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Connective tissue - The components - Functions of connective tissue - Extracellular matrix - Ground substance -Types of ground substance -Tissue fluid - Edema - collagen fiber - Reticular fibers - Elastic fibers	1	▪ Describe the components of C.T. ▪ Explain the mechanical, protection and nutrition roles of C.T. ▪ Recognize the types of ground substance and their functions. ▪ Define edema and explain its causes. ▪ Identify collagen fiber histologically. ▪ List types of collagen fibers and their distribution. ▪ Recognize structure of reticular fibers and elastic fibers. ▪ Determine distribution and function of reticular fiber and elastic fiber.
Connective tissue cells -Types of connective tissue cells - Fibroblasts - Macrophages - Mast cells - Plasma cells - Adipose cells - Undifferentiated mesenchymal cells - Reticular cells - Leukocytes (White blood cells)	2	▪ Distinguish fibroblast, macrophage and mast cells. ▪ List their functions and distribution. ▪ Distinguish plasma cell, adipose cell, mesenchymal cell and reticular cell. ▪ List their functions and distribution ▪ List types of leukocytes (White blood cells)
Classification of connective tissue - Mesenchymal connective tissue - Mucous connective tissue - Loose (areolar) connective tissue - Dense connective tissue - Dense irregular connective tissue - Dense regular collagenous connective tissue - Dense regular elastic connective tissue - Reticular connective tissue - Adipose connective tissue	2	▪ Identify loose C.T. and its function ▪ List the distribution of loose C.T. in the body. ▪ Classify the types of dense C.T. ▪ Compare between dense regular and dense irregular C.T. ▪ Determine functions and distribution of types of dense C.T. ▪ Identify reticular connective tissue and give examples of its function and distribution. ▪ Distinguish types of adipose connective tissue ▪ List the distribution of white and brown adipose tissues and their functions.
Blood - The plasma - Erythrocytes (Red blood cells) - Leukocytes (White blood cells) - Granulocytes - Neutrophils - Eosinophils	1	▪ Explain the general functions of blood ▪ Determine components of plasma ▪ Describe shape of erythrocytes and their functions ▪ Classify leukocytes

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- Basophils - Agranulocytes - Lymphocytes, - Monocytes - Platelets		▪ Differentiate between types of granulocytes ▪ List functions of neutrophils, eosinophils and basophils ▪ Differentiate between types of agranulocytes ▪ List functions of lymphocytes and monocytes ▪ Describe shape of platelets and their functions.
Cartilage - General functions of cartilage - Classification of cartilage - Hyaline cartilage - Articular cartilage - Elastic cartilage - Fibrocartilage - Development and growth of cartilage - Interstitial growth (endogenous growth) - Appositional growth (exogenous growth)	1	▪ List functions of cartilage ▪ Determine nature of matrix ▪ Identify the hyaline cartilage and summarize its distribution ▪ Distinguish of chondrogenic cells, chondroblast and chondrocyte ▪ Describe the perichondrium and its function ▪ Explain structure of articular cartilage ▪ Distinguish between elastic cartilage and hyaline cartilage ▪ Identify the fibrocartilage and summarize its distribution ▪ Basic steps of development and growth of cartilage
Bone - General functions of bone - Components of bone structure - Types of bone cells - Periosteum and endosteum - Shapes and types of bones - Spongy and compact bone - Synovial membrane and synovial fluid - Primary and secondary bones	1	▪ List general functions of bone ▪ Determine nature of the bone matrix ▪ Recognize different types of bone cells and their functions . ▪ Compare between periosteum and endosteum. ▪ List shapes and types of bones ▪ Identify spongy and compact bones. ▪ Explain the synovial membrane and synovial fluid ▪ Differentiate between primary and secondary bones
Development and growth of bone - Intramembranous ossification - Endochondral ossification	1	▪ Explain who intramembranous ossification takes place and list type of bone formed by this process. ▪ Explain how intramembranous ossification takes place and list the type of bone formed by this process. ▪ Enumerate and distinguish the different zones of epiphyseal cartilage.

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Muscular tissue - Characteristics of muscle tissues - Types of muscle tissues - Skeletal muscle - Organization of skeletal muscle - Sarcomere	1	▪ Characteristics of muscle tissues ▪ Classify the types of muscle tissues ▪ Identify skeletal muscle ▪ Discuss organization of skeletal muscle ▪ Define Sarcomere ▪ Explain striation of skeletal muscle
Muscular tissue (2) - Cardiac muscle - Smooth muscle - Regeneration of muscle tissue	1	▪ Identify cardiac muscle ▪ Distinguish smooth muscle, and cardiac muscle ▪ Explain regeneration of muscle tissue ▪
Nervous tissue - Definition - Types of nerve cells -Structure of a neuron -Synapse -Classification of neurons	1	▪ Definition of neurons ▪ Classification of neurons ▪ Explain the structure of a neuron ▪ Identification of synapses
Neuroglia (Glial cells) - Definition -The main functions Types of neuroglial cells	1	▪ Definition of neuroglia ▪ Classification of neuroglia cells
Introduction to Genetic- Laws of Mendel's -Some terms used in genetics -Mendel's first law -Law of independent assortment	1	▪ Define genetic terms Study Mendel's laws
Mode of Mendel's inheritance -Patterns of Mendelian -Inheritance and single-gene disorders Autosomal dominant pattern of -inheritance -Autosomal recessive pattern of inheritance -X-linked Dominant pattern of inheritance -X-linked recessive pattern of inheritance -Y Chromosome–linked single-gene disease -Sex influenced-traits -Sex limited-traits	1	▪ Application of Mendel's laws & ▪ diseases

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Extensions and Exceptions to Mendel's Laws -Incomplete dominance -Codominant -Multiple alleles -Gene interaction -Variable expressivity and Incomplete Penetrance -Modifier or dominance modification -Lethal gene -Pleiotropy	1	▪ Students will learn that there are exceptions to genetics, so students will learn about non-Mendelian genetics ▪ Explain incomplete dominance and codominance (compare and contrast ,giving examples about each of non-Mendelian genetics ▪ Define multiple alleles, lethal and modifier genes and pleiotropy and give examples for each
Extensions and Exceptions to Mendel's Laws -Polygenic inheritance (Continuous variation) -Linkage and crossover -Gene mapping -Maternal inheritance and mitochondrial gene -Phenocopies	1	▪ Explain what it means for two genes to be linked. How does this affect the way those genes are transmitted to offspring? ▪ Explain the role of crossing over in creating recombinant offspring. ▪ determine the distance in map units between two genes, given offspring data. ▪ Explain the relationship between the relative distance of genes are apart from each other on a chromosome. ▪ Explain polygenic inheritance and give examples of polygenic inheritance in humans. ▪ Describe epistasis and give an example. ▪ Explain the types and purpose of the genetic map ▪ How does crossing over contribute to the construction of a gene map?
Molecular genetic - Experiments identify and describe the genetic material -DNA structure (Watson and Crick model of DNA) -Types of DNA -Replication of DNA	1	▪ Review the experiments that established DNA as the genetic material ▪ Explain the DNA structure: number of strands, polarity (5'-3'), complementary strands and their anti-parallel nature. ▪ Explain the steps for DNA replication: strand separation, name of the protein enzyme, pairing of complementary nucleotides and termination. ▪ Distinguish between the DNA template strand and the new strand.

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		In what direction is the new strand made? ▪ Compare and contrast the leading and lagging newly synthesized DNA strands: which is continuously made and which is discontinuously made?
The structure and functions of RNAs -Structure of RNA -Levels of RNA -Types and Functions of RNA -Transcription -processes and splicing of mRNA	1	▪ Define the structure of RNA. ▪ Contrast RNA and DNA. ▪ List the types of RNA and explain their functions ▪ Explain the process of transcription ▪ Explain how the immature mRNA is modified and spliced
Genetic code &protein synthesis -Genetic code (codon) -Protein synthesis (translation) -Synthesis of proteins on rough endoplasmic reticulum (RER) -Gene regulation -Genetic bases of cancer	1	▪ Identify the genetic code and explain how it is read. ▪ Summarize the process of translation on the free and attached ribosome to RER. ▪ Explain how most eukaryotic genes are regulated.
Gene mutation - Classification of mutation according to their effects and chemical changes	1	▪ Define mutations and describe how each type of mutation can cause a phenotypic change. ▪ List and distinguish between the different types of mutations that result in phenotypic change.
Genetic engineering -Introduction -Recombinant DNA technology -Cloning genes of eukaryotes -Polymerase chain reaction (PCR). -Application of genetic engineering	2	▪ Describe common DNA technology techniques ▪ Identify how each technique is used to study or manipulate the genomes of organisms ▪ Describe the process of inserting a gene into a plasmid to form recombinant DNA. ▪ List and describe the processes that can be used to insert recombinant DNA molecules into cells. ▪ Describe how a sample of DNA can be amplified in a test tube using the process of PCR. ▪ Basic steps of cloning gene in eukaryotes ▪ Understanding of medical applications of recombinant DNA technology and genetic engineering. ▪

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Gene repair -DNA damage -DNA repair mechanisms	1	▪ How cells identify ▪ Correct DNA damage, Factors affecting DNA damage