MATRIC REVISION

MATRIC REVISION 2008

education
Department:
Education
REPUBLIC OF SOUTH AFRICA

TOP TIPS FROM THE EXPERTS: EDITION 12 OF 13

LIFE SCIENCES

Good luck message

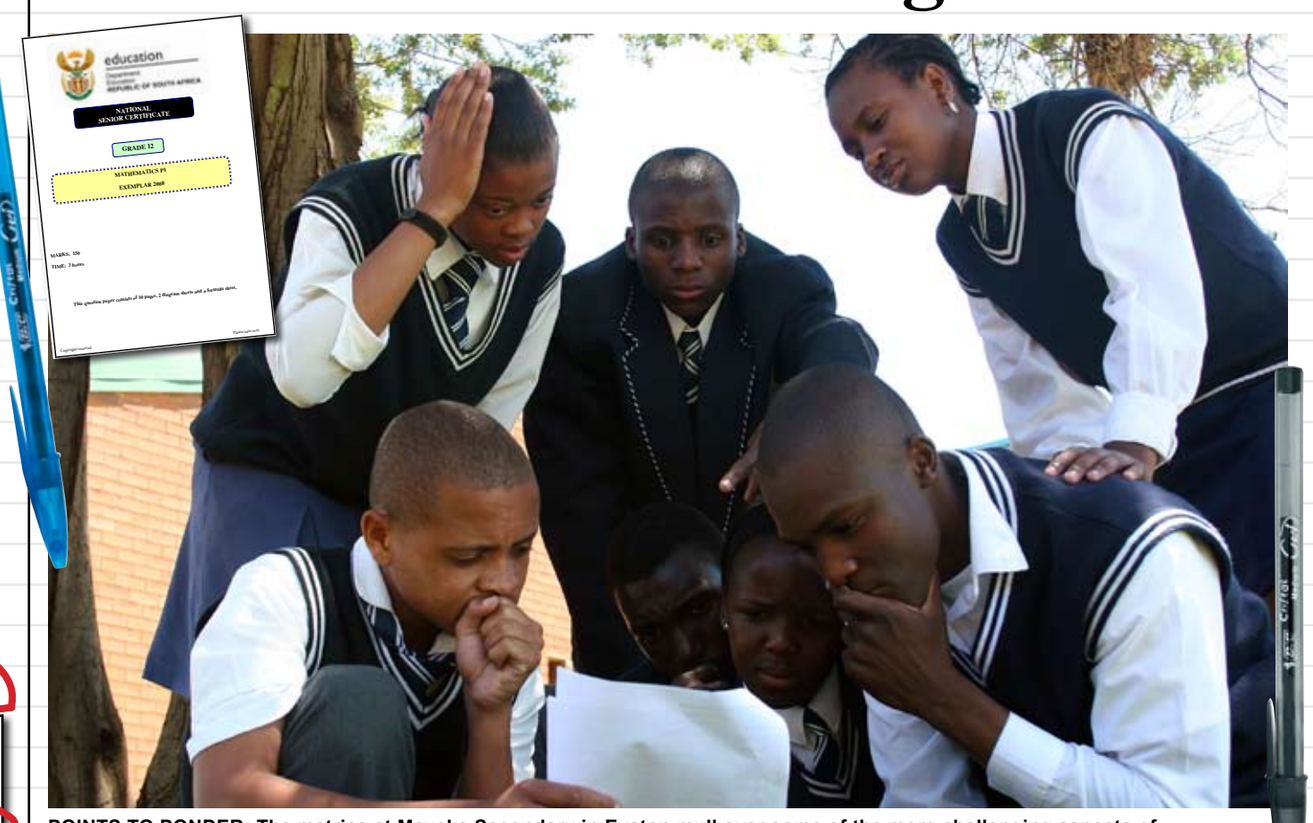
Celebrity hola!

Cutting Jade

"In this stressful time try to relax and keep it together. I wish you all nothing but the best and hope that you are well prepared. I wish each and every one of you a wonderful future".

Andrew Duggan, lead singer

Life Sciences: Cracking the code



POINTS TO PONDER: The matrics at Maxeke Secondary in Evaton mull over some of the more challenging aspects of Life Sciences

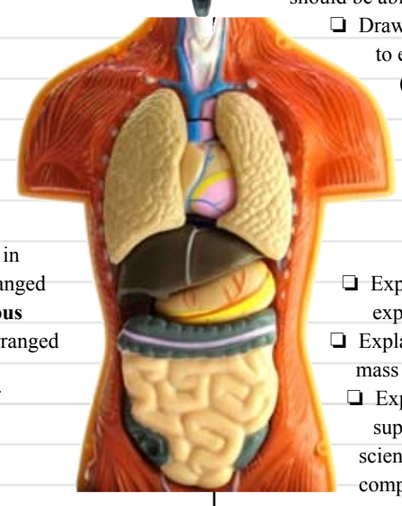
There are two Life Sciences papers: **Paper 1** will be written on **Friday 21 November** and **Paper 2** on **Monday 24 November.** Both papers are **2½ hours** long.

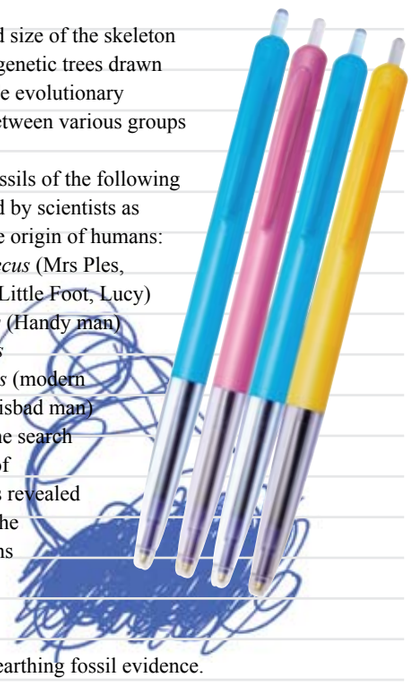
PAPER 1: 60% of the paper will be on **Nucleic Acids**, **Protein Synthesis**, **Meiosis** and **Genetics**; and **40%** of the paper will be on **Human Reproduction** and **Reproduction in Plants**.

PAPER 2: 50% of the paper will be on **Environmental Studies**; and the other **50%** of the paper will be on **Diversity, Continuity and Change**.

GENERAL GUIDELINES:

1. Use the preparatory examination papers and the national exemplar papers (available on www.education.gpg.gov.za) to familiarise yourself with:
   - ❏ The format and approximate mark allocation of the two papers;
   - ❏ The various types of questions you could be asked (e.g. multiple choice, matching, short paragraphs, mini-essays and interpretation of data given in the form of texts, drawings, diagrams, graphs, etc);
   - ❏ The kinds of skills you will be expected to demonstrate (e.g. measurements, calculations, biological diagrams/ drawings, drawing various types of graphs – line graphs, bar graphs and pie graphs – and the 'translation' of information from one form to another, such as from a paragraph to a table or from a table to a graph, etc);
   - ❏ How investigative practical work is assessed (you need to know how to put forward a hypothesis, how to design investigations, how to identify and control variables, how to identify weaknesses in experimental design, etc); and
   - ❏ The depth of knowledge and skill required in the various aspects of the curriculum (the marking guidelines for these papers as well as the Examination Guidelines released in February this year will be of great help here).
2. Use the time available between now and the Life Sciences examinations to plan a final revision timetable including all four Knowledge Areas. When designing your study timetable, bear in mind the weighting that will be given to each Knowledge Area in the final examination papers.
3. Adjust your revision time-table to make extra time for those sections that you may have fared badly in during your preparatory examinations.
4. When revising **DNA and Protein Synthesis**, make sure you are familiar with:
   - ❏ Complementary base-pairing (cytosine with guanine and adenine with thymine or uracil)
   - ❏ How to match the triplets of bases on tRNA (the anticodons) with complementary triplets on mRNA (the codons)
   - ❏ The formation of mRNA from DNA by transcription
   - ❏ The translation of mRNA to form a protein using tRNA
5. In **Meiosis**, you should be able to:
   - ❏ Distinguish the various phases (e.g. in prophase, the chromosomes begin to appear; whereas in metaphase the chromosomes are arranged along the 'equator' of the cell)
   - ❏ Distinguish between phases in the first division and phases of the second division (e.g. in Prophase 1 **crossing–over** takes place but not in Prophase 2; in Metaphase 1, the chromosomes are arranged along the equatorial plane in **homologous pairs,** while in Metaphase 2 they are arranged along the equatorial plane **singly**)
   - ❏ Explain the process and significance of crossing-over
6. **In Genetics**, you should be able to:
   - ❏ Solve genetic problems based on monohybrid crosses
   - ❏ Interpret pedigree diagrams
   - ❏ Explain and predict the possible blood groups of children from parents with different blood groups
   - ❏ Compare the value of the use of blood groups with DNA analysis in resolving cases of disputed parentage
7. In **Reproduction**, you should know:
   - ❏ How to draw and label the male and female sex organs of humans
   - ❏ Gametogenesis (spermatogenesis and ogenesis)
   - ❏ The ovarian and uterine cycles
   - ❏ Hormonal control of the above cycles
   - ❏ The role of the different parts of the developing embryo (chorionic villi, amnion and amniotic fluid, umbilical cord and placenta)
   - ❏ The causes, transmission, symptoms and treatment of sexually transmitted diseases such as syphilis, gonorrhoea and HIV/AIDS
   - ❏ The structure of a flower
   - ❏ The fate of various parts of the flower (such as the ovary and ovules) after fertilisation
8. In **Environmental Studies**, you should understand:
   - ❏ The biotic and abiotic components of an ecosystem and the interactions between them (revision of Grade 10 work)
   - ❏ Energy flow through food chains, food webs and pyramids of energy, numbers and biomass (revision of Grade 10 work)
   - ❏ The intricate balance that exists within ecosystems
   - ❏ How human activities affect this intricate balance by:
     - Altering the abiotic components through pollution (air, water and land)
     - Threatening the biodiversity of the biotic components by over-exploitation of the plant and animal resources for food and medicinal purposes and by invasion of alien species
   - ❏ The sustainable use of resources
   - ❏ How domestic and industrial waste may be managed to prevent destruction of the habitat
9. In **Biodiversity, Continuity and Change (Evolution)**, you should be able to:
   - ❏ Draw on your knowledge of meiosis and reproduction to explain the sources of variation in off-spring (crossing-over, random arrangement of chromosomes during first metaphase, chance fertilisation and mutations)
   - Explain and compare the theories of
     - ❏ Lamarck and Darwin
     - ❏ Explain micro-evolution, speciation and macro-evolution
   - ❏ Explain the use of the geological time scale in explaining macro-evolution
   - ❏ Explain the earthly and extra-terrestrial theories of mass extinctions
   - ❏ Explain the 'evidence' that scientists provide to support their contention that evolution is a valid scientific theory (fossil evidence, evidence from comparative anatomy, comparative embryology, comparative biochemistry and biogeography)
   - ❏ List the characteristics we share with other primates
   - ❏ List the characteristics that make us different from other primates
   - ❏ Describe the trends in human evolution such as:
     - The shift in the position of the foramen magnum
     - The increase in size of cranium
     - The development of a more rounded skull
     - The development of a flatter face due to a less-sloping forehead, less protruding jaws and a more developed chin
     - The development of a more rounded jaw and change in dentition
     - The increased size of the skeleton
   - ❏ Interpret phylogenetic trees drawn to show possible evolutionary relationships between various groups of organisms
   - ❏ Explain how fossils of the following species are used by scientists as evidence for the origin of humans:
     - *Australopithecus* (Mrs Ples, Taung child, Little Foot, Lucy)
     - *Homo habilis* (Handy man)
     - *Homo erectus*
     - *Homo sapiens* (modern humans, Florisbad man)
   - ❏ Explain what the search for the Cradle of Humankind has revealed with regard to the origin of humans
   - ❏ Describe the contribution of South African scientists in unearthing fossil evidence.





MEET OUR LIFE SCIENCES EXPERT

Kanthan Naidoo

Kanthan is passionate about Life Sciences. He matriculated at Lenasia Secondary School in Lenasia before attending Wits University, where he obtained a BSc degree in Genetics and Advanced Biology. Kanthan subsequently qualified as a Biology teacher and taught at the Nirvana Secondary School in Lenasia, where his students obtained distinctions in Biology in Grade 12. Kanthan then joined the Gauteng Department of Education (GDE) as a subject advisor in Biology. While in this position he conducted workshops for teachers and also managed the Secondary School Intervention Programme (SSIP) in the Randfontein District. This programme provided quality tuition to matriculants to enhance their performance in the matric examinations. He later joined the Johannesburg East District where he conducted workshops for FET Life Sciences teachers. Kanthan was then promoted to coordinate Life Sciences for Gauteng.

He is currently a Life Sciences curriculum specialist for the national Department of Education.

These guidelines are meant to provide:

- An overview of the format of the question paper and the style of the questions;
- Direction regarding the focus areas within each strand; and
- Specific information on difficult areas.

The guidelines will NOT:

- Provide an exhaustive guide to each and every concept contained in the curriculum; or
- 'Spot' particular questions in the examinations.

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NEXT WEEK: HISTORY PAPER