

**UNIVERSITY OF SWAZILAND  
FACULTY OF EDUCATION  
DEPARTMENT OF CURRICULUM AND TEACHING  
MAIN EXAMINATION QUESTION PAPER, MAY 2017**

**TITLE OF PAPER : CURRICULUM STUDIES IN BIOLOGY II**  
**COURSE CODE : EDC378/CTE 528**  
**STUDENTS : BEd. III and PGCE**  
**TIME ALLOWED : THREE (3) HOURS**

**INSTRUCTIONS:**

- 1. This examination paper has five (5) questions. Answer four (4) questions only.**
- 2. Each question has a total of 25 points.**
- 3. There is an attachment for some questions**

**THIS PAPER IS NOT TO BE OPENED UNTIL PERMISSION HAS BEEN GRANTED BY THE INVIGILATOR**

- 1a) The curriculum materials developed by Linking School Science with Industry and Technology (LISSIT) in Swaziland and Science and Technology in Action in Ghana (STAG) attempt to link school science with that of the workplace and the home.
- i) Discuss the origins of this concept in Africa. [6]  
 ii) Describe the characteristic features of each of these projects. [12]
- b) The goal of Science Technology and Society (STS) teaching is to help the learner make sense of his or her everyday experiences. Explain how STS achieves this goal. [7]
- 2a) A gender responsive school ensures that boys' and girls' needs are catered for equally. Explain, using appropriate indicators, how this can be accomplished. [10]
- b) In 2010, Swaziland joined African countries such as Burkina Faso, Gambia, Kenya, Namibia, Tanzania, Rwanda and Senegal in establishing Gucuka High School as a Gender Responsive School/Centre of Excellence. Discuss the process of transformation and its impact on this school. [10]
- c) In Swaziland, girls and boys are generally equally represented in enrolment in school and in science subjects and yet there are fewer females than males in science professions. Discuss how societal attitudes act as a barrier to women's participation in Mathematics, Science and Technology fields in Swaziland. [5]
- 3a) The Swaziland Science Education Policy (1999) embraced contextualisation as the approach to be used in the teaching of science at Grades 1-12. Discuss the process of curriculum development undertaken to produce contextualised curriculum materials at the Junior Secondary level. [10]
- b) Discuss the extent to which the curriculum development process followed the Tyler and/or the National Curriculum Centre Models for curriculum development. [5]
- c) Two broad aims of the Junior Certificate Science syllabus and Sustainable Development Goal 6 (SDG6) are stated below, in that order:

At the end of the three year course learners should

- be able to use scientific concepts to address social issues and maintain a healthy lifestyle in their environment
- recognise and appreciate the importance of living in harmony with the environment by demonstrating the use of resources in a sustainable manner both individually and in the community

SDG 6 – to ensure access to safe water sources and sanitation for all

Use the attached article 'Ezulwini, E. Coli' by Zakhele Dawson, Swazi News 2011 to perform the following tasks:

- i) Show how you could use the contents of the article to address the 2 broad aims of the syllabus and SDG 6 in a Form1 science class. [6]
- ii) Suggest an integrative structure for an STS science topic providing the proportion of pure science to STS science content. [4]

- 4a) Explain how practical work, personal use of language and teacher talk (lecture method) impact on language development and subsequent science learning. [9]
- b) Explain how the following factors affect how learners process scientific information and, therefore, how they respond to questions in science: *key words; terms of quantity; large numbers of words; negative forms of language.* [16]
- 5a) Explain how you would use i) the attached article and ii) a chart to teach a topic on pollution to a Form 5 Biology class, given the following content requirements from the SGCSE Biology Syllabus. [10]

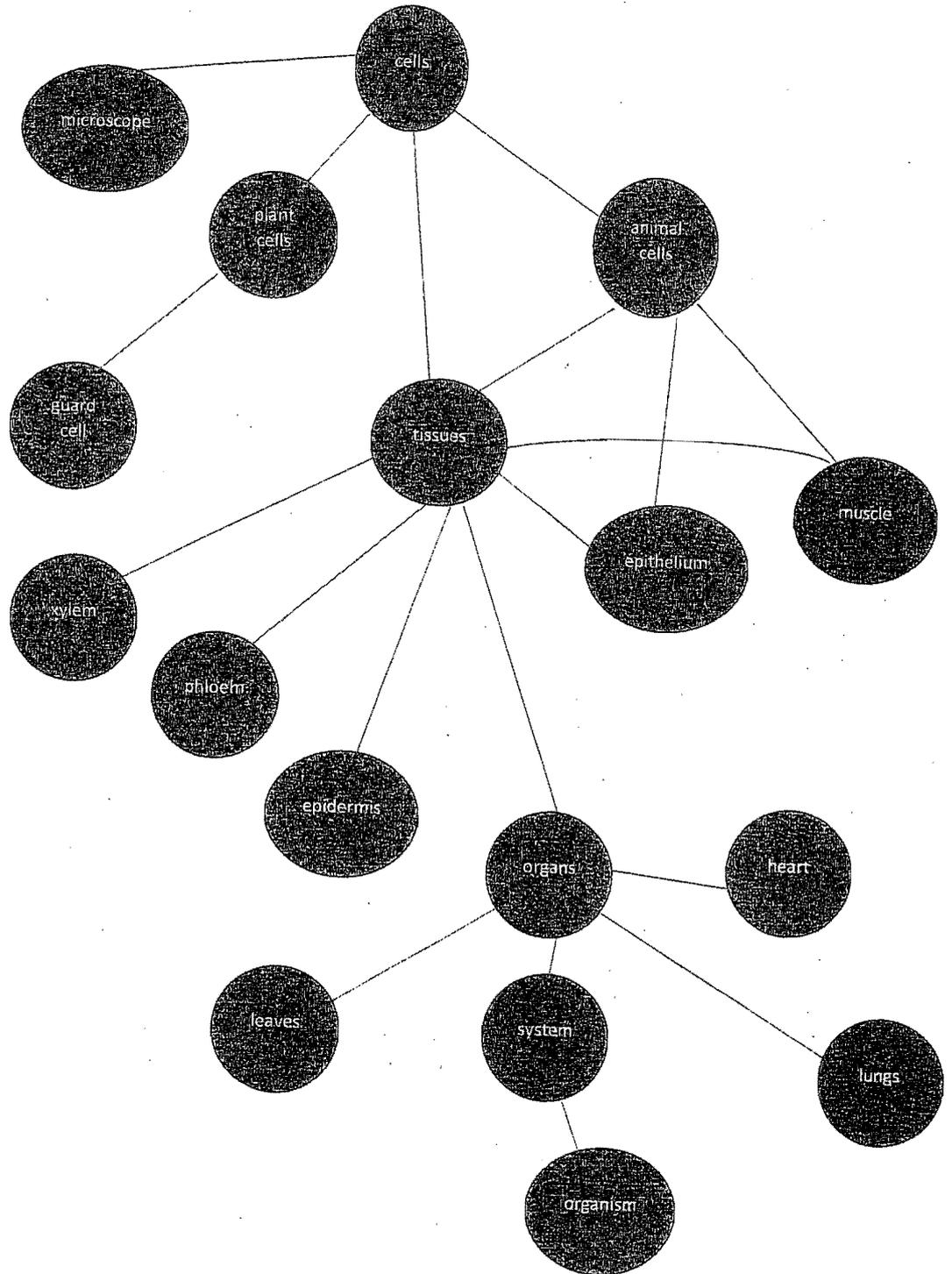
#### Section 4. Human influence on the ecosystem

<b>Core</b> All learners should be able to:	<b>Extended</b> In addition to what is required in the core, learners taking the extended paper should be able to:
<b>4.2 Pollution</b> - define pollution as a build-up of substances such as chemicals which damage the environment - describe the undesirable effects of water pollution by sewage and chemical waste, air pollution by sulphur dioxide and pollution due to pesticides, herbicides and nuclear fall-out	- assess the significance of non-biodegradable plastics and other materials used in the manufacturing industry, with reference to local examples - discuss the causes and apparent effects on the environment of acid rain, and the measures that might be taken to reduce its incidence

- b) The following is the required knowledge in the Junior Certificate Examination Syllabus for the unit on **cell structure and organisation**:
- All learners should be able to:
- Name a microscope as a magnifying instrument
  - Label parts of a microscope (eye piece, objectives, mirror, light source, focusing knob, handle) and state their functions
  - Describe a cell as a basic unit of life
  - Identify from diagrams the following: palisade cell, root hair cell, red blood cell, guard cell and white blood cells
  - Label and give one function of the following parts of a plant cell; cell wall, membrane, nucleus, cytoplasm and chloroplast
  - Define a tissue as a group of similar cells that work together to perform a special function
  - Give examples of tissues and their functions; plant tissue-xylem, phloem, epidermis, animal tissues- muscles, epithelium, bone, nerve, blood tissue
  - Discuss relationships between cells, tissues, organs, systems and organisms
  - Describe cell division (binary fission)
  - Define growth in terms of increase in number of cells

Mr Sithole, a student teacher on teaching practice, constructed the concept map below for his learners as a summary of the unit to show the concept relationships he expects the learners to have.

- i) Comment on the organisational structure of the concept map [5]
- ii) Construct your own improved concept map using the same concepts [10]



# Ezulwini, E.coli

**UMGUJIM**  
BY ZAKHELE DAWSON

I have been writing a bit about water and sanitation recently and while conducting a little research, I found some interesting figures.

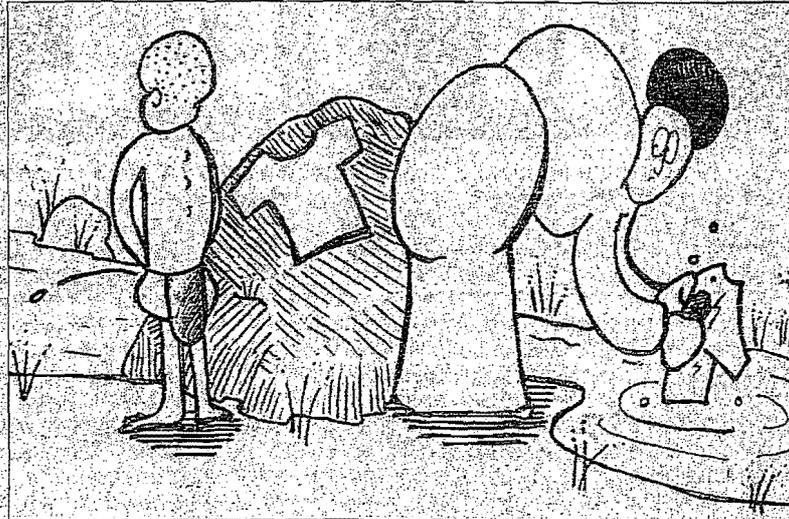
Regular readers of my column (thanks, mum!) will know that I hail from the Valley of Heaven, Ezulwini. It really is the most beautiful little valley I have ever seen but it hides a dirty little secret. Well, not so little really – the Lusushwana River runs the length of Ezulwini, watering the most beautiful real estate in the country (not to be too biased) and the people lucky enough to live there.

The Lusushwana is a home, too, to all sorts of microbes. The one I'm concerned with at the moment, or concerned about, is a little bug called *Escherichia coli*.

This is the bacterium that gives us what we colloquially call 'food poisoning'. It can be fatal. More than half of the human body is made up of water. Diarrhoea, which is the most obvious symptom of food poisoning, can dehydrate a human being to the point where the very cells of our bodies collapse in upon themselves for a lack of fluids. An insidious little creature, *E. coli*, as it's normally written, will even get sucked into plants that are watered with contaminated water. It gets into our food and attacks us. That's how it got its common name, of course.

*E. coli* has been mankind's enemy for so long that our immune systems can deal with some of it, if we are healthy. However, too many microbes can overwhelm us.

The recommended 'safe' level of *E. coli* bacteria in 100 millilitres of water is 1-10. A litre is 1,000 ml. That's one to 10 actual 'faecal coliforms' as they are known in



the sanitation trade. Remember this number.

The following water test readings were taken from the Lusushwana River at various points on the same day, at some time in the last three months:

From upstream to downstream,

**The Ezulwini:** 60 *E. coli* bacteria per 100 ml.

**The Lobamba:** 1 450 *E. coli* bacteria per 100 ml.

**The Matsapha:** 1 100 *E. coli* bacteria per 100ml.

On another day, this station recorded 1 700 *E. coli* bacteria in 100 ml of water.

That's 170 times the maximum recommended level of just these germs.

### CHOOSING

What this means is that if you have any plans to drink the water from the river, or go swimming, or wash your clothes in it or anything really – don't.

The problem is, so many people living in the valley of heaven have no other option and, since it's the valley of heaven, more and more people are choosing to live there. It's getting a little crowded. Every day people can be seen fetching water, washing clothes, swimming, and generally using the river as what the NGOs call a 'primary water source'. Also, of course, they use it for a toilet. This is how the *E. coli* got into the water in the first place.

Everytime someone goes to the toilet anywhere near an open body of water, or even worse, in it, the waste that is expelled from their bodies becomes one with the water. Which really sucks for the guy downstream. When the rains come, and they always do, all that rich living waste material by the side of the river gets washed into it. When the river swells and bursts its banks, or the flood-gates are opened, it scours the land of all those germs. A river can't be both a toilet and a water source. It has to be one or the other.

So the first thing we can do to make our beautiful, deadly river safe again is to provide proper toilets for ourselves and others. We also need better access to tap-water, which is clean. In the meantime, if we have to use the river water for washing, we need to remember to wash our hands before and after every meal. The catch here is that it only does any good if you wash with soap and running water. We could do with more of these, too. Washing hands before and after eating also helps to minimise the transfer of germs.

Oh, and if you live or use any other rivers, the same warnings apply. You should check the stats on the Umbuluzi: that sucker hit 2 000 *E. coli*/100ml one day.

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**'DO NOT GIVE UP, BE COURAGEOUS' (1 Kings 17)**

HEALING

Unless you take heed or pay attention...