

**UNIVERSITY OF SWAZILAND
FACULTY OF EDUCATION
DEPARTMENT OF CURRICULUM AND TEACHING
MAIN EXAMINATION QUESTION PAPER: MAY 2018**

TITLE OF PAPER : CURRICULUM STUDIES IN BIOLOGY II
COURSE CODE : CTE328/528 & EDC378
STUDENTS : B.Ed. LEVEL III, PGCE
TIME ALLOWED : THREE (3) HOURS

INSTRUCTIONS:

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

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1. a) The science education curriculum has evolved over the years in response to changes in society and developments in science and technology. Describe the nature of the curriculum during the following periods:
 - i) Before sputnik [3]
 - ii) The reform curriculum [5]
 - iii) Science Technology & Society curriculum (STS) [5]
 - iv) Science Technology Engineering & Maths (STEM) education curriculum [4]

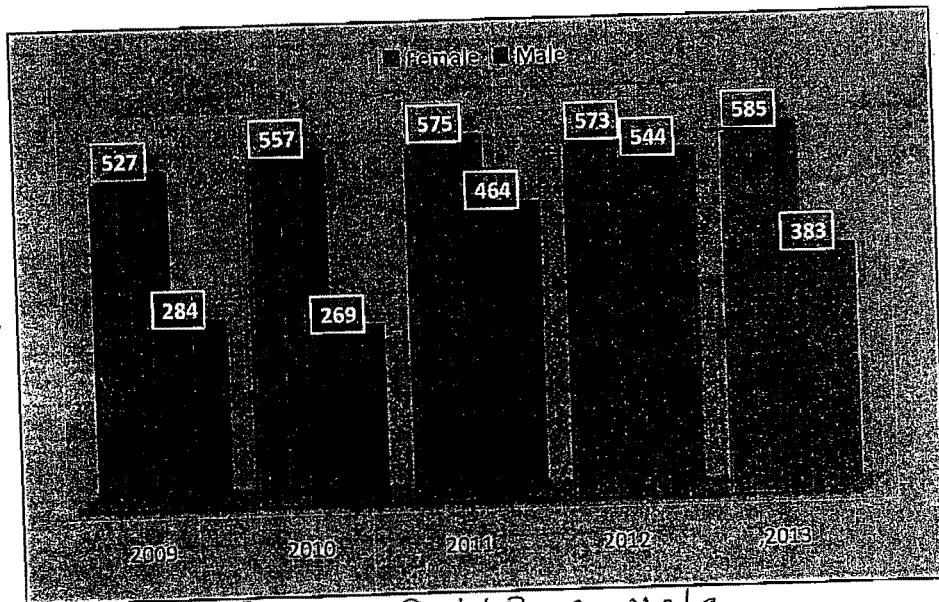
b) **E-10** Times of Swaziland – Wednesday, April 5, 2017

NEWS

SD ranked 2nd lowest in science, Technology development capacity

- i) Discuss the implications of this headline for the status of science and technology education in Swaziland. [5]
 - ii) Why does Professor Ajeyalemi (1990) advise that African countries focus more on low science than high science? [3]
2. a) Compare and contrast the curriculum development approaches used by Swaziland and Botswana during transformation of their science curricula at the junior secondary level from a traditional approach to a contextualised approach. [10]
 - b) Swaziland and Ghana were selected as centres for the development of science curriculum materials that link school science with that which is practised in industry and the community by the African Forum for Children's Literacy in science and Technology (AFCLIST). Describe the activities these two countries engaged in when developing these materials. [10]
 - c) STS science teaching is about making sense of learners' everyday experiences. With the aid of an illustration, explain what this means. [5]
3. The attached content on plant cells for a Form I class, Activity 3.2, pp59-61 and Unit 7, pp108-110, shows different approaches in teaching the topic.
 - a) Describe 4 fundamental differences between them [12]
 - b) Which one of these approaches would you use with your learners and why? [8]
 - c) Explain the role of the story in Unit 7 [5]
 4. a) Discuss how the Forum for African Women Educationalists (FAWESWA) has impacted on girls' education in Swaziland. [10]
 - b) The chart below shows trends in dropout rates between boys and girls at the high school level in Swaziland for the indicated years.

Chart 63: Dropout by Sex 2009 to 2013



Left Bar - female; Right Bar - male

- i) Discuss the possible contributing factors for the differences [5]
- ii) Describe how this will impact on the country and on participation of females in Science, Mathematics and Technology (SMT) and/or Science, Technology and Vocational Education (STVE) and/or STEM fields. [10]
5. a) Research studies show the following about teacher practices in science classrooms
- teachers spend 2/3 of the time talking; telling, instructing, directing and informing learners
 - learners average 2 speeches a day, each speech is 8.4 words in length
- Explain how this impacts on learners' development of scientific language and thinking abilities. [10]
- d) i) Concept mapping is important in the teaching and learning of biology concepts. Explain what this means. [5]
- ii) Using attachment pages 108-100, construct a concept map that represents the conceptual structure of the topic which you would expect from your learners at the end of the unit. [10]

Other than at a school laboratory, find out about two other places where microscopes are used in this country, and what they are used for.

Unit 7 Microscopic organisms

Think about it: What is the smallest part of a living thing?

Living cells

Act out the play below and answer the two questions that follow.

Busi and Themba usually helped their mother weed the fields every morning before going to the nearby secondary school. Themba was in Form 5 and Busi was in Form 1.

Mother: You had better go and take a bath now my children, or you will be late for school.

Busi: Let me pull out this last cluster of weeds and then I'll be off.

She pulled out a cluster of weeds with thick, fleshy leaves that was growing next to a weak-looking maize plant.

Busi: Ah ha! When I tear this leaf, it leaves a plastic-like part. I wonder what it is?

Themba came to see the "plastic-like" part Busi was referring to.

What do you think Themba saw?

Themba: Come on, you pumpkin! This is not plastic. It is a layer of cells that cover the inner parts of the leaf.

She looked at Themba with questioning eyes.

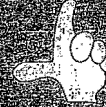
Busi: What does this mean? What are cells? Can I see them here?

1. Discuss Busi's questions.
2. Themba promised to show Busi what he meant. Describe a complete plan of what Themba would do to show Busi the cells.

In the next activity you will find out how Busi could have prepared the "plastic" layer in order to see the cells.



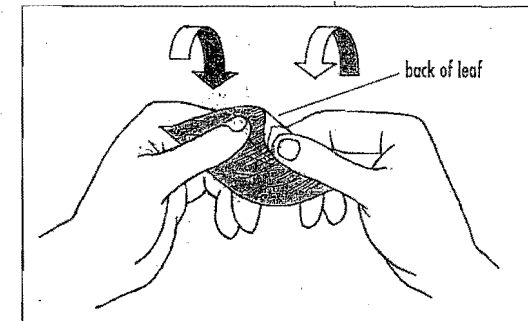
ACTIVITY



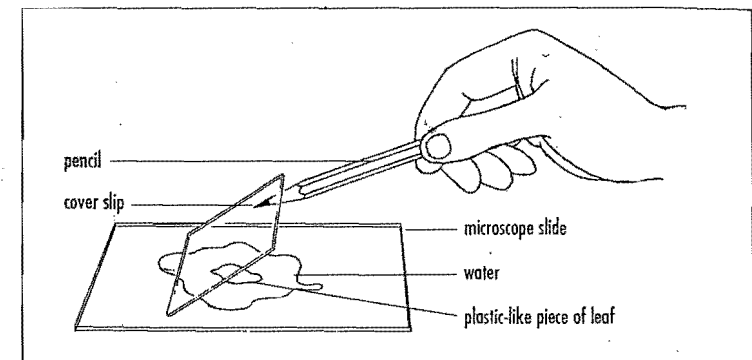
Activity 5.14

You will need a scalpel (or a sharp pen, knife or razor), leaf, microscope slide, microscope, cover slip, water, dissecting needle or sharp pencil.

You are provided with a leaf similar to the ones Busi discovered. Look at the picture below. Tear the leaf in two (breaking the top surface first) to get a thin layer.



1. Put two drops of water onto a clean microscope slide.
2. Use a scalpel to cut off a small piece of the layer of leaf epidermis and spread it flat on the water.
3. Cover with a cover slip, putting one end on the edge of the water and lowering the opposite end slowly, using a sharp, dissecting needle (or sharp pencil). This will prevent air bubbles from being trapped under the cover slip.



4. Put the slide on the microscope stage and observe the layer under the low power objective. Describe what you see.
5. Move the high power objective into place, and focus using the fine focusing knob.

Organisms and cells

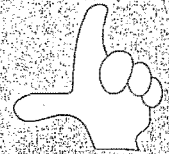
The small compartments you see under the microscope are called **cells**. All living things, plants and animals, are made up of cells. A cell has all the characteristics of living things discussed in chapter 4. Some organisms are made up of one cell, yet others are made up of many cells. Those that are made up of one cell are called unicellular organisms e.g. bacteria. Most organisms however, are made up of many cells and are called multicellular organisms e.g. a cat. Human beings are also multicellular organisms.

Activity 5.15

Your teacher has prepared several slides of kidney cells and has put them under microscopes for you to look at. The microscopes are already focused, therefore **do not** touch the focusing knobs.

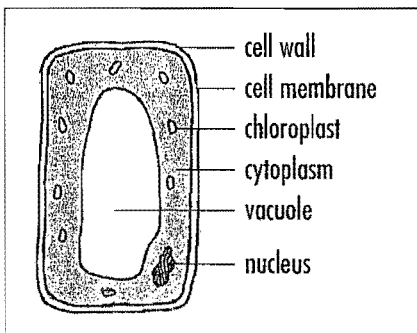
1. Observe the cells and draw them in your notebook.
2. Compare these cells with those you drew in question 1 above.
3. The cells you are looking at come from a piece of kidney that is 200 times smaller than your thumb. Estimate the number of cells that cover your thumb.

ACTIVITY

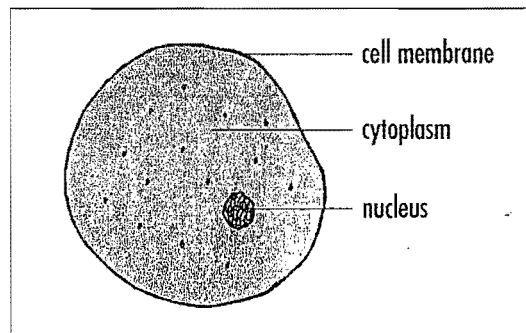


Activity 5.16

The diagrams below show a plant cell and an animal cell. Study them and answer the questions that follow.



A plant cell

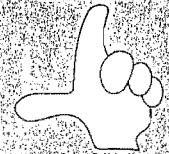


An animal cell

1. Mention ways in which the two diagrams differ from each other.
2. In what ways are the two diagrams the same?
3. Try to draw a diagram of a plant cell and one of an animal cell.

All cells are made up of a nucleus, cytoplasm and a cell membrane. Plant cells have extra parts that make them different from animal cells. These parts are the cell wall, the vacuole and chloroplasts. A vacuole has a solution in it. A chloroplast contains a green substance called chlorophyll. You learned about chlorophyll, in Chapter 4.

ACTIVITY



ACTIVITY 3.2

CELLS

Although there are many different kinds of cells, they are all built to a basic pattern and all have certain common features.

The following exercises will help you to get a simple understanding of cell structure.

LOOKING AT ONION CELLS

- a) Cut an onion bulb into quarters. The fleshy "scale leaves" will easily separate from each other.
- b) Hold one of the leaves so that the curving inside faces you and snap it backwards. The transparent thin epidermis (outer skin) is seen as a ragged (torn) edge on the broken leaf.
- c) Using a forceps remove a small piece of the epidermis and place it on a drop of water on a microscope slide. Cover the piece of epidermis with a cover slip as shown in drawing E.
- d) Examine the slide with the low power objective. What is the shape of the cells?

Next examine the cells under high power.

The "lines" you see making a network between the cells are the walls of the cells.

The walls are made up mainly of a non-living substance called cellulose.

Inside the cell wall is the cell membrane. This is a kind of "skin" which surrounds the living material of the cell. This living material is called the cytoplasm. The middle part of many plant cells has a fluid filled space called a vacuole. The fluid consists mainly of water and salt.

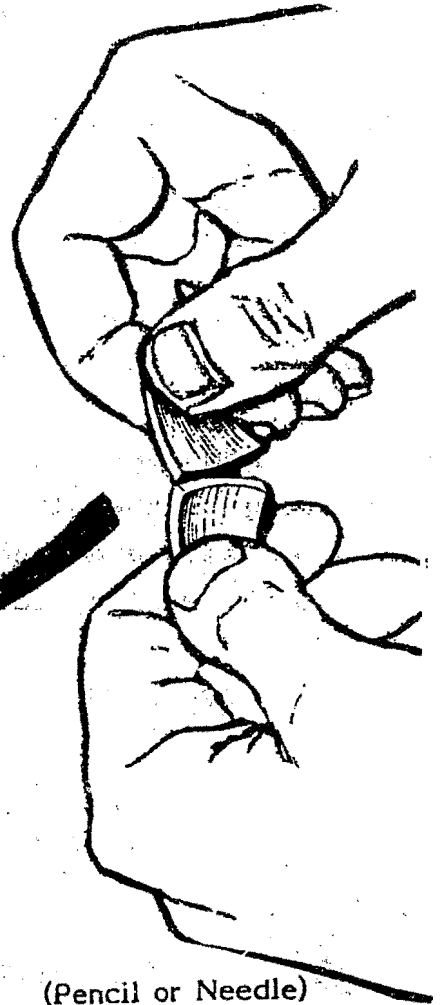
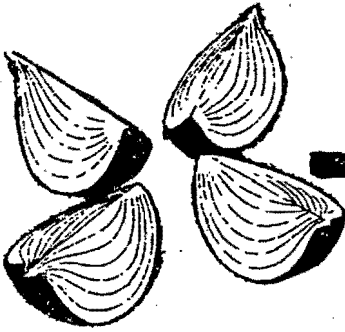
You will see a small dark body in the cytoplasm. It is the nucleus. This little body regulates all the activities of cell. It is separated from the cytoplasm by a "skin" (membrane). The membranes of the cell are very difficult to see in this kind of preparation.

Make a drawing of what you see and label the parts of one cell that you were able to see with the microscope.

A Cut an onion bulb into quarters.

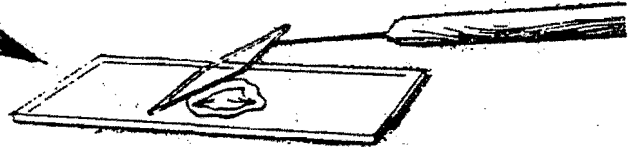
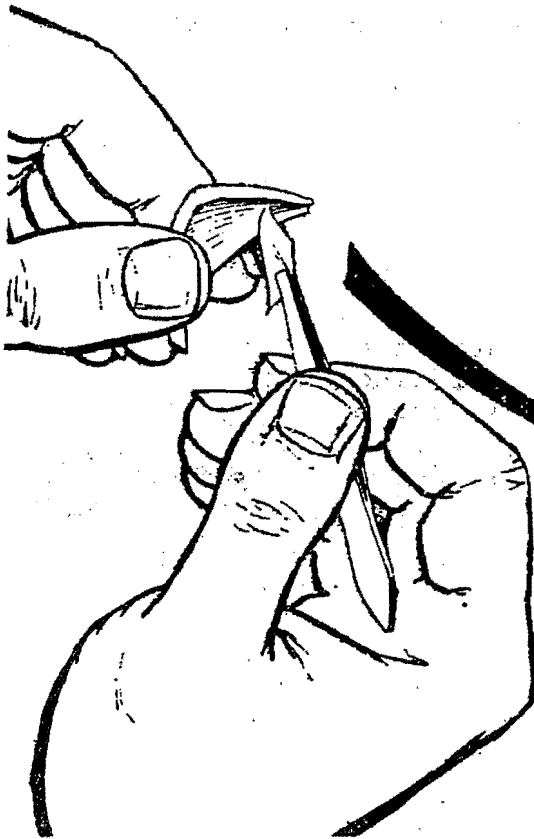
B Remove one of the fleshy "scale" leaves.

C. Snapping the "leaf" backwards usually provides a ragged piece of epidermis.



Remove a small piece of epidermis and spread it evenly in a drop of water on a slide.

(Pencil or Needle)



E Gently lower a cover slip to prevent trapping air bubbles. Examine with your microscope. Add more water to the edge of the cover slip with an eye dropper if the slide begins to dry.