

- Sec III Life Science Section

Content	Resources	Periods	Learning objectives
Basic Mechanisms of Sexual reproduction: Male and female reproductive system	- C.E.R.D Book - Worksheet	3	-Identify the different parts of the male and female reproductive system Compare the structure of the male and female reproductive system. -Compare the genital activity of the male and female reproductive system.
Basic Mechanisms of Sexual reproduction: Diploidy and haploidy	C.E.R.D Book	3	Differentiate between haploidy and diploidy. Compare karyotypes of somatic cells and gametes
Basic Mechanisms of Sexual reproduction: Meiosis	C.E.R.D Book	3	Differentiate between the corresponding phases of Meiosis I and Meiosis II. Explain the variation of DNA during interphase and Meiosis. Describe the behavior of chromosomes during the different phases of Meiosis.
Basic Mechanisms of Sexual reproduction: Spermatogenesis	C.E.R.D Book	3	Explain the different steps of spermatogenesis in the testis. Describe the different parts of the testes and relate them to different steps of spermatogenesis.
Basic Mechanisms of Sexual reproduction: Oogenesis	C.E.R.D Book	4	Explain the different steps of Oogenesis Explain the different steps of Folliculogenesis. Compare spermatogenesis with oogenesis
Basic Mechanisms of Sexual reproduction: Fertilization	C.E.R.D Book	2	Explain the importance of both Meiosis and fertilization in restoring the karyotype of the species.
Transmission of genes and genetic recombination: Hereditary traits and genes	C.E.R.D Book	2	To define the notions: gene, allele, phenotype, and genotype.

Transmission of genes and genetic recombination Transmission of allelic genes	C.E.R.D Book	2	Differentiate between genotype and phenotype Identify dominant and recessive characteristics.
Transmission of genes and genetic recombination: Interchromosomal recombination	C.E.R.D Book	5	Construct the punnet square of monohybrid or dihybrid cross. Interpret the results of monohybrid and dihybrid cross and relate its results to the mode of transmission. Relate interchromosomal recombination to the formation of phenotypic polymorphism. Draw schematically the independent assortment of genes.
Transmission of genes and genetic recombination: Intrachromosomal recombination	C.E.R.D Book	5	Interpret the results of dihybrid cross and relate its results to the mode of transmission (Absolutely linked, Partially linked, independent genes). Relate intrachromosomal recombination to the formation of phenotypic polymorphism. Draw schematically the crossing over phenomenon related to the formation of different types of gametes. Determine the distance between the different genes based on the results of intrachromosomal recombination.
Genetic Variation and Polymorphism: Mutation and the environment		3	Define mutation Determine the different types of mutation Distinguish between harmful and beneficial mutation Determine the mode of transmission of mutation to offsprings.
Genetic Variation and Polymorphism: Mutation and multiple alleles		3	Define polymorphic genes (multiple alleles) Explain the case of blood types.
Genetic Variation and Polymorphism: Polymorphic genes in a population		2	Distinguish the different alleles of the same allele and determine whether they are dominant or recessive.

Genetic Variation and Polymorphism: Detection of genetic polymorphism Genetic identity of individuals		3	Define restriction enzymes. Define recognition sites. Describe the different steps of RFLP technique and FISH, and DNA print. Explain the role of each of the above tests. Analyze the results of the different genetic tests.
Human Genetics Inheritance of genetic traits	C.E.R.D Book	3	Analyze the results of a pedigree to determine the mode of transmission of a certain trait Calculate the risk of a couple to have affected children.
Genetic variation and polymorphism: Autosomal diseases	C.E.R.D Book	3	Identify examples of different autosomal linked diseases. Explain the mode of transmission of different alleles in gene linked autosomes.
Genetic variation and polymorphism: Sex-Linked diseases	C.E.R.D Book	3	Identify examples of different sex linked diseases. Explain the mode of transmission of different alleles in gene linked gonosomes.
Genetic variation and polymorphism: Chromosomal abnormalities	C.E.R.D Book	3	Identify the types of chromosomal abnormalities. Explain the different mechanisms which result in chromosomal mutations.
Genetic variation and polymorphism: Prenatal diagnosis	C.E.R.D Book	3	Describe the different techniques utilized during prenatal diagnosis.
Role and components of the immune system: HLA: major self marker	C.E.R.D Book	2	Define HLA Define iso, auto, and allografts. Relate the degree of graft acceptance to %of similarity of Donor and receiver HLA.
Role and components of the immune system: Blood groups another self marker		2	Determine the rules of blood transfusion Compare the presence of agglutinins A and B with that of Rh with respect to their presence in the body.

Role and components of the immune system: The "non-self"		2	-Identify the infectious agents -Give examples of molecules or cells which are identified as non-self. - Define nonself
Role and components of the immune system: Cells of the immune system.		2	-Identify the different types of white blood cells based on their morphology. - Describe the roles of the different leucocytes. - Determine which leucocytes are in charge of nonspecific immune response and which ones are in charge of specific immune response.
Role and components of the immune system: Lymphoid organs		2	-Identify the different organs of the immune system and their roles.(primary and secondary) - Deduce the roles of each of the bone marrow and the thymus. -Recognize the cellular molecules which are recognized by TCR
Role and components of the immune system: Antigen recognition by B lymphocytes.		2	-Describe the specific mode of action of B cells. -Identify the role of antibody in binding specifically to the epitope.
Role and components of the immune system: Antigen recognition by T lymphocytes.		2	-Explain the recognition of antigenic peptides by T lymphocytes. - Distinguish between the roles of HLA I and HLA II during cell mediated immune response. -Explain the role of TH cells in graft rejection
Immune Response. Non- specific immune response		3	-List the elements of nonspecific immune response. -Name the nonspecific immune reaction and nonspecific immune response after an infection. -Explain the signs of inflammatory reaction -Explain the steps of phagocytosis.
Immune Response. Specific Immune response		3	Deduce the type of immune response induced post an infection with a soluble antigen or cellular antigen.

Immune Response. Induction of the specific immune response.		3	Explain the induction of specific immune response Deduce the role played by macrophages during specific immune response
Immune Response. Role of TH in the specific immune response.	C.E.R.D Book	2	Deduce the role played by T H cells during specific immune response
Immune Response. Specific humoral immune response	C.E.R.D Book	2	-Deduce the different roles of antibodies in the elimination of antigens -Explain how specific and nonspecific immune processes are interdependent.
Immune Response. Specific cell mediated immune response	C.E.R.D Book	2	-Explain the mechanism of cytotoxicity adopted by the TC lymphocytes. - Explain the concept of immunotherapy against cancer. -
Immune Response. Immunological memory	C.E.R.D Book	3	-Differentiate between the characteristics of PSIR and SSIR. - Explain the importance of immunological memory in fighting the diseases. -Relate the importance of immunological memory to the preventive measure of vaccination.
Immune Response. Diagnostic applications of	C.E.R.D Book	2	Draw out the importance use of antibodies as specific tools to detect the presence of specific molecules in a variety of biological samples. Explain the ELISA test ,agglutination test, and the double diffusion test.

antibody properties.			
Disorders of the immune system Immunodeficiencies	C.E.R.D Book	2	Determine the causes of immune deficiency(Inborn or congenital) Explain the mode of action of HIV in the induction of AIDS
Disorders of the immune system Hypersensitivities	C.E.R.D Book	3	Deduce the main causes behind hypersensitivity. Explain the steps of allergic reaction mediated by antibodies Differentiate between immediate and delayed hypersensitivity.
Disorders of the immune system Autoimmune diseases.	C.E.R.D Book	2	Deduce the main cause of autoimmune diseases. Explain the specificity of autoimmunity.
Functions of neurons Resting potential and Action Potential	C.E.R.D Book	2	Explain the Physiological causes and structural causes behind the formation of resting potential.
Functions of neurons Nerve impulse and Action Potential	C.E.R.D Book	5	Explain the different phases of Action Potential. Deduce the factors which affect the speed of conduction of the nerve message. Explain the Law of all or none manifested by the nerve fiber. Compare the response of a nerve and that of a nerve fiber to stimulations of different intensities.
Functions of neurons Sensory receptor and nerve impulse	C.E.R.D Book	2	Explain the initiation of AP from receptor potential. Explain the role of different sensory receptors
Functions of neurons Synapses structure and	C.E.R.D	3	Draw and label a synapse Locate the different synapses

function	Book		Deduce the direction of transmission of nerve message across a synapse. Deduce the nature of the message transmitted across a synapse.
Functions of neurons Integrating properties of the nerve centers.	C.E.R.D Book	3	Distinguish inhibitory synapse from excitatory synapse Explain that the type of the receptor which determines the type of the synapse. Explain how the integration of nerve message happens at the level of post synaptic membrane either by spatial summation or temporal summation.
Neurotransmitters and Medical Application. Neurotransmitters and membrane channels	C.E.R.D Book	3	Determine the sites of synthesis of different neurotransmitters Determine the mode of action of different neurotransmitters to find out if a synapse is inhibitory or excitatory.
Neurotransmitters and Medical Application. Neurotransmitters and pain circuit	C.E.R.D Book	3	Differentiate between analgesic and analgesic substances. Explain the interactive chemical control in the spinal cord as the mode of action of enkephaline. Compare the action of morphine to that of enkephaline.
Neurotransmitters and Medical Application. Disorders of the nervous system	C.E.R.D Book	2	Explain how the perturbation in the production of a neurotransmitter leads to a disorder of the nervous system. List some types of nervous disorder diseases and their symptoms and causes.
Neurotransmitters and	C.E.R.D	3	Explain the action of drugs on the transmission of nerve message.

Medical Application. Action of drugs on synapses.	Book		Compare agonistic with antagonistic drugs. Describe the mode of action of different drugs at the level of the synapse.
Myotatic Reflex Maintaining posture	C.E.R.D Book	2	Define myotatic reflex Deduce the action of antagonistic muscles during extension and flexion of different parts of the body. Explain how the maintenance of equilibrium is done by simultaneous contractions(EPSP) and relaxations(IPSP) of different skeletal muscles.
Myotatic Reflex Anatomy and reflex action	C.E.R.D Book	3	Explain the transmission of nerve messages simultaneously from the sensory organs via poly synaptic pathway and monosynaptic pathway to reach the antagonistic muscles. Study the anatomical elements which make up the reflex arc.
Myotatic Reflex Reflex control	C.E.R.D Book	3	Deduce the effect of the intervention of superior nerve centers on the myotatic reflex.
Myotatic Reflex Motor Activity	C.E.R.D Book	5	Study the different regions of the brain and their corresponding roles. Explain the role of different exploring methods of the brain: EEG, MRI,... Identify the roles of different parts of the cerebrum based on Pathological symptoms. Note that the large surface area of projection and the sensory and motor areas are relative to the activity of the organ that they represent.
Regulation of Glycemia Glycemia, a biological constancy	C.E.R.D Book	2	Define glycemia as an example of physiological constancy-Glycemic homeostasis.. Deduce the presence of regulatory system for glycemia.
Regulation of Glycemia The liver, an effector organ in the regulation of glycemia	C.E.R.D Book	2	Deduce the role of the liver as a storage organ and as a source of glycemia. Explain the glycogenic function of the liver. Explain where is excess glucose stored. Name and define the different metabolic processes related to the synthesis and degradation of glucose.
Regulation of Glycemia	C.E.R.D	2	Identify the major clinical symptoms of diabetes mellitus as well as biological

The pancreas and Glycemia	Book		diagnosis of diabetes based on measuring glycemia Deduce the action of the blood as an endocrine gland and as an exocrine gland(mixed gland). Explain the double action of the pancreas in the regulation of glycemia. Label the different parts of the pancreas.
Regulation of Glycemia Hypoglycemic/Hyperglycemic system. Regulation of glycemia feedback control.	C.E.R.D Book	4	Deduce the hypoglycemic effect of insulin Deduce the hyperglycemic effect of glucagon. Explain the mode of action of insulin and the mode of action of glucagon. Describe the mode of action of regulatory systems in maintaining normal glycemia.(negative feed back control)
Regulation of female sex hormones The sexual cycle	C.E.R.D Book	2	Label the parts of the uterus. Describe the ovarian and uterine modifications during the menstrual cycle
Regulation of female sex hormones Cyclic evolution of ovarian hormones	C.E.R.D Book	3	Deduce the intervention of the ovaries during the uterine cycle through an endocrine mechanism. Explain the cyclic variation of estrogen and progesterone and its effect on the cyclic occurrence of menstrual cycle.
Regulation of female sex hormones Hypothalamo-pituitary axis and ovarian secretions	C.E.R.D Book	4	Label the Hypothalamo-pituitary axis. Explain the mode of communication between the hypothalamus and the anterior pituitary. Explain the mode of communication between the pituitary gland and the ovaries Explain the mode of communication between the ovaries and the uterus Explain the cyclic variation of pituitary and ovarian hormones
Regulation of female sex hormones Ovarian feedback control On the hypothalamo- pituitary axis	C.E.R.D Book	4	Describe the variation of pituitary hormones w.r.t ovarian hormones and vice versa. Explain the feed back mechanism which regulates the menstrual cycle.

Regulation of female sex hormones Birth control	C.E.R.D Book	8	Determine the mode of action of different contraceptive methods. Determine the mode of action of different contraceptive methods. Explain the different medically assisted procreations.
---	-----------------	---	--