the functions of the male and female urinary system;

(i) compare and contrast the anatomical structures of the male and female urinary system

(ii) describe the functions of the male urinary system

(iii) describe the functions of the female urinary system

(C) summarize and illustrate the structures, functions, and types of nephrons;

(i) summarize the structures of nephrons

(ii) summarize the functions of nephrons

(iii) summarize the types of nephrons

(iv) illustrate the structures of nephrons

(v) illustrate the functions of nephrons

(vi) illustrate the types of nephrons

(D) examine the methods of fluid balance and homeostasis in the urinary system, including fluid intake and output;

(i) examine the methods of fluid balance in the urinary system, including fluid intake

(ii) examine the methods of fluid balance in the urinary system, including fluid output

(iii) examine the methods of fluid homeostasis in the urinary system, including fluid intake

(iv) examine the methods of fluid homeostasis in the urinary system, including fluid output

(E) analyze the composition of urine and the process of urine formation, including filtration, reabsorption, and secretion;

(i) analyze the composition of urine

(ii) analyze the process of urine formation, including filtration

(iii) analyze the process of urine formation, including, reabsorption

(iv) analyze the process of urine formation, including secretion

(F) describe the relationship between the nervous system, renal system, and muscular system before and during micturition; and

(i) describe the relationship between the nervous system, renal system, and muscular system before micturition

(ii) describe the relationship between the nervous system, renal system, and muscular system during micturition

(G) identify and describe common diseases and disorders of the urinary system such as chronic kidney disease, kidney stones, urinary tract-2(.)13(.7)2(o)-2(.4)(0).3.9(o)(t)4(1.7)e(c)-6(2)1.6 (Tw)0.495)(3(c))-0(.2)(.61(3.8)(-2)(8)(se)(-1)2(1)3(.8)0.5)(0.61(.9)3(f)8-2.6(m)0.05(3.7(h)

(x) investigate external anatomy of the heart, including coronary vessels

(xi) illustrate how systemic circulation transports blood from the heart to the internal anatomy of the heart, including tissue layers

(xii) illustrate how systemic circulation transports blood from the heart to the internal anatomy of the heart, including chambers

(xiii) illustrate how systemic circulation transports blood from the heart to the internal anatomy of the heart, including valves

(xiv) illustrate how systemic circulation transports gasses from the heart to the internal anatomy of the heart, including tissue layers

(xv) illustrate how systemic circulation transports gasses from the heart to the internal anatomy of the heart, including chambers

(xvi) illustrate how systemic circulation transports gasses from the heart to the internal anatomy of the heart, including valves

(xvii) illustrate how systemic circulation transports nutrients from the heart to the internal anatomy of the heart, including tissue layers

(xviii) illustrate how systemic circulation transports nutrients from the heart to the internal anatomy of the heart, including chambers

(xix) illustrate how systemic circulation transports nutrients from the heart to the internal anatomy of the heart, including valves

(xx) illustrate external anatomy of the heart, including coronary vessels

(D) describe the relationship between blood flow and blood pressure, including systolic and diastolic pressure, pulse pressure, and mean arterial pressure;

(i) describe the relationship between blood flow and blood pressure, including systolic pressure

(ii) describe the relationship between blood flow and blood pressure, including diastolic pressure

(iii) describe the relationship between blood flow and blood pressure, including pulse pressure

(iv) describe the relationship between blood flow and blood pressure, including mean arterial pressure

(E) compare and contrast coronary, pulmonary, and systemic circulation, and describe the major vessels of each;

(i) compare and contrast coronary, pulmonary, and systemic circulation

(ii) describe the major vessels of [coronary circulation]

(iii) describe the major vessels of [pulmonary circulation]

(iv) describe the major vessels of [systemic circulation]

(F) illustrate how the PQRST waves of an electrocardiogram (EKG) demonstrate the conduction of electricity through the structures of the heart;

(i) illustrate how the PQRST waves of an electrocardiogram (EKG) demonstrate the conduction of electricity through the structures of the heart

(G) describe the relationship between the cardiovascular system, nervous system, and muscular system in regulating cardiac output; and

(i) describe the relationship between the cardiovascular system, nervous system, and muscular system in regulating cardiac output

(H) identify and describe common diseases and disorders of the cardiovascular system such as heart disease, myocardial infarction, ischemia, and hypertrophic cardiomyopathy.

(i) identify common diseases of the cardiovascular system

(ii) identify common disorders of the cardiovascular system

(iii) describe common diseases of the cardiovascular system

(iv) describe common disorders of the cardiovascular system

(15) Lymphatic system. The student analyzes the relationships between the anatomical structures and physiological functions of the lymphatic system and understands the immune response. The student is expected to:

(A) evaluate the interaction of the lymphatic system with other body systems such as the circulatory system;

(i) evaluate the interaction of the lymphatic system with other body systems

(B) describe the structure and function of the lymphatic organs and explain how lymph moves through the bod0.6d(ot)5.7 (h)4 (

(iii) summarize the ways the body protects against disease, including active and passive immunity

(iv) summarize the ways the body defends against disease, including inflammation

(v) summarize the ways the body defends against disease, including barrier defenses

(vi) summarize the ways the body defends against disease, including active and passive immunity

(F) describe the role of antigens and antibodies in the immune response; and

(i) describe the role of antigens in the immune response

(ii) describe the role of antibodies in the immune response

(G) identify and describe commo3 (e)-1 ((i)3.4 (ge)3 (ns)s.ln)-3.91 ( )0.5 (ro)044 sr 21.641 0 Td( )TjEMC /LB2cr (d)-3.9 (e)-rs9 ( )0

(D) identify and describe common diseases and disorders of the digestive system such as gallstones, Crohn's disease, irritable bowel syndrome, and gastroesophageal reflux disorder.

(i) identify common diseases of the digestive system

(ii) identify common disorders of the digestive system

(iii) describe common diseases of the digestive system

(iv) describe common disorders of the digestive system

(19) Emerging technologies. The student identifies emerging technological advances in science and healthcare treatment and delivery. The student is expected to:

(A) research and discuss advances in science and medicine at the organ and tissue level such as bionics and wearable monitoring technologies; and

(i) research advances in science at the organ level

(ii) research advances in medicine at the organ level

(iii) research advances in science at the tissue level

(iv) research advances in medicine at the tissue level

(v) discuss advances in science at the organ level

(vi) discuss advances in medicine at the organ level

(vii) discuss advances in science at the tissue level

(viii) discuss advances in medicine at the tissue level

(B) research and describe advances in science and medicine at the cellular level such as stem cells and gene therapy.

(i) research advances in science at the cellular level

(ii) research advances in medicine at the cellular level

(iii) describe advances in science at the cellular level

(iv) describe advances in medicine at the cellular level