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`LIFE SCIENCES GRADE 12 - WORK SCHEDULE 2017

School: _____ **Teacher:** _____ **Total number of Grade 12 learners:** _____

TOPICS	Week (days)	Planned Date	Date completed	INFORMAL ASSESSMENT			FORMAL ASSESS-MENT
				Homework/ Classwork ACTIVITY NUMBER	Experiments/ Investigations	Informal Tests	Annual Assessment Plan
TERM 1							
DNA: THE CODE of LIFE [Paper 2: 27 marks]	**2 ½ weeks**						
Introduction							
❑ Revise the structure of the cell with an emphasis on the ribosome, cytoplasm and the parts of the nucleus	**Week 1 (3)**	**11 – 13 Jan 2017**		**Activity no. 1**			
❑ State that nucleic acids consist of nucleotides.							
❑ Name the two types of nucleic acids.							
DNA: location, structure and functions				**Activity no. 2**			
❑ Location of DNA (nuclear DNA and mitochondrial DNA)							
❑ Brief history of the discovery of the structure of the DNA molecule (Watson, Crick, Franklin & Wilkins)							
❑ Three components of a DNA nucleotide (N-bases, P, D)	**Week 2 (5)**	**16 – 20 Jan 2017**		**Activity no. 3**	**Inv 1 : DNA extraction and examine the threads**		
❑ The natural shape of the DNA molecule is a double helix							
❑ Stick diagram of DNA molecule to illustrate its structure							
❑ Functions of DNA: genes and non-coding DNA							
DNA Replication:				**Activity no. 4**			
Process of DNA replication:							
• When, where and how							
• The significance of DNA replication							
DNA Profiling				**Activity no. 5**	**Inv 2: DNA profiling case study**		
• State what a *DNA profile/DNA 'fingerprint'* is.							
• State the various uses of DNA profiles.							
• State views for and against the use of DNA profiling.							

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TERM 1 continued							
RNA: location, structure and functions	**Week 3 (5)**	**23 – 27 Jan 2017**					
❑ Location of RNA (i.e. mRNA and tRNA)				**Activity no. 6**			
❑ Function of RNA (protein synthesis)							
❑ Structure of RNA (single-stranded, N-bases, P, R)							
❑ Stick diagram of RNA molecule to illustrate its structure							
Comparison of DNA and RNA				**Activity no. 7**			
❑ List similarities							
❑ Tabulate differences							
Protein synthesis				**Activity no. 8, 9, 10**			
❑ Define protein synthesis							
❑ The involvement of DNA and RNA in:							
❑ Transcription • Double-stranded DNA unzips • When the hydrogen bonds break. • One strand is used as a template • To form mRNA • Using free RNA nucleotides form 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 • 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. • Amino acids become attached by peptide bonds • To form the required protein							

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TERM 1 continued							
MEIOSIS [Paper 1: 11 marks] [Paper 2: 12 marks]	**2 weeks**	**Paper 1: Gametogenesis Mutations**			**Paper 2: Process Significance**		
Introduction	**Week 4 (5)**	**30 Jan – 3 Feb 2017**		**Activity no. 11**			
❑ Review structure of a cell with emphasis on the parts of the nucleus, the centrosome and the cytoplasm							
❑ State that: • Chromosomes consist of DNA (makes up genes) and protein • The number of chromosomes in a cell is a characteristic of an organism (e.g. humans 46) • Chromosomes which are single stranded become double stranded (2 chromatids joined by a centromere) as a result of DNA replication							
❑ Differentiate between: • Hploid (n) and diploid (2n) cells in terms of chromosome number • Sex cells (gametes) and somatic cells (body cells) • Sex chromosomes (gonosomes) and autosomes							
❑ Review the process of mitosis							
Meiosis – The process							
❑ Definition of meiosis							
❑ State where meiosis takes place in plants and animals.							
❑ Purpose (spermatogenesis + oogenesis) + exceptions e.g. mosses & ferns							
❑ State that interphase takes place before meiosis and that although meiosis is a continuous process, the events are divided into different phases for convenience							

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❑ Describe what happens during interphase as follows: • DNA replication takes place • Single-stranded chromosomes become double stranded • 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	**continued in week 4**	**continued up to 3 Feb 2017**		**Activity no. 12** **Activity no. 13**			
❑ Describe the events of the following phases of Meiosis I, diagrams:					**Inv 3:** **Observe and draw prepared microscope slides, micrographs or models of cells in different stages of meiosis**		
• Prophase I (include description of crossing over)							
• Metaphase I							
• Anaphase I							
• Telophase I							
❑ The events of each phase of Meiosis II, using diagrams:							
• Prophase II							
• Metaphase II							
• Anaphase II							
• Telophase II							
Importance of meiosis:	**Week 5 (5)**	**6 – 10 Feb 2017**		**Activity no. 14** **Activity no. 15**			
• Production of gametes • Halving of the chromosome number (diploid to haploid) • Mechanism to introduce genetic variation through: ◊ Crossing over ◊ The random arrangement of chromosomes at the equator							
Abnormal meiosis							
❑ Non-disjunction and its consequences							
❑ Non-disjunction of chromosome pair 21 Down syndrome							
Comparison of mitosis and meiosis							
❑ List similarities in mitosis and meiosis							
❑ Tabulate differences between mitosis and meiosis							

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TERM 1 continued							
REPRODUCTION IN VERTABRATES [Paper 1: 6 marks]	**½ week**						
Diversity of reproductive strategies	**Week 6 (5)**	**13 – 17 Feb 2016**		**Activity no. 16**			**Practical Task 1.1 Meiosis Date: 16 Feb**
• Describe the role of the following reproductive strategies in animals in maximising reproductive success in different environments (using relevant examples):							
• External fertilisation and internal fertilisation							
• Ovipary, ovovivipary and vivipary							
• Amniotic egg							
• Precocial and altricial development							
• Parental care							
HUMAN REPRODUCTION [Paper 1: 31 marks]	**3 weeks**						
❑ Review the schematic outline of the human life cycle to show the role of meiosis, mitosis and fertilisation	**Week 7 (5)**	**20 – 24 Feb 2017**		**Activity no. 17 Activity no. 18**	**Inv 4: Microscope slides of ovary, testes and section through penis. Identify tissues and different structures**		**Assignment: Human Reproduction Date: 20 April *(record in third term)***
Structure of the male reproductive system							
❑ Identify and state the functions of the testis, epididymis, vas deference, seminal vesicle, ejaculatory duct, prostate gland, Cowper's gland and the urethra.							
Structure of the female reproductive system							
❑ Identify and state the functions of the ovary, Fallopian tube, uterus with uterine wall line by endometrium, cervix, vagina and its external opening and the vulva							
❑ In a section through the ovary, identify and state the functions of: • Follicles at various stages of development; • The Graafian follicle and • The corpus luteum							
Puberty							
❑ List the main changes that occur in male characteristics during puberty under the influence of testosterone							
❑ List the main changes that occur in female characteristics during puberty under the influence of oestrogen.							

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TERM 1 continued							
Gametogenesis							
❑ Define each of the following terms: • Gametogenesis • Spermatogenesis • Oogenesis	**Week 8 (5)**	**27 Feb – 3 March 2017**		**Activity no. 19** **Activity no. 20**			
❑ Describe spermatogenesis as follows: • Diploid cells in the seminiferous tubules of the testes undergo meiosis • To form haploid sperm cells							
❑ Identify and state the functions of the parts of the sperm cell (acrosome, head with haploid nucleus, middle portion/neck with mitochondria and a tail)							
❑ Describe oogenesis as follows: • Diploid cells in the ovary undergo meiosis • To form a primary follicle consisting of haploid cells • One cell develops into an ovum contained in a Graafian follicle.							
❑ Identify and state the functions of the different parts of an ovum (layer of jelly, haploid nucleus, cytoplasm)							
Menstrual cycle							
❑ State that the menstrual cycle includes the uterine and the ovarian cycle							
❑ Describe the following events in the ovarian cycle:				**Activity no. 21**			
• Development of the Graafian follicle							
• Ovulation							
• Formation of the corpus luteum							
❑ Describe the following events in the uterine cycle:	**Week 9**	**6 – 10 March 2017**		**Activity no. 22**			
• Changes that take place in the thickness of the endometrium							
• Menstruation							

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TERM 1 continued							
❑ Describe the hormonal control of the menstrual cycle (ovarian and uterine cycles) with reference to the action of FSH, oestrogen, LH and progesterone.	**Week 9 continued (5)**	**6 – 10 March 2017**		**Activity no. 23**			
❑ Describe the negative-feedback mechanism involving FSH and progesterone in controlling the production of ova.							
Fertilisation and development of zygote to blastocyst				**Activity no. 24**	**Inv 5: Prepared microscope slides or micrographs or ultrasound pictures of embryonic development.** **Inv 6: Stages of pregnancy by watchingDVDs of the development of an embryo and the birth process.** **Inv 7: Observe contraceptive devices.**		
❑ Define *copulation* and *fertilisation*							
❑ State where and describe how fertilisation occurs							
❑ Describe the following development: zygote → morula → blastocycts → embryo							
Gestation							
❑ Define *implantation*							
❑ State the role of oestrogen and progesterone in maintaining pregnancy							
❑ Identify and state the functions of the following parts of the developing embryo/foetus:							
• Chorion and chorionic villi							
• Amnion, amniotic cavity and amniotic fluid							
• Umbilical cord (including umbilical artery and umbilical vein)							
❑ Placenta							
Birth							
❑ Name the three stages of natural birth process (labour, expulsion of baby, release of the afterbirth)							

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TERM 1 continued							
HUMAN IMPACT on the environment [Paper 1: 25 marks]	**2 weeks**						**Formal Test (Week 1 – 9) Date: 16 March**
❑ The atmosphere and climate change	**Week 10 & 11**	**13 – 17 March 2017 22 – 24 March 2017**		**Activity no. 27, 28, 29, 30, 31, 32, 33**			
❑ Water availability & quality							
❑ Food security							
❑ Loss of Biodiversity							
❑ Solid waste disposal							
GENETICS AND INHERITANCE [Paper 2: 45 marks]	**1/4 week**						
❑ Define each of the following: • Genetics • Inheritance • Variation	**Week 12 (5)**	**27 - 31 March 2017**		**Activity no. 34**			
❑ Outline the experiments conducted by Mendel.							
Concepts in inheritance							
❑ Differentiate between:							
• Chromatin and chromosomes							
• Genes and alleles							
• Phenotype and genotype							
• Dominant and recessive alleles ◊ State Mendel's Law of Dominance							
• Homozygous (pure breeding) and heterozygous (hybrid)							
• Monohybrid cross and dihybrid cross							
Monohybrid crosses							
❑ Write down the format for representing a genetic cross				**Activity no. 35**	**Inv 8:** Solving genetic problems: • Monohybrid crosses		
❑ State Mendel's principle of segregation							
❑ Solve monohybrid genetics problems							
❑ Determine proportion and ratio of genotypes and phenotypes							

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TERM 2							
GENETICS AND INHERITANCE [Paper 2: 45 marks]	**3/4 weeks**						
Types of dominance							
❑ Use examples to distinguish amongst the following:	**Week 13 (4)**	**18 – 21 April 2017**		**Activity no. 36, 37**	**Inv 9:** Solve genetic problems involving each of the three types of dominance		
• Complete dominance – one allele is dominant over the other; the other is recessive							
• Incomplete dominance – none of the two alleles of a gene is dominant							
• Co-dominance – both alleles of a gene are equally dominant							
Sex determination							
❑ Differentiate between *sex chromosomes (gonosomes)* and *autosomes* in the karyotypes of human males and females				**Activity no. 38**			
❑ Represent a genetic cross to show the inheritance of sex							
Sex-linked inheritance							
❑ Differentiate between *sex chromosomes (gonosomes*) and *autosomes*				**Activity no. 39**	**Inv 10:** Solve genetic problems involving the following sex-linked characteristics: e.g. • haemophilia • colour-blindness		**Assignment: Human Reproduction Date: 20 April *(record in third term)***
❑ State what is meant by *sex-linked characteristics*							
❑ Solve genetic problems involving the following sex-linked characteristics:							
• Haemophilia							
• Colour-blindness							
Blood grouping							
❑ State what is meant by multiple alleles.				**Activity no. 40**	**Inv 11:** Solve genetic problems involving the inheritance of blood type.		
❑ Using the alleles I^A , I^B and I, show how the four blood groups arise.							

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TERM 2 continued							
Dihybrid crosses					**Inv 12:** Solve dihybrid genetics problems		
❑ State Mendel's principle of independent assortment.	**Week 14 (3)**	**24 – 26 April 2017**		**Activity no. 41, 42**			
❑ Determine proportion/ratio of genotypes and phenotypes.							
Genetic lineages / Pedigrees							
❑ State what is meant by a *genetic pedigree.*					**Inv 13:** Interpret pedigree diagrams		
❑ Interpret pedigree diagrams showing the inheritance of characteristics over many generations				**Activity no. 43, 44**			
Mutations	**Week 14 continued (3)**	**24 – 26 April 2017 continued**					
❑ State what is meant by a *mutation*.				**Activity no. 45**			
❑ State the causes of mutations.							
❑ Differentiate amongst *harmful mutations*, *harmless mutations* and *useful mutations*.							
❑ Differentiate between a *gene mutation* and a *chromosomal aberration.*							
❑ Describe how mutations contribute to genetic variation and natural selection							
❑ Describe how mutations lead to altered characteristics in each of the following:				**Activity no. 46**			
• Haemophilia – absence of blood-clotting factors							
• Colour-blindness - absence of the proteins that comprise either red or the green cones/photoreceptors in the eye							
• Albinism - absence of pigmentation							
Genetic engineering							
❑ State what is meant by *genetic engineering*.	**Week 15 (4)**	**2 – 5 May 2017**		**Activity no. 47**			
❑ State what is meant by *biotechnology*.							
❑ Describe how each of the following examples of genetic engineering represent the use of biotechnology to satisfy human needs:							
• Stem cell research (what are stem cells; sources of stem cells; uses of stem cells)							
• Genetic modification (example in plants and animals; benefits of genetic modification)							
• Cloning (an example; description of process)							
❑ State views for and against genetic engineering.							

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TERM 2 continued							
Paternity testing	**Week 15 (4) continued**	**2 – 5 May 2017 continued**		**Activity no. 48**			
❑ Describe the role of each of the following in paternity testing: • Blood grouping • DNA profiles							
Genetic links/ancestry							
❑ Describe how mutations in mitochondrial DNA may be used in tracing female ancestry.							
RESPONDING TO THE ENVIRONMENT – HUMANS [Paper 1: 40 marks]	**4 weeks**						
❑ Differentiate between the *nervous system* (involving nerves) and the *endocrine system* (involving hormones) as two components that help us respond to the environment.	**Week 16 (5)**	**8 – 12 May 2017**		**Activity no. 49**	**Inv 14: Model of brain or a sheep's brain to observe regions of brain. Identify the cerebrum, cerebellum and spinal cord.**		**Practical Task: Sex-linked inheritance/ diseases Date: 9 May**
Human nervous system							
❑ Explain the need for a nervous system in humans in terms of:							
• Reaction to stimuli (stimuli can be external and internal)							
• Coordination of the various activities of the body							
Central nervous system							
❑ State that the brain and spinal cord are protected by meninges.							
❑ State the location and provide functions of the following parts:				**Activity no. 50**			
• Cerebrum							
• Cerebellum							
• Corpus callosum							
• Medulla oblongata							
• Spinal cord							
Peripheral nervous system							
❑ State the location and provide the functions of the peripheral nervous system (cranial and spinal nerves).							
Autonomic nervous system							
❑ State the location and provide the functions of the autonomic nervous system (sympathetic and parasympathetic sections).							

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TERM 2 continued							
Structure and functioning of a nerve	**Week 17 (5)**	**15 – 19 May 2017**					
❑ Identify and state the functions of each of the following parts of sensory and motor neurons: nucleus, cell body, cytoplasm, myelin sheath, axon and dendrites.				**Activity no. 51**	**Inv 15: Examine a cross-section of spinal cord to observe the white and grey matter**		
A simple reflex arc							
❑ Differentiate between a *reflex action* and a *reflex arc*.							
❑ Identify and state the function of each of the following components of a simple reflex arc: receptor, sensory neuron, dorsal root of spinal nerve, spinal cord, interneuron, motor neuron, ventral root of spinal nerve, effector.				**Activity no. 52**			
❑ Describe the functioning of a simple reflex action, using an example.					**Inv 16: Design an investigation to determine the reaction time of different learners to a stimulus. Record the results and calculate the average time. Calculate the distance that will be travelled by a car travelling at 100 km /hour within the average reaction time**		
❑ State the significance of a reflex action.							
❑ State the significance of synapses.							
Disorders of the CNS							
❑ State the causes and symptoms of the following disorders of the nervous system:				**Activity no. 53**			**Formal Test (week 10 – 15) 23 May**
• Alzheimer's disease							
• Multiple sclerosis							
Injuries							
❑ Describe the consequences of possible brain and spinal injuries and state the use of stem cell research in the possible repairing of injuries.							
Effects of drugs							
❑ List the negative effects of drugs on the central nervous system.							

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TERM 2 continued							
Receptors							
❑ State how receptors, neurons and effectors function together in responding to the environment.	**Week 18 (5)**	**22 – 26 May 2017**					
❑ State that 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 are necessary, except for the names of the receptors in the eye and ear.)							
Human eye							
❑ Describe the structure and state the functions of the parts of the human eye.				**Activity no. 54**	**Inv 17: 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.**		
❑ State what is meant by *binocular vision*.							
❑ Describe the changes that occur in the human eye for each of the following:				**Activity no. 55**			
• Accommodation							
• Pupil reflex/pupillary mechanism							
❑ Describe each of the following visual defects using diagrams, and state how each visual defect is treated:				**Activity no. 56**			
• Short-sightedness							
• Long-sightedness							
• Astigmatism							
• Cataracts							
Human ear							
❑ Describe the structure and state the functions of the different parts of the human ear.	**Week 19 (5)**	**29 May – 2 June 2017**		**Activity no. 57**			
❑ Describe the functioning of the human ear in:				**Activity no. 58**			
• Hearing (include the role of the organ of Corti, without details of its structure)							**Midyear exam: P1: 9 June**
• Balance (include the role of maculae and cristae, without details of their structure)							**P2: 12 June**
❑ Describe the cause and state the treatment of the following hearing defects:				**Activity no. 59**			
• Middle ear infection (treatment using grommets)							
• Deafness (treatment using hearing aids & cochlear implants)							

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WEEK 20 – 23 IS ALLOCATED TO EXAMS

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TERM 3							
HUMAN ENDOCRINE SYSTEM [Paper 1: 15 marks]	**1 ½ weeks**						
❑ Differentiate between *endocrine glands* and *exocrine glands*.	**Week 24 (5)**	**24 – 28 July 2017**		**Activity no. 60, 61**	**Inv 18: Research disorders caused by under- and over secretion of at least one hormone. Different learners should research different hormones. Brief written report.**		
❑ Define a *hormone*.							
❑ State the location of each of the following glands, the hormones they secrete and function(s) of each hormone:							
• Hypothalamus (ADH)							
• Pituitary/hypophysis (GH, TSH, FSH, LH, prolactin)							
• Thyroid gland (thyroxin)							
• Pancreas/islets of Langerhans (insulin, glucagon)							
• Adrenal glands (adrenalin, aldosterone)							
• Ovary (oestrogen, progesterone)							
• Testis (testosterone)							
❑ State what is meant by *negative feedback*.				**Activity no. 62, 63**			
❑ Describe the negative feedback mechanism involving:							
• TSH and thyroxin (and the result of an imbalance: thyroid disorders)							
• Insulin and glucagon (and the result of an imbalance: diabetes mellitus)							
HOMEOSTASIS IN HUMANS [Paper 1: 11 marks]	**1 week**						
❑ Define *homeostasis* as the process of maintaining a constant, internal environment within narrow limits, despite changes that take place internally and externally.	**Week 25 (5)**	**31 July – 4 Aug 2017**					
❑ State that the conditions within cells depend on the conditions within the internal environment (tissue fluid).							
❑ List the factors/conditions within the tissue fluid that should be kept constant, within narrow limits.							

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TERM 3 continued							
Homeostasis through negative feedback	**Week 25 (5) continued**	**31 July – 4 Aug 2017 continued**		**Activity no. 64, 65**			
❑ Describe the control of the levels of the following through negative feedback:							
• Glucose							
• Carbon dioxide							
• Water							
• Salts					**Inv 19:**		
Temperature regulation				**Activity no. 66, 67**	**Observe prepared microscope slides of a section through human skin or use a micrograph or model. Identify main features**		
❑ Identify the different parts of the skin involved in thermoregulation.							
❑ Describe the role of each of the following in thermoregulation:							
• Sweating							
• Vasodilation							
• Vasoconstriction							
RESPONDING TO THE ENVIRONMENT – PLANTS [Paper 1: 11 marks]	**1 week**						
Plant hormones	**Week 25 (5)**	**31 July – 4 Aug 2017**		**Activity no. 68, 69**	**Inv 20:**		
❑ List the functions of the following:					**Design investigations to show geotropism and phototropism. Identify the variables and recommend ways to sontrol the variables Record and interpret the results**		
• Auxins							
• Gibberellins							
• Abscisic acid							
❑ Describe the control of weeds using plant hormones.							
❑ Describe the role of auxins in:							
• Geotropism							
• Phototropism							
Plant defence mechanisms							
❑ State how each of the following is used by plants as defence:							
• Chemicals							
• Thorns							

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TERM 3 continued							
EVOLUTION [Paper 2: 66 marks]	**6 weeks**						
❑ Define *evolution* and *biological evolution*.	**Week 26 (4)**	**7 - 11 Aug 2017**		**Activity no. 70**	**Inv 21: Origin of ideas about origins: Class debate and discussion**		
❑ State the difference between a *hypothesis* and a *theory*.							
❑ State that 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							
❑ Describe how each of the following provides evidence for evolution:							
• Fossil record							
• Modification by descent (homologous structures)							
• Biogeography							
• Genetics							
Variation				**Activity no. 71**			
❑ Define a *species* and a *population*.							
❑ Describe how each of the following contributes to variation amongst individuals of the same species:							
• Meiosis							
◊ Crossing over							
◊ Random arrangement of chromosomes							
• Mutations							
• Chance fertilisation							
• Random mating							
❑ Differentiate between *continuous variation* and *discontinuous variation*.							
Origin of the idea about origins (a historical development)				**Activity no. 72**			
❑ Draw a timeline of the development and the contribution of different scientists towards our understanding of evolution, including the following:							
• Lamarckism							
• Darwinism							
• Punctuated equilibrium							

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TERM 3 continued							
Lamarckism (Jean Baptiste de Lamarck – 1744 – 1829)	**Week 26 (4) continued**	**7 - 11 Aug 2017 continued**					
❑ Describe what is meant by each of the following 'Laws' used by Lamarck to explain evolution:				**Activity no. 74**			
• 'Law' of use and disuse							
• 'Law' of the inheritance of acquired characteristics							
❑ Give reasons for Lamarck's theory being rejected.							
Darwinism (Charles Darwin – 1809 – 1882)							
❑ State the observations upon which Darwin based his theory:				**Activity no. 75**			
• Organisms of a species produce a large number of offspring							
• The offspring show a great deal of variation							
• Of the large number of offspring produced, only a few survive							
• Characteristics are inherited from surviving parents to offspring							
❑ Describe Darwin's theory of evolution by natural selection as follows:					**Inv 22: Demonstrate natural selection through games, e.g. camouflage.**		
• Organisms produce a large number of offspring.							
• There is a great deal of variation amongst the offspring.							
• Some have desirable 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 characteristics that make them less suited, die.							
• The organisms that survive, reproduce							
• and thus pass on the desirable characteristic to their offspring.							
• The next generation will therefore have a higher proportion of individuals with the desirable characteristic.							

TOPICS	Week	Planned Date	Date completed	INFORMAL ASSESSMENT			FORMAL ASSESS-MENT
				Homework/ Classwork ACTIVITY NUMBER	Experiments/ Investigations	Informal Tests	Annual Assessment Plan
TERM 3 continued							
Artificial selection	**Week 27 (5)**	**14 - 18 Aug 2017**		**Activity no. 76, 77**	**Inv 23: Research one example of artificial selection. Present findings in a report.**		**Practical Task: Homeostasis Date: 17 Aug**
❑ State what is meant by *artificial selection*.							
❑ Describe *artificial selection* using an example of each of the following:							
• A domesticated animal species							
• A crop species							
❑ List similarities between *natural selection* and *artificial selection*.							
❑ Tabulate differences between *natural selection* and *artificial selection*.							
Punctuated equilibrium							
Based on Darwinism, it is thought that evolution takes place through an accumulation of small or gradual changes that occur over a long period of time. This is supported by the many transitional fossils in the fossil record which show the progressive changes over time.				**Activity no. 78**			
❑ Describe how punctuated equilibrium explains the speed at which evolution takes place, as follows:							
• According to punctuated equilibrium, evolution is not gradual as proposed by Darwinism.							
• Evolution involves long periods of time where species do not change or change very little (known as equilibrium).							
• This alternates with (is punctuated by) short periods of time where rapid changes occur through natural selection.							
• As a result, new species are formed in a short period of time, relative to the long periods of no/little change.							
• This is supported by the absence of transitional fossils (usually termed missing links) indicating the period of rapid change.							

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				Homework/ Classwork ACTIVITY NUMBER	Experiments/ Investigations	Informal Tests	Annual Assessment Plan
TERM 3 continued							
Formation of new species							
❑ Define a *species* and a *population*.	**Week 28 (5)**	**21 - 25 Aug 2017**		**Activity no. 79**			**Formal Test: (week 24 – 28) Date: 24 Aug**
❑ Differentiate between *speciation* and *extinction* and state the effect of each on biodiversity.							
❑ Give a general account on speciation through geographic isolation as follows:							
• If a population of a single species							
• becomes separated by a geographical barrier (sea, river, mountain, lake),							
• then the population splits into two populations.							
• There is now no gene flow between the two populations.							
• Since each population may be exposed to different environmental conditions,							
• 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 reproduce with each other.							
• They have thus become different species.							
❑ Describe speciation through geographic isolation using any ONE of the following examples:				**Activity no. 80, 81**			
• Galapagos finches							
• Galapagos tortoises							
• Plants on different land masses (linked to continental drift)							
◊ Baobabs in Africa and Madagascar							
◊ Proteas in South Africa and Australia							
• Any example of mammals on different land masses							

TOPICS	Week	Planned Date	Date completed	INFORMAL ASSESSMENT			FORMAL ASSESS-MENT
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TERM 3 continued							
Keeping species separate (Mechanisms of reproductive isolation)	**Week 28 (5)**	**21 - 25 Aug 2017**					
❑ When one species gives rise to two new species (speciation), the two species cannot reproduce with each other even if they mix. They remain as separate species due to mechanisms that restrict gene flow between them.				**Activity no. 82**			
❑ Describe how each of the following reproductive isolation mechanisms help in keeping species separate:							
• Breeding at different times of the year							
• Species-specific courtship behaviour (animals)							
• Adaptation to different pollinators (plants)							
• Infertile offspring (e.g. mules)							
Evolution in present times							
❑ Explain that natural selection and evolution are still occurring in present times by using any ONE of the following examples:				**Activity no. 83**			
• The use of DDT and the consequent resistance to DDT in insects which can be explained in terms of natural selection							
• Bill (Beak) and body size of Galapagos finches							
• The 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 anti-retroviral medication							

TOPICS	Week	Planned Date	Date completed	INFORMAL ASSESSMENT			FORMAL ASSESS-MENT
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TERM 3 continued							
Evidence of common ancestors for living hominids, including humans	**Week 29 (5)**	**28 Aug – 1 Sept 2017**					
❑ Interpret a phylogenetic tree to show the place of the family Hominidae in the animal kingdom.				**Activity no. 84**			
❑ Describe the following as evidence that support the idea of common ancestors for living hominids including humans:				**Activity no. 85**			
• Fossil evidence							
• Genetic evidence: mitochondrial DNA							
• Cultural evidence: tool making							
❑ List characteristics that humans share with African apes.							
❑ Tabulate anatomical differences between African apes and humans as it applies to the following characteristics:				**Activity no. 86, 87**			
• Bipedalism (foramen magnum, spine and pelvic girdle)							
• Brain size							
• Teeth (dentition)							
• Prognathism							
• Palate shape							
• Cranial ridges							
• Brow ridges							
Out of Africa hypothesis							
❑ State that the Out of Africa hypothesis states that all modern humans originated in Africa.				**Activity no. 88**			
❑ Describe how the following lines of evidence support the Out of Africa hypothesis:							
• Fossil record – by referring to fossil sites in:							
◊ The Rift Valley in East Africa (Kenya and Tanzania), Ethiopia							
◊ South Africa							
• Mitochondrial DNA							

TOPICS	Week	Planned Date	Date completed	INFORMAL ASSESSMENT			FORMAL ASSESS-MENT
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TERM 3 continued							
❑ Give information on each of the following fossils that serve as evidence for the Out of Africa hypothesis:	**Week 29 (5)**	**28 Aug – 1 Sept 2017**		**Activity no. 89**	**Inv 24:** **Poster presentation:** **Map out the three major phases in hominid evolution from 6 mya up to the present:** ***Ardipithecus (Ethiopia)*** ***Australopithecus (East and South Africa)*** ***Homo (various sites)*** **The map/timeline should show the diagnostic features and the approximate times that examples of the three major genera existed. It is not necessary to show the relationships between genera.**		
• *Ardipithecus*							
• *Australopithecus*							
• *Homo*							
with regard to:							
• The fossil sites where they were found							
• The scientists who discovered them							
• Emphasis on the evidence and evolutionary trends provided by fossils of these three genera in support of the Out of Africa hypothesis							**Trial exam:** **P1: 8 Sept** **P2: 11 Sept**