TYPICAL EXAMPLES OF GR. 12 ESSAYS FROM PAST PAPERS
APPLICABLE TO THE CAPS

NB: These are NOT the only questions that can be included in essays. It is only to assist learners in their preparation. Some of the questions in this document were adapted to satisfy the CAPS prescriptions.

Mark allocation of all these questions is:

Content:	17
Synthesis:	3
TOTAL:	20

PAPER 1 (APPLICABLE to CAPS)	PAPER 2 (APPLICABLE to CAPS)
Nov. 2011 Describe how the principle of negative feedback operates in controlling the glucose concentration of the blood in a normal healthy person. Also describe the causes, symptoms and management of the disease diabetes mellitus which results from an inability of the body to normalise the glucose concentration of the blood.	**EXEMPLARS 2011** Describe how proteins are formed in a cell and explain the impact of the two types of gene mutations on the formation of proteins.
Feb. 2012 Describe the role of the hypothalamus and the adrenal glands in bringing about changes to the blood vessels of the human skin and explain why these changes take place.	**Nov. 2011** Describe the mechanisms by which meiosis contributes to genetic variation and describe how abnormal meiosis leads to Down's syndrome.
Jun. 2012 Discuss the concept of homeostasis by referring to the role played by the pituitary gland, the thyroid gland and the autonomic nervous system in regulating the metabolic rate of the body.	**March 2012** Mention structural differences between DNA and RNA and describe the role of both molecules in the synthesis of proteins. Also explain the uses of DNA fingerprinting/profiling in everyday life
Nov. 2012 The nervous and endocrine systems help to protect the human body. Use suitable examples to describe how this is achieved through a reflex action and by the hormone adrenalin.	**Gauteng Jun. 2012** DNA carries the genetic code to determine which protein is going to be formed. Name and describe TWO processes involved in converting the genetic code of the DNA into protein
Feb. 2013 Describe the negative feedback mechanism involving TSH and thyroxin and describe the consequences if this mechanism does NOT function well.	**Nov. 2012** One of the observations Darwin made during his study of pigeons was about artificial selection. In 1859 Darwin and Wallace jointly proposed that new species could develop by a process of natural selection. Using examples, describe natural and artificial selection and also highlight the differences between these two processes.
Jun. 2013 When the human body is exposed to extreme environmental temperatures, certain control mechanisms play a role to maintain internal body temperature. Describe the role of the brain and the skin in the regulation of body temperature on a very cold day.	**Feb. 2013** Charles Darwin and Jean Baptiste de Lamarck had different ideas to explain evolution. Describe how each of them would have explained the evolution of the long necks of giraffes. Justify whose idea is more acceptable in the science community today.
Nov. 2013 Describe the role of hormones during the menstrual cycle in the female body.	**Jun. 2013** Compare the different characteristics between the Human and other ape-like beings that characterise human evolution. Also highlight the significance of the position of the foramen magnum in humans.

PAPER 1 (APPLICABLE to CAPS)	**PAPER 2 (APPLICABLE to CAPS)**
Feb. 2014 (Supplementary Paper of 2013) Start with a cell containing FOUR chromosomes and describe ALL the chromosomal changes that occur during meiosis, resulting in the formation of abnormal gametes due to non-disjunction in meiosis 1. **Feb. 2014 (Supplementary Paper of 2013)** Name and state the functions of FOUR hormones secreted by the pituitary gland in humans. Describe how the pituitary gland controls the functioning of the thyroid gland using negative feedback.	**Sep. 2013** Describe the process of protein synthesis and also describe the impact that gene mutations may have on the formation of proteins. **Nov. 2013** Describe the structural changes to the skull that characterise the evolution of modern humans from their ape-like ancestors, and explain the significance of these changes.
Exemplars 2014 Name the hormones produced by the testes and ovaries and describe the role of each hormone in human reproduction.	**Exemplars 2014** It is thought that modern humans evolved gradually from ape-like beings over millions of years through speciation. Describe how a single species can form new species, and explain how the differences in the skulls and other parts of the skeleton of primitive ape-like beings and modern humans support the idea that the general trend in human evolution has been towards bipedalism and a change in diet from raw food to cooked food
June 2014 State the difference between a reflex action and a reflex arc. Describe the functioning of a simple reflex action, using a suitable example. Mention in your description the role of each component of the reflex arc.	**June 2014** Describe the structure of DNA as well as the process of DNA replication. Also explain the significance of DNA replication for meiosis.
Sept. 2014 Explain what food security is and discuss how poor farming practices and reduced agricultural land as a result of alien plants, influence food security in South Africa.	**Sept. 2014** Describe Lamarckism, Darwinism and Punctuated Equilibrium as explanations for evolution and show similarities in these explanations.
Gauteng Sept. 2014 "Homeostasis is the maintenance of a constant internal environment, within narrow limits, despite a changing external environment." Nomsa is sitting in class on a particular day and looks at the wall thermometer. What she sees is shown in the diagram of part of the thermometer below. *Diagram with thermometer showing 45 °C* Discuss the processes and mechanisms that are involved in thermoregulation and osmoregulation in her body on that particular day.	**Gauteng Sept. 2014** Sandy has given birth to a baby girl. There are two men claiming to be the father of the child. Explain how the inheritance of blood groups and DNA testing could assist in establishing who the father is.
Nov. 2014 A goalkeeper in a soccer match prevented a goal from being scored when he dived to his right after the ball was kicked towards him. Just before he dived, he heard his team-mate shout, 'your ball'. Describe how his eyes adjusted to see the ball as it travelled towards him and describe how he heard his team-mate and maintained his balance as he dived to save the ball.	**Nov. 2014** Describe how meiosis and different types of mutations contribute to genetic variation and the role of this variation in natural selection.

Feb. 2015 The unicellular zygote undergoes many developmental changes until it becomes a multicellular foutus, nourished and protected by the mother. Describe the changes that allow the zygote to eventually develop into a foetus and how this foetus is nourished and protected during the period of pregnancy	**Feb. 2015** Describe how Lamarck and Darwin explained evolution, and compare Darwin's ideas to the ideas of Punctuated Equilibrium
Jun. 2015 Explain how the use of water by domestic, industrial and agricultural actions might lead to eutrofication and thermal pollution and describe the effects of eutrofication, thermal pollution and alien plants on the availability and quality of water. **Sep. 2015** Describe how the human body maintains a constant body temperature when a person is doing strenuous exercise on a hot day and describe the role played by the hypothalamus to regulate the water content of the body, on a hot day. **Nov. 2015** Explain the structural suitability of the sperm cell for its function and describe its involvement in the formation of a zygote and the development of this zygote until implantation.	**Jun. 2015** Describe the process by which proteins are produced in the cells of the human body and explain how gene mutations lead to altered characteristics resulting in haemophilia and albinism. **Sep. 2015** Modern Humans (*Homo sapiens*)differ from African apes in many ways. Describe these differences as it related to structures involved in posture (bipedalism) and features of the skull as it relates to diet. **Nov. 2015** Describe the process of protein synthesis and the way in which this process would be affected by a gene mutation.
Feb. 2016 Plants and animals are both able to sense and respond to light. Explain how plant stems respond to unilateral light and describe the path taken by light through the human eye until it is converted into an impulse. **Jun. 2016** While a balancing artist was demonstrating his balancing act, 'walking' on a tight rope, he could hear shouting from the audience cheering him on. Describe the role of his ears and his brain to hear the shouting and also to maintain his body position. **Sep. 2016** Describe the development of the Graafian follicle until it becomes a corpus luteum during the menstrual cycle, describe oogenesis and also explain how another Graafian follicle is prevented from forming in the case of pregnancy.	**Feb. 2016** An ancestor of the elephant, Phiomia, had a long nose-like structure called a proboscis which evolved into the trunk of the elephant. The proboscis was used to gather leaves as food. The proboscis of Phiomia and the trunk of the elephant are shown below. The diagrams have been drawn to scale. [*Diagram of ancestor and modern eliphant*] Explain the evolution of the elephant's trunk in terms of Lamarckism and Darwinism as well as the way in which an increase in the length of the trunk of the elephant could be achieved through artificial selection. **Jun. 2016** A mutation is any change in the genetic composition of an organism. State the different mutations as well as the causes and effects of the mutations on living organisms. **Sep.2016** The characteristics of organisms can be changed through selective breeding and genetic engineering. Use an example to describe selective breeding and also describe the similarities and the differences between natural selection, selective breeding and genetic engineering.

Nov. 2016

While walking in the bush Paul hears a sound which he thinks is the roar of a lion. He immediately runs to safety.

Describe how he hears the sound and describe the role of adrenalin to ensure that his muscles are able to function efficiently while he runs away.

Nov. 2016

Fossils of the bipedal primates *Ardipithecus*, *Australopithecus* and early *Homo* species are used to support the 'Out of Africa' hypothesis.

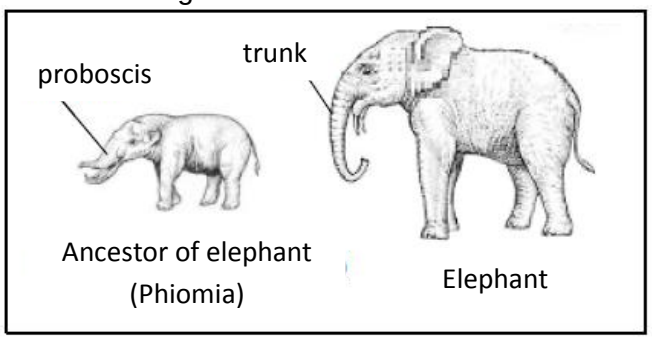
State the 'Out of Africa' hypothesis. Describe the evidence that supports the 'Out of Africa' hypothesis and the evidence that shows that the three primate genera mentioned above, were all bipedal.

Feb/March 2017

Plants and animals are both able to detect light and respond to it.
Explain how the stems of plants react to a one sided light stimulus and describe the pathway of light through the human eye until converted into an impulse

Feb/March 2017

An ancestor of the elephant, Phiomia, had a long nose-like structure called a proboscis which evolved to the trunk of the elephant. The proboscis was used to collect leaves for food. The proboscis of Phiomia and the trunk of the elephant are shown below. The diagrams are not drawn to scale.



Explain the evolution of the trunk of the elephant regarding Lamarckism and Darwinism, as well as the way in which the elongation of the trunk of the elephant can happen by natural selection

Jun 2017

A man was accidentally locked in a cool room in which the temperature was 8°C. He was only released after six hours when a co-worker heard his cries for help.
Describe how his body maintained his temperature at 37°C and how his co-worker heard his cries for help.

Jun 2017

Differentiate between a *population* and a *species*, describe speciation by geographic isolation and explain how speciation and extinction affect biodiversity.

Sep 2017

Describe the process of oogenesis in the female body. Also describe the functions of the hormones produced by the ovaries including their role in the body during puberty

Sep 2017

Describe the structural changes to the body that correspond with changes in the diet and the change to bipedalism in the evolution of modern humans and explain the significance of these changes

ASSESSING THE PRESENTATION OF THE ESSAY: Synthesis (e.g. Gauteng Sept. Paper 1)

Criterion	Elaboration		Mark
Relevance	All information provided is relevant to the topic	Only information relevant to thermoregulation and osmoregulation on a hot day is given (no irrelevant information is provided)	1
Logical sequence	Ideas arranged in a logical/cause-effect sequence	The sequence of events that occur during thermoregulation and osmoregulation are correct. The structures in the skin and the hormone/s of osmoregulation are linked to the appropriate events	1
Comprehensive	Answered all aspects required by the essay	The role of the hypothalamus, blood vessels & sweat glands in thermoregulation and the role of ADH in osmoregulation are included	1

Hints and tips:
Break up the information into logical parts as given in the question and discuss each part in its own paragraph

- Don’t repeat facts
- Get to the point and keep the facts relevant
- Don’t use unnecessarily long sentences
- Put your statements in context and in a logical/cause-effect sequence
- Cover all aspects required by the essay
- No tables, diagrams or flow diagrams are allowed in your essay