

TERM 1 (47 days)	Week 1 15 – 19 Feb (5 days)	Week 2 22 – 26 Feb (5 days)	Week 3 1 – 5 March (5 days)
CAPS Topics	(2021 National Examination Guidelines p 7 and 8) DNA code of Life (PAPER 2: 27 MARKS)		
Core Concepts, Skills and Values	<p>Revision of the structure of the cell with an emphasis on the ribosome, cytoplasm and the parts of the nucleus</p> <p>Two types of nucleic acids: DNA and RNA</p> <p>Nucleic acids consist of nucleotides</p> <p>DNA: location</p> <ul style="list-style-type: none"> Present in the nucleus (nuclear DNA) – makes up genes on chromosomes Present in mitochondria (mitochondrial DNA) Present in chloroplasts (plants) <p>Brief history of the discovery of the DNA molecule (Watson & Crick, Franklin & Wilkins)</p>	<p>DNA: structure</p> <ul style="list-style-type: none"> The natural shape of the DNA molecule is a double helix Each strand of the helix is made up of a sequence of DNA nucleotides <p>Three components of a DNA nucleotide:</p> <ul style="list-style-type: none"> Nitrogenous bases linked by weak hydrogen bonds: <ul style="list-style-type: none"> Four nitrogenous bases of DNA: adenine (A), thymine (T), cytosine (C), guanine (G) Pairing of bases in DNA occur as follows: A : T and G : C Sugar portion (deoxyribose in DNA) Phosphate portion <p>Stick diagram of DNA molecule to illustrate its structure</p> <p>DNA: functions</p> <ul style="list-style-type: none"> DNA makes up genes which carry hereditary information DNA contains coded information for protein synthesis <p>Process of DNA replication</p> <ul style="list-style-type: none"> When in the cell cycle it takes place Where in the cell it takes place How DNA replication takes place (<i>no names of enzymes</i>) The significance of DNA replication [DNA replication helps to double the genetic material so that it can be shared by the new cells arising from cell division] <p>DNA profiling</p> <ul style="list-style-type: none"> Interpretation of DNA profiles Uses of DNA profiles 	<p>RNA: location</p> <ul style="list-style-type: none"> mRNA is formed in the nucleus and functions on the ribosome tRNA is located in the cytoplasm <p>Structure of RNA</p> <ul style="list-style-type: none"> A single-stranded molecule consisting of nucleotides <p>Three components of an RNA nucleotide:</p> <ul style="list-style-type: none"> Nitrogenous bases <ul style="list-style-type: none"> Four nitrogenous bases of RNA: Adenine(A), Uracil (U), cytosine (C), guanine (G) Sugar portion (ribose in RNA) Phosphate portion <p>Stick diagram of mRNA and tRNA molecules to illustrate their structure</p> <p>Function of RNA:</p> <ul style="list-style-type: none"> RNA plays a role in protein synthesis <p>The involvement of DNA and RNA in protein synthesis:</p> <ul style="list-style-type: none"> Transcription <ul style="list-style-type: none"> The double helix DNA unwinds. The double-stranded DNA unzips/weak hydrogen bonds break to form two separate strands. One strand is used as a template to form mRNA using free RNA nucleotides from the nucleoplasm. The mRNA is complementary to the DNA mRNA now has the coded message for protein synthesis. mRNA moves from the nucleus to the cytoplasm and attaches to the ribosome. Translation <ul style="list-style-type: none"> Each tRNA carries a specific amino acid. When the anticodon on the tRNA matches the codon on the mRNA then tRNA brings the required amino acid to the ribosome. (<i>Names of specific codons, anticodons and their amino acids are not to be memorised</i>) Amino acids become attached to each other by peptide bonds to form the required protein.
Daily Activities	<p>Activity 1 Revision of cell structure (ribosome, cytoplasm, nucleus) including location of DNA</p> <p>Activity 2 History of discovery of DNA</p>	<p>Activity 3 Scaffolding of the DNA molecule: start with the nucleotides and build up to the double helix structure of DNA molecule. Use diagrams. Also mention the functions of DNA.</p> <p>Activity 4 DNA replication</p> <p>Activity 5 DNA profiling case study</p>	<p>Activity 6 Use simple diagrams to illustrate transcription and translation (protein synthesis) Tabulate differences between transcription, translation and DNA replication.</p>
Investigation/Experiments		INVESTIGATION 1 DNA extraction and examine the threads	
Informal Tests			Informal Test 1
PRE-KNOWLEDGE	Grade 10: Organic molecules & Cell structure (focus on nucleus, cytoplasm, ribosomes, mitochondrion, nucleic acids)		
Date completed			

TERM 1 (47 days)	Week 4 8 – 12 March (5 days)	Week 5 15 – 19 March (5 days)	Week 6 23 – 26 March (4 days)
CAPS Topics	(2021 National Examination Guidelines p 9) Meiosis (PAPER 2: 21 MARKS)		(2021 National Examination Guidelines p 10) Reproduction in Vertebrates (PAPER 1: 8 MARKS)
Core Concepts, Skills and Values	<p>Structure of chromosomes:</p> <ul style="list-style-type: none"> Chromosomes consist of DNA (which makes up genes) and protein The number of chromosomes in a cell is a characteristic of an organism (e.g. humans have 46 chromosomes) Chromosomes which are single threads become double (two chromatids joined by a centromere) as a result of DNA replication <p>Differentiate between:</p> <ul style="list-style-type: none"> Haploid (n) and diploid (2n) cells in terms of chromosome number Sex cells (gametes) and somatic cells (body cells) Sex chromosomes (gonosomes) and autosomes <p>Meiosis – The process Definition of meiosis and site of meiosis in plants and animals</p> <p>Events of interphase:</p> <ul style="list-style-type: none"> DNA replication takes place <ul style="list-style-type: none"> Chromosomes which are single threads, become double Each chromosome will now consist of two chromatids joined by a centromere DNA replication helps to double the genetic material so that it can be shared by the new cells arising from cell division <p>The events of the following phases of Meiosis I, using diagrams:</p> <ul style="list-style-type: none"> Prophase I (Including a description of crossing over) Metaphase I (Including the random arrangement of the chromosomes) Anaphase I Telophase I <p>The events of each phase of Meiosis II, using diagrams:</p> <ul style="list-style-type: none"> Prophase II Metaphase II (Including the random arrangement of the chromosomes) Anaphase II Telophase II 	<p>Importance of meiosis:</p> <ul style="list-style-type: none"> Production of haploid gametes The halving effect of meiosis overcomes the doubling effect of fertilisation, thus maintaining a constant chromosome number from one generation to the next Mechanism to introduce genetic variation through: <ul style="list-style-type: none"> Crossing over The random arrangement of chromosomes at the equator <p>Abnormal meiosis and consequences</p> <ul style="list-style-type: none"> Non-disjunction and its consequences Non-disjunction of chromosomes at position 21 during Anaphase in humans to form abnormal gametes with an extra copy of chromosome 21 The fusion between an abnormal gamete (24 chromosomes) and a normal gamete (23 chromosomes) may lead to Down syndrome <p>Comparison Similarities of mitosis and meiosis</p> <p>Differences between mitosis and meiosis</p>	<p>Diversity of reproductive strategies</p> <p>The role of the following reproductive strategies in animals in maximising reproductive success in different environments (using relevant examples):</p> <ul style="list-style-type: none"> External fertilisation and internal fertilisation Ovipary, ovovivipary and vivipary Amniotic egg Precocial and altricial development Parental care
Daily Activities	<p>Activity 7 Structure of chromosomes, differentiation of cells, revision of mitosis. Indicate the actions during interphase. Revise the process of mitosis</p> <p>Activity 8 Tabulate the different phases of meiosis I including diagrams, micrographs and description of different phases.</p> <p>Activity 9 Tabulate the different phases of meiosis II including diagrams, micrographs and description of different phases.</p> <p>Activity 10 Compare each phase of meiosis I and II.</p>	<p>Activity 11 Abnormal meiosis and importance of meiosis.</p> <p>Activity 12 Comparison between mitosis and meiosis (similarities and differences)</p>	<p>Activity 13 Tabulate differences between internal and external fertilisation. Include examples as well as advantages and disadvantages.</p> <p>Activity 14 Tabulate differences between ovipary, ovovivipary and vivipary with examples.</p> <p>Activity 15 Draw a diagram of an amniotic egg with labels and functions.</p> <p>Activity 16 Differentiate between precocial and altricial development with advantages and disadvantages. Indicate the importance of parental care.</p>
Investigations Experiments	<p>INVESTIGATION 2 Observe and draw prepared microscope slides, micrographs or models of cells in different stages of meiosis</p>		
Informal Tests		Informal Test 2	
PRE-KNOWLEDGE	Grade 10: Mitosis & Cell structure (parts of the nucleus, centrosome/centrioles, cytoplasm)		
Date completed			

TERM 1 (47 days)	Week 7 29 March – 1 April (4 days)	Week 8 6 – 9 April (4 days)	Week 9 12 – 16 April (5 days)	Week 10 19 – 23 April (5 days)
CAPS Topics	(2021 National Examination Guideline p 10 & 11) Human reproduction (PAPER 1: 41 MARKS)			
Core Concepts, Skills and Values	<p>Structure of male reproductive system, using a diagram Functions of the testis, epididymis, vas deference, seminal vesicle, prostate gland, Cowper's gland, penis and the urethra</p> <p>Structure of the female reproductive system, using a diagram Functions of the ovary, Fallopian tube, uterus lined by endometrium, cervix, vagina with its external opening and the vulva Structure of the ovary, using a diagram showing the primary follicles, the Graafian follicle and the corpus luteum</p> <p>Puberty Main changes that occur in male characteristics during puberty under the influence of testosterone. Main changes that occur in female characteristics during puberty under the influence of oestrogen.</p> <p>Gametogenesis Formation of gametes (gametogenesis) by meiosis</p> <p>Male gametes formed by Spermatogenesis:</p> <ul style="list-style-type: none"> Under the influence of testosterone diploid cells in the seminiferous tubules of the testes undergo meiosis to form haploid sperm cells <p>Structure of a sperm, using a diagram Functions of the parts of the sperm cell (acrosome, head with haploid nucleus, middle portion/neck with mitochondria and a tail)</p> <p>Female gametes formed by Oogenesis:</p> <ul style="list-style-type: none"> Diploid cells in the ovary undergo mitosis to form numerous follicles At the onset of puberty and under the influence of FSH, one cell inside a follicle enlarges and undergoes meiosis Of the four cells that are produced, only one survives to form a mature, haploid ovum in a Graafian follicle This occurs in a monthly cycle. <p>Structure of an ovum, using a diagram Functions of the different parts of an ovum (layer of jelly, haploid nucleus, cytoplasm)</p>	<p>The menstrual cycle includes the uterine and the ovarian cycles</p> <p>Events in the ovarian cycle:</p> <ul style="list-style-type: none"> Development of the Graafian follicle Ovulation Formation of the corpus luteum <p>Events in the uterine cycle:</p> <ul style="list-style-type: none"> Changes that take place in the thickness of the endometrium Menstruation <p>Hormonal control of the menstrual cycle (ovarian and uterine cycles) with reference to the action of FSH, oestrogen, LH and progesterone</p> <p>Negative-feedback mechanism involving FSH and progesterone in controlling the production of ova <i>(*See endocrine system for 2 more neg. feedback examples)</i></p>	<p>Fertilisation and development of zygote to blastocyst</p> <ul style="list-style-type: none"> Definition of copulation and fertilisation Process of fertilisation Development of zygote → embryo (morula and blastula/blastocyst) → foetus <p>Gestation</p> <p>Definition of implantation</p> <p>The role of oestrogen and progesterone in maintaining pregnancy</p> <p>Structure of the developing foetus in the uterus, using a diagram</p> <p>Functions of the following parts:</p> <ul style="list-style-type: none"> Chorion and chorionic villi Amnion, amnion cavity and amniotic fluid Umbilical cord (including umbilical artery and umbilical vein) Placenta 	CATCH-UP & REVISION
Daily Activities	<p>Activity 17 Flow diagram of the human life cycle. Emphasis on the role of meiosis, mitosis and fertilisation.</p> <p>Activity 18 Structure of male reproductive system with labels and functions. Use micro-scope slides to identify tissues and different structures of the testis and section through penis.</p> <p>Activity 19 Structure of female reproductive system with labels and functions. Use microscope slides to identify tissues and different structures of the ovaries.</p> <p>Activity 20 Diagrams and description of spermatogenesis. Draw the sperm with labels and functions.</p> <p>Activity 21 Diagrams and description of oogenesis. Draw the ovum with labels and functions.</p>	<p>Activity 22 Draw the ovary and explain the events taking place during the cycle. With emphasis on the hormonal control.</p> <p>Activity 23 Diagram/graph of the menstrual cycle combining the ovarian and uterine cycle and influence of the different hormones on these cycles.</p>	<p>Activity 24 Diagram and table to indicate the fertilisation, development of fertilised ovum and implantation.</p>	<p>Activity 25 Diagram with labels and functions as well as description of gestation</p>
Investigations Experiments	<p>INVESTIGATION 3 Microscope slides of ovary, testes and section through penis. Identify tissues and different structures</p>		<p>INVESTIGATION 4 Prepared microscope slides or micrographs or ultrasound pictures of embryonic development.</p>	<p>INVESTIGATION 5 Stages of pregnancy by watching DVDs of the development of an embryo and the birth process.</p>
Informal Tests				
SBA (Formal Assessment)		<p>PRACTICAL 1.1 Human Reproduction Date: 1 April 2021</p>		<p>FORMAL TEST 2.1 Week 1 – 9 Date: 20 April 2021</p>
Date completed				

TERM 2 (49 days)	Week 1 3 – 7 May (5 days)	Week 2 10 – 14 May (5 days)	Week 3 17 – 21 May (5 days)	Week 4 24 – 28 May (5 days)
CAPS Topics	(2021 National Examination Guidelines p 11, 12 & 13) Genetics and Inheritance (PAPER 2: 48 MARKS)			
Core Concepts, Skills and Values	<p>Mention of Mendel as the father of genetics</p> <p>Concepts in inheritance</p> <ul style="list-style-type: none"> Chromatin and chromosomes Genes and alleles Dominant and recessive alleles Phenotype and genotype Homozygous and heterozygous The Law of Dominance: <ul style="list-style-type: none"> When two homozygous organisms with contrasting characteristics are crossed, all the individuals of the F₁ generation will display the dominant trait An individual that is heterozygous for a particular characteristic will have the dominant trait as the phenotype. <p>Monohybrid crosses Format for representing a genetic cross Mendel's Principle of Segregation – An organism possesses two 'factors' which separate or segregate so that each gamete contains only one of these 'factors'</p> <p>Types of dominance Complete dominance – one allele is dominant and the other is recessive, such that the effect of the recessive allele is masked by the dominant allele in the heterozygous condition</p> <p>Incomplete dominance – neither one of the two alleles of a gene is dominant over the other, resulting in an intermediate phenotype in the heterozygous condition</p> <p>Co-dominance – both alleles of a gene are equally dominant whereby both alleles express themselves in the phenotype in the heterozygous condition</p>	<p>Sex determination</p> <ul style="list-style-type: none"> 22 pairs of chromosomes in humans are autosomes and one pair of chromosomes are sex chromosomes/gonosomes Males have XY chromosomes and females have XX chromosomes Differentiate between sex chromosomes (gonosomes) and autosomes in the karyotypes of human males and females <p>Sex-linked inheritance Sex-linked alleles and sex-linked disorders Genetic problems involving the following sex-linked disorders:</p> <ul style="list-style-type: none"> Haemophilia Colour-blindness <p>Blood grouping Different blood groups are a result of multiple alleles The alleles I^A, I^B and i in different combinations result in four blood groups</p>	<p>Dihybrid crosses Mendel's Principle of Independent Assortment – The various 'factors' controlling the different characteristics are separate entities, not influencing each other in any way, and sorting themselves out independently during gamete formation.</p> <p>Genetic lineages / Pedigrees A genetic lineage/pedigree traces the inheritance of characteristics over many generations</p> <p>Mutations Definition of a mutation Effects of mutations: harmful mutations, harmless mutations and useful mutations Mutations contribute to genetic variation Definition of gene mutation and chromosomal mutation</p> <p>Two types of mutations that can alter characteristics leading to genetic disorders:</p> <p>Gene mutations:</p> <ul style="list-style-type: none"> Haemophilia – absence of blood-clotting factors Colour-blindness - due to absence of the proteins that comprise either red or green cones/photoreceptors in the eye <p>Chromosomal mutation:</p> <ul style="list-style-type: none"> Down syndrome – due to an extra copy of chromosome 21 as a result of non-disjunction during meiosis 	<p>Genetic engineering Biotechnology is the manipulation of biological processes to satisfy human needs. Genetic engineering is an aspect of biotechnology and includes:</p> <ul style="list-style-type: none"> Stem cell research – sources and uses of stem cells Genetic modified organisms – brief outline of process (names of enzymes involved are not required) and benefits of genetic modification Cloning – brief outline of process and benefits of cloning <p>Paternity testing The use of each of the following in paternity testing:</p> <ul style="list-style-type: none"> Blood grouping DNA profiles <p>Genetic links Mutations in mitochondrial DNA used in tracing female ancestry</p>
Daily Activities	<p>Activity 26 Concepts in inheritance by mentioning Mendel's role and the 2 laws.</p> <p>Activity 27 Draw and explain the format for representing a genetic cross. Indicate mark allocation.</p> <p>Activity 28 At least 3 examples of monohybrid crosses.</p> <p>Activity 29 Tabulate the different types of dominance. Description of each, symbols to use with examples.</p> <p>Activity 30 Solving genetic problems involving each of the three types of dominance. Proportion and ratio of genotypes and phenotypes</p>	<p>Activity 31 Use a diagram to explain the karyotype of a human, showing the autosomes, the gonosomes, chromosomes XY and XX.</p> <p>Activity 32 Representation of a genetic cross to show the inheritance of sex</p> <p>Activity 33 Sex-linked cross of haemophilia and colour-blindness.</p> <p>Activity 34 Solving genetic problems involving the inheritances of blood groups.</p> <p>Activity 35 The role of blood grouping and DNA profiles in paternity testing. Mutations in mitochondrial DNA.</p>	<p>Activity 36 At least 2 different dihybrid crosses. Determination of the proportion/ratio of genotypes and phenotypes</p> <p>Activity 37 At least 3 pedigree diagrams</p> <p>Activity 38 Mutation: effects and disorders</p>	<p>Activity 39 Genetic engineering such as stem cell research, GMO's and cloning.</p>
PRE-KNOWLEDGE	Grade 10: Differentiate between chromatin & chromosomes, genes and alleles; stem cells and cloning			
Informal Tests			Informal Test 3	
SBA (Formal Assessment)				PRACTICAL 1.2 Genetic lineages and mutations Date: 25 May 2021
Date completed				



TERM 2 (49 days)	Week 5 31 May – 4 June (5 days)	Week 6 7 – 11 June (5 days)	Week 7 14 – 18 June (4 days)
CAPS Topics	(2021 National Examination Guideline p 13, 14) Responding to the environment (Humans) (PAPER 1: 54 MARKS)		
Core Concepts, Skills and Values	<p>Human Nervous system The nervous system (involving nerves) and endocrine system (involving hormones) are two components that help humans respond to the environment</p> <p>The need for a nervous system in humans:</p> <ul style="list-style-type: none"> Reaction to stimuli (stimuli can be external and internal) Coordination of the various activities of the body <p>Central nervous system The brain and spinal cord are protected by meninges Location and functions of the following parts:</p> <ul style="list-style-type: none"> Brain <ul style="list-style-type: none"> Cerebrum Cerebellum Corpus callosum Medulla oblongata Spinal cord <p>Peripheral nervous system Location and functions of the peripheral nervous system (cranial and spinal nerves)</p> <p>Autonomic nervous system Location and functions of the autonomic nervous system (sympathetic and parasympathetic sections)</p> <p>Structure and functioning of a nerve Nerves send and carry signals to and from all parts of the body and are made up of neurons (sensory or motor) Functions of sensory and motor neurons Structure and functions of parts of sensory and motor neurons, using a diagrams: nucleus, cell body, cytoplasm, myelin sheath, axon and dendrites</p> <p>A simple reflex arc</p> <ul style="list-style-type: none"> Definition of a reflex action and a reflex arc. Structure of a reflex arc and functions of each part, using a diagram: receptor, sensory neuron, dorsal root of spinal nerve, spinal cord, interneuron, motor neuron, ventral root of spinal nerve, effector. Functioning of a simple reflex action, using an example. Significance of a reflex action. Significance of synapses. <p>Disorders of the CNS Causes and symptoms of the following disorders of the nervous system:</p> <ul style="list-style-type: none"> Alzheimer's disease Multiple sclerosis 	<p>Receptors Functions of receptors, neurons and effectors in responding to the environment.</p> <p>The body responds to a variety of different stimuli, such as light, sound, touch, temperature, pressure, pain and chemicals (taste and smell). (No structure and names necessary except for names of the receptors in the eye and ear.)</p> <p>Human eye Structure and functions of the parts of the human eye, using a diagram</p> <p>Binocular vision and its importance</p> <p>The changes that occur in the human eye for each of the following, using diagrams:</p> <ul style="list-style-type: none"> Accommodation Pupillary mechanism <p>The nature and treatment of the following visual defects, using diagrams:</p> <ul style="list-style-type: none"> Short-sightedness Long-sightedness Astigmatism Cataracts 	<p>Human ear Structure of the human ear and the functions of the different parts, using a diagram.</p> <p>Functioning of the human ear in:</p> <ul style="list-style-type: none"> Hearing (include the role of the organ of Corti, without details of its structure) Balance (include the role of maculae and cristae, without details of their structure) <p>Cause and treatment of the following hearing defects:</p> <ul style="list-style-type: none"> Middle ear infection (the use of grommets) Deafness (the use of hearing aids and cochlear implants)
Daily activities	<p>Activity 40 Central nervous system including brain and spinal cord. Diagrams, labels and function of each part.</p> <p>Activity 41 Peripheral and autonomic nervous system.</p> <p>Activity 42 Diagram of a neuron with labels and functions. Tabulate and name the different neurons, make drawings and give functions.</p> <p>Activity 43 Draw a cross section of spinal cord to observe the white and grey matter. Indicate the direction of a nerve impulse with arrows, labels and functions. Differentiate between reflex arc and reflex action.</p> <p>Activity 44 Disorders</p>	<p>Activity 45 Diagram of the human eye with labels and functions.</p> <p>Activity 46 Tabulate the changes that occur in the eye during accommodation and pupillary mechanism.</p> <p>Activity 47 Visual defects</p>	<p>Activity 48 Diagram of the human ear with labels and functions.</p> <p>Activity 49 Use diagrams to explain hearing and balance.</p> <p>Activity 50 Defects and management</p>

Investigation/ Experiments	INVESTIGATION 6 Model of brain or a sheep's brain to observe regions of brain. Identify the cerebrum, cerebellum and spinal cord. INVESTIGATION 7 Design an investigation to determine the reaction time of different learners to a stimulus. Record the results and calculate the average time.	INVESTIGATION 8 Dissect the eye of a sheep or pig. Observe the different regions. Worksheet to be used to follow instructions for dissecting and observing the significant parts.	
Informal Tests		Informal Test 4	
SBA (Formal Assessment)			June Examination Papers
Date completed			

TERM 2 (49 days)	Week 8 21 – 25 June (5 days)	Week 9 28 June – 2 July (5 days)	Week 10 5 – 9 July (5 days)
CAPS Topics	(2021 National Examination Guidelines p14, 15) (PAPER 1: 34 MARKS) Human endocrine system Homeostasis in humans		(2021 National Examination Guidelines p15) Responding to the environment (plants) (PAPER 1: 13 MARKS)
Core Concepts, Skills and Values	Human Endocrine system Difference between an endocrine and an exocrine gland. Definition of a hormone . Location of each of the following glands , using a diagram, the hormones they secrete and function(s) of each hormone: <ul style="list-style-type: none"> Hypothalamus (ADH) Pituitary/Hypophysis (GH, TSH, FSH, LH, prolactin) Thyroid glands (thyroxin) Islets of Langerhans in the pancreas (insulin, glucagon) Adrenal glands (adrenalin, aldosterone) Ovary (oestrogen, progesterone) Testis (testosterone) 	Homeostasis as the process of maintaining a constant, internal environment within narrow limits, despite changes that take place internally and externally. The conditions within cells depend on the conditions within the internal environment (tissue fluid). Factors such as carbon dioxide, glucose, salt and water concentration, temperature and pH must be kept constant in the internal environment (the tissue fluid) Homeostasis: negative feedback mechanism Negative feedback mechanism controlling each of the following in the body: <ul style="list-style-type: none"> Thyroxin levels Blood glucose levels Blood carbon dioxide levels Water balance (osmoregulation) Salt Disorders caused by an imbalance in levels of: <ul style="list-style-type: none"> Thyroxin – Goitre Blood glucose – Diabetes mellitus Thermoregulation Structure of the skin, using a diagram, with an emphasis on the parts involved in thermoregulation Role of the following in negative feedback mechanism for controlling temperature/thermoregulation: <ul style="list-style-type: none"> Sweating Vasodilation Vasoconstriction 	Plant hormones General functions of the following: <ul style="list-style-type: none"> Auxins Gibberellins Abcisic acid The control of weeds using plant hormones. The role of auxins in: <ul style="list-style-type: none"> Geotropism Phototropism Plant defence mechanisms Role of the following as plant defence mechanisms: <ul style="list-style-type: none"> Chemicals Thorns
Daily activities	Activity 51 Define hormone. Tabulate difference between exo- and endocrine glands. Diagram of the location of each gland, their secretions and functions. Activity 52 Diagram of negative feedback of TSH and thyroxin. Activity 53 Diagram of negative feedback of insulin and glucagon. Give an explanation of diabetes mellitus.	Activity 54 Use diagrams to describe negative feedback of maintaining carbon dioxide concentrations in blood Activity 55 Use diagrams to describe negative feedback of maintaining water and salt concentrations in blood Activity 56 Temperature regulation using micrograph of the human skin and identify the main features.	Activity 57 Tabulate the functions of the different plant hormones. Activity 58 Use diagrams to explain the role of auxins in phototropism and geotropism. Activity 59 Defence mechanisms.
Investigation Experiments	INVESTIGATION 9 Research disorders caused by under- and over secretion of at least one hormone. Different learners should research different hormones. Brief written report.		INVESTIGATION 10 Design investigations to show geotropism and phototropism. Identify the variables and recommend ways to control the variables Record and interpret the results
Informal Tests	Informal Test 5		
SBA (Formal Assessment)	<div>PRE-KNOWLEDGE</div> <div>Grade 11: Aim of respiration, nutrition, homeostasis Grade 11: Control of glucose, CO₂, water, salt & role of hormones</div>		<div>PRE-KNOWLEDGE</div> <div>Gr 10 Plant tissues</div>
Date completed			

TERM 3 (48 days)	Week 1 26 - 30 July (5 days)	Week 2 2 – 6 Aug (5 days)	Week 3 10 – 13 Aug (4 days)
CAPS Topics	(2021 National Examination Guidelines p 15, 16 & 17) Evolution (PAPER 2: 54 MARKS)		
Core Concepts, Skills and Values	Introduction to Evolution <ul style="list-style-type: none"> Definition of biological evolution – change in the characteristics of species over time Difference between a hypothesis and a theory. The Theory of Evolution is regarded as a scientific theory since various hypotheses relating to evolution have been tested and verified over time Evidence for evolution Role of the following as evidence for evolution: <ul style="list-style-type: none"> Fossil record – Link to Grade 10 Biogeography – Link to Grade 10 Modification by descent (homologous structures) Genetics Variation Definition of a biological species and a population. A review of the contribution of each of the following to variation that exists amongst individuals of the same species: <ul style="list-style-type: none"> Meiosis <ul style="list-style-type: none"> Crossing over Random arrangement of chromosomes Mutations Random fertilisation Random mating Types of variation: <ul style="list-style-type: none"> Continuous variation – those characteristics where there is a range of intermediate phenotypes e.g. height Discontinuous variation – those characteristics that fall into distinct categories e.g. blood groups 	Origin of an idea about origins (a historical development) Ideas on evolution in the order of their origin are as follows: <ul style="list-style-type: none"> Lamarckism Darwinism Punctuated Equilibrium Lamarckism (Jean Baptiste de Lamarck – 1744 – 1829) <ul style="list-style-type: none"> Lamarck used two 'laws' to explain evolution: <ul style="list-style-type: none"> 'Law' of use and disuse 'Law' of the inheritance of acquired characteristics Reasons for Lamarck's theory being rejected. Darwinism (Charles Darwin – 1809 – 1882) Darwin's theory of evolution by natural selection: <ul style="list-style-type: none"> There is a great deal of variation amongst the offspring. Some have favourable characteristics and some do not. When there is a change in the environmental conditions or if there is competition, then organisms with characteristics, which make them more suited, survive whilst organisms with unfavourable characteristics, which make them less suited, die. The organisms that survive, reproduce and thus, pass on the allele for the favourable characteristic to their offspring. The next generation will therefore have a higher proportion of individuals with the favourable characteristic. Punctuated equilibrium (Eldredge and Gould – 1972) Punctuated Equilibrium explains the speed at which evolution takes place: <ul style="list-style-type: none"> Evolution involves long periods of time where species do not change or change gradually through natural selection (known as equilibrium) This alternates with (is punctuated by) short periods of time where rapid changes occur through natural selection. during which new species may form in a short period of time 	Artificial selection Artificial selection involving: <ul style="list-style-type: none"> A domesticated animal species A crop species Formation of new species <ul style="list-style-type: none"> Biological species concept: similar organisms that are capable of interbreeding to produce fertile offspring Speciation and extinction and the effect of each on biodiversity. Speciation through geographic isolation: <ul style="list-style-type: none"> If a population of a single species becomes separated by a geographical barrier (sea, river, mountain, lake), then the population splits into two. There is now no gene flow between the two populations. Since each population may be exposed to different environmental conditions/the selection pressure may be different natural selection occurs independently in each of the two populations such that the individuals of the two populations become very different from each other genotypically and phenotypically. Even if the two populations were to mix again, they will not be able to interbreed. The two populations are now different species. Speciation through geographic isolation in ONE of the following: <ul style="list-style-type: none"> Galapagos finches Galapagos tortoises Plants on different land masses (linked to continental drift) <ul style="list-style-type: none"> Baobabs in Africa and Madagascar Proteas in South Africa and Australia Any example of mammals on different land masses Mechanisms of reproductive isolation (Keeping species separate) A brief outline of reproductive isolation mechanisms that help to keep species separate: <ul style="list-style-type: none"> Breeding at different times of the year Species-specific courtship behaviour Plant adaptation to different pollinators Infertile offspring Prevention of fertilisation Evolution in present times Any ONE example of natural selection and evolution in present times: <ul style="list-style-type: none"> Use of insecticides and consequent resistance to insecticides in insects Development of resistant strains of tuberculosis-causing bacteria (MDR and XDR) to antibiotics, due to mutations (variations) in bacteria and failure to complete antibiotic courses HIV resistance to antiretroviral medication Bill (beak) and body size of Galapagos finches
	Activity 60 Introduction to evolution. Evidence for evolution Activity 61 Variation	Activity 62 Origin of ideas about origin of organisms. Activity 63 Tabulate the differences between Lamarck and Darwin's ideas on evolution. Include similarities in Darwin's theory and punctuated equilibrium.	Activity 64 Artificial selection. Write a report on one type artificial selection Activity 65 Speciation Activity 66 Reproductive isolation and evolution in present times
	PRE-KNOWLEDGE Grade 10: Fossil formation, fossil record, biogeography, classification, human skeleton Grade 11: Basic structure of viruses, bacteria, biodiversity of plants and animals		
	Informal Tests		Informal Test 6
	Date completed		

TERM 3 (48 days)	Week 4 16 - 20 Aug (5 days)	Week 5 23 - 27 Aug (5 days)
CAPS Topics	(2021 National Examination Guidelines p 17) Evolution continues	
Core Concepts, Skills and Values	<p>Evidence of common ancestors for living hominids, including humans Interpretation of a phylogenetic tree to show the place of the family Hominidae in the animal kingdom.</p> <p>Characteristics that humans share with African apes.</p> <p>Anatomical differences between African apes and humans, with the aid of diagrams, as it applies to the following characteristics:</p> <ul style="list-style-type: none"> • Bipedalism (foramen magnum, spine and pelvic girdle) • Brain size • Teeth (dentition) • Prognathism • Palate shape • Cranial ridges • Brow ridges <p>Lines of evidence that support the idea of common ancestors for living hominids including humans:</p> <ul style="list-style-type: none"> • Fossil evidence: Evidence from fossils of different ages show that the anatomical characteristics of organisms changed gradually over time. • Emphasis on evolutionary trends provided by the anatomical features of fossils of the following three genera: <ul style="list-style-type: none"> - <i>Ardipithecus</i> - <i>Australopithecus</i> - <i>Homo</i> as well as: <ul style="list-style-type: none"> - The age of each fossil found/time-line for the existence of the three genera - The fossil sites where they were found: emphasis on the fossil sites that form a part of the Cradle of Humankind - The scientists who discovered them • Genetic evidence: mitochondrial DNA • Cultural evidence: tool-making 	<p>Out-of-Africa hypothesis</p> <ul style="list-style-type: none"> • The Out-of-Africa hypothesis: Modern humans originated in Africa and then migrated to other continents • Evidence for the 'Out-of-Africa' hypothesis: <ul style="list-style-type: none"> ◇ Fossil evidence: information on each of the following fossils that serve as evidence for the 'Out-of-Africa' hypothesis: <ul style="list-style-type: none"> ○ <i>Ardipithecus</i> (fossils found in Africa only) ○ <i>Australopithecus</i> (fossils found in Africa only, including Karabo, Little foot, Taung Child, Mrs Ples) ○ <i>Homo</i> (fossils of <i>Homo habilis</i> found in Africa only, oldest fossils of <i>Homo erectus</i> and <i>Homo sapiens</i> found in Africa, while the younger fossils were found in other parts of the world) ◇ Genetic evidence: mitochondrial DNA • Timeline for the existence of different species of the genus <i>Homo</i> and the significant features of each fossil type of to show the differences amongst them • Interpretation of phylogenetic trees proposed by different scientists showing possible evolutionary relationship as it applies to hominid evolution
Daily activities	<p>Activity 67 Phylogenetic tree to show the place of the family Hominidae in the animal kingdom.</p> <p>Activity 68 Similarities between humans and African apes</p> <p>Activity 69 Differences between humans and African apes</p> <p>Activity 70 Fossil evidence Genetic evidence: mitochondrial DNA Cultural evidence: tool-making</p> <p>Activity 71 Use a map or tabulate the different fossils, the age of each, the fossil sites where they were found and the scientists who discovered them.</p>	<p>Activity 72 Tabulate fossils that serve as evidence for the Out of Africa hypothesis and describe genetic evidence: mitochondrial DNA.</p>
Informal Tests		
SBA (Formal Assessment)	ASSIGNMENT Evolution Date: 17 August 2021	
Date completed		



TERM 3 (48 days)	Week 6 30 Aug – 3 Sept (5 days)	Week 7 6 – 10 Sept (5 days)	Week 8 13 – 17 Sept (5 days)	Week 9 20 – 23 Sept (4 days)	Week 10 27 Sept – 1 Oct (5 days)																						
CAPS Topics	REVISION AND TRIAL EXAMINATION																										
Core Concepts, Skills and Values	<div>PAPER 1</div> <div>Marks: 150 Time: 2 ½ hours Learners must answer all 3 questions</div> <table><thead><tr><th>TOPIC</th><th>MARKS</th></tr></thead><tbody><tr><td>Reproduction in vertebrates</td><td>8</td></tr><tr><td>Human Reproduction</td><td>41</td></tr><tr><td>Responding to the environment (humans)</td><td>54</td></tr><tr><td>Human endocrine system and Homeostasis</td><td>34</td></tr><tr><td>Responding to the environment</td><td>13</td></tr></tbody></table>		TOPIC	MARKS	Reproduction in vertebrates	8	Human Reproduction	41	Responding to the environment (humans)	54	Human endocrine system and Homeostasis	34	Responding to the environment	13	<div>PAPER 2</div> <div>Marks: 150 Time: 2 ½ hours Learners must answer all 3 questions</div> <table><thead><tr><th>TOPIC</th><th>MARKS</th></tr></thead><tbody><tr><td>DNA: Code of life</td><td>27</td></tr><tr><td>Meiosis</td><td>21</td></tr><tr><td>Genetics and inheritance</td><td>48</td></tr><tr><td>Evolution (Evolution through natural selection)</td><td>54</td></tr></tbody></table>			TOPIC	MARKS	DNA: Code of life	27	Meiosis	21	Genetics and inheritance	48	Evolution (Evolution through natural selection)	54
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	<div>Cognitive levels:</div> <div>Knowing Science – 40% Understanding Science – 25% Applying scientific knowledge – 20% Evaluating, analysing and synthesising – 15%</div>		<div>Degrees of difficulty for exam and test questions:</div> <div>Easy – 30% Moderate – 40% Difficult – 25% Very difficult – 5%</div>																								

TERM 4 (48 days)	Week 1 11 – 15 Oct (5 days)	Week 2 18 – 22 Oct (5 days)	Week 3 25 – 29 Oct (5 days)	Week 4 1 – 5 Nov (5 days)	Week 5 8 – 12 Nov (5 days)	Week 6 15 – 19 Nov (5 days)	Week 7 22 – 26 Nov (5 days)	Week 8 - 10 29 Nov – 15 Dec (13 days)
CAPS Topics								
Core Concepts, Skills and Values	Consolidation & Revision					FINAL EXAM		
Daily activities								
Investigation Experiment								
Inform Tests								
SBA (Formal Assessment)								
Date completed								

PAPER 1**Marks: 150****Time: 2 ½ hours****Learners must answer all 3 questions**

TOPIC	MARKS
Reproduction in vertebrates	8
Human Reproduction	41
Responding to the environment (humans)	54
Human endocrine system and Homeostasis	34
Responding to the environment	13

Cognitive levels:

Knowing Science – 40%

Understanding Science – 25%

Applying scientific knowledge – 20%

Evaluating, analysing and synthesising – 15%

PAPER 2**Marks: 150****Time: 2 ½ hours****Learners must answer all 3 questions**

TOPIC	MARKS
DNA: Code of life	27
Meiosis	21
Genetics and inheritance	48
Evolution (Evolution through natural selection)	54

Degrees of difficulty for exam and test questions:

Easy – 30%

Moderate – 40%

Difficult – 25%

Very difficult – 5%