

THE NATIONAL EXAMINATIONS COUNCIL OF TANZANIA



**STUDENTS' ITEM RESPONSE ANALYSIS
REPORT FOR THE FORM TWO NATIONAL
ASSESSMENT (FTNA) 2015**

033 BIOLOGY

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FOREWORD

The Form Two National Assessment (FTNA) is a two years formative assessment in secondary education which, among other aspects serves to diagnose student's progress towards mastering the two years Biology syllabus contents. The report helps teachers and other education stakeholders to get feedback that will direct subsequent teaching.

The analysis presented highlights factors which influenced students' performance on observed marks in each question. The feedback provided will enable the education administrators, school managers, teachers and students to find appropriate measures to be taken in order to improve students' acquisition of knowledge and skills hence good performance in future assessments.

The National Examinations Council of Tanzania will highly appreciate comments and suggestions from teachers, students and other education stakeholders, which can be used for improving future Students Item Response Analysis Reports.

Finally, the Council would like to thank all the Examination Officers, Subject Teachers, and all stakeholders who participated in the preparation of this report. We would also like to express our sincere appreciation to all who participated in analyzing the data used in this report.



Dr. Charles E. Msonde

EXECUTIVE SECRETARY

1.0 INTRODUCTION

This report is based on the analysis of responses of students who sat for Biology paper of the Form Two National Assessment (FTNA) in November 2015. The paper was set according to the revised Biology syllabus for secondary education of 2010. It was intended to measure students' competences after covering two years Biology syllabus contents.

The paper consisted of sections A, B and C. Section A consisted of three questions which were Multiple Choice, True and False, and Matching Items respectively. Each questions had 10 items. Section B had five short answer questions, each of which carried 10 marks and section C consisted of two essay questions, each carrying 20 marks. Questions in each section were compulsory except in section C where students were required to choose and answer one question.

A total number of students who sat for this paper was 363,217 of which, 210,365 (57.92%) passed and 152,852 (42.08%) failed. This implies that the general performance in this paper was good. However, when the results are compared to those of 2014, a slight drop of 4.47 percent is observed, since in 2014 the number of students who passed was 249,641 (62.39%).

The report starts by explaining the demand of each question, and then provides an analysis of students' performance in a particular question. The criteria used in analysis are that, performance in a question was considered to be good, average or poor if the percentage of students who scored 30 percent or more of the marks allotted in a question lied in the intervals 50 - 100, 30 – 49 and 0 - 29 respectively.

Subsequently, the report highlights misconceptions observed, and spots out some possible reasons for the observed misconception. In addition, samples of students' answers were attached as extracts used to illustrate good and poor responses.

2.0 ANALYSIS OF STUDENTS' RESPONSE PER QUESTION

2.1 Section A: Objective Questions

2.1.1 Question 1: Multiple Choices

The question consisted of ten multiple choice items with a total of ten marks. For each of the items (i) - (x), students were required to choose the correct answer from the given alternatives and write its letter in the box provided. The items were picked from eight topics: *Introduction to Biology, Safety in Our Environment, Health and Immunity, Cell Structure and Organization, Classification of Living Things, Transport of Materials in Living Things, Nutrition, and Gaseous Exchange and Respiration.*

The analysis shows that, the performance was good as out of 100 percent of students who attempted this question, 37.6 percent scored from 3.0 - 4.0 marks while 49.0 percent scored 5.0 - 10.0 marks. Of the latter category, 0.4 percent scored all 10.0 marks allocated to this question. Only 13.4 percent scored from 0 - 2.0 marks.

Despite the good performance in this question, further analysis revealed that few students who scored less than 10.0 marks faced some difficulties in answering item (iii), (viii) and (ix). In item (iii) they were required to select the first step to be taken when giving First Aid to a bus accident victim who has severe bleeding. While the correct answer was alternative 'C' (use finger to apply pressure direct to the bleeding point), most of the students selected alternative 'D' (Ask a person to go to the hospital immediately). Such students were not aware that sending a victim to the hospital is not a first aid. The word *immediately* contained in alternative 'D' might have attracted the students since first aid is defined as any immediate help provided to the injured person before taking him/her to hospital.

In item (viii), the students were required to identify the disease and disorder of the human circulatory system. The correct answer was 'B' (Blood pressure and sickle cell anemia), but the majority of students chose alternative 'A' (Arteriosclerosis and heartburn). These students failed to differentiate between arteriosclerosis which is a disease and disorder of the human circulatory system, and heartburn which is a disorder of the digestive system. Such students failed to understand that arteriosclerosis is the hardening of arteries due to fat deposits on the walls of the artery,

whereby fibrous tissues form on the artery, whereas heartburn is a painful sensation in the esophagus which occurs in the alimentary canal. Lack of sufficient knowledge on circulatory system made students fail to correctly answer this question.

In item (ix), the students were required to identify the end products of fats/lipids in digestion process. The correct answer was 'D' (Fatty acid and glycerol). However, majority of students chose 'A' (Amino acid). These students failed to recognize that, amino acid is the end product of digestion of proteins and not fat/lipids. These students might have been confused by the word *acid* contained in both alternatives 'A' and 'D', suggesting that they had little understanding of the concept of end products of digestion of various food staff.

2.1.2 Question 2: True and False Items

The question consisted of ten statements drawn from five topics which were *Introduction to Biology, Cell Structure and Organization, Safety in Our Environment, Respiration and Gaseous Exchange* and *Nutrition*. The students were required to write 'True' for correct statements and 'False' for incorrect statements.

The data in this question indicates that 100 percent of the students attempted this question. Generally, the performance was good as 87.0 percent of students scored from 5.0 - 10.0 marks, out of which 3.8 percent scored all 10.0 marks allocated to this question. On the other hand, 11.8 percent scored 3 - 4 marks; and only 1.2 percent scored 0 - 2.0 marks.

Students who performed well in this question were able to identify correct statements accordingly. This indicates that such students had adequate knowledge of the topic assessed. In addition, they followed instructions by writing TRUE to a correct statement and FALSE to an incorrect statement. Extract 2.1 presents a sample of student's good responses.

Extract 2.1

2. Write **TRUE** if the statement is correct or **FALSE** if a statement is not correct.
- (i) A microscope is an instrument used to observe smaller objects which cannot be seen by using our normal eyes **TRUE**.....
 - (ii) Plant cells possess cellulose cell walls while animal cell do not have **TRUE**.....
 - (iii) We can use dry wooden stick to move a victim of electric shock from the source of electric current..... **TRUE**.....
 - (iv) Botanists study both plants and animals **FALSE**.....
 - (v) It is safe to warm the room by using charcoal when people are sleeping the whole night inside the room **FALSE**.....
 - (vi) Onion store food in leaves while carrots store food in root tubers **FALSE**.....
 - (vii) Gaseous exchange in fish takes place through the spiracles..... **FALSE**.....
 - (viii) Materials which can be recycled included aluminum cans and magazines..... **TRUE**.....
 - (ix) All living things are made up of small units known as cells **TRUE**.....
 - (x) Biology is the study of non-living things..... **FALSE**.....

Extract 2.1 shows a student's correct responses. The student was able to correctly identify correct and incorrect statements.

Despite the fact that the question was the most well performed, there were few students who scored low marks after facing difficulties in responding to items (vi) and (viii). Item (vi) stated that; "Onion store food in leaves while carrots store food in root tubers" The answer is FALSE, but most of students wrote TRUE. This implies that students lacked sufficient knowledge of food storage organs particularly on root tubers since carrot does not form tubers but stores food in its main root (tap root). The point of deviation to those students was in the fact that, carrot stores food in the tap root and not actually in a tuber.

Item (viii) stated, "Materials which can be recycled include aluminum cans and magazines". While the answer is TRUE, some students wrote FALSE. This wrong response implies that some students lacked competence of the correlating the concept of environment achieved from the topic of *Safety in Our Environment* with the real objects in our environment. They did not realize that aluminum cans can be recycled. This might have been attributed by the wrong idea that, since aluminum are metallic objects they cannot be broken down for further use.

Extract 2.2

2. Write **TRUE** if the statement is correct or **FALSE** if a statement is not correct.

(i) A microscope is an instrument used to observe smaller objects which cannot be seen by using our normal eyes **FALSE**

(ii) Plant cells possess cellulose cell walls while animal cell do not have **FALSE**

(iii) We can use dry wooden stick to move a victim of electric shock from the source or electric current..... **TRUE**.....

(iv) Botanists study both plants and animals **TRUE**.....

(v) It is safe to warm the room by using charcoal when people are sleeping the whole night inside the room **TRUE**.....

(vi) Onion store food in leaves while carrots store food in root tubers **TRUE**.....

(vii) Gaseous exchange in fish takes place through the spiracles..... **TRUE**.....

(viii) Materials which can be recycled included aluminum cans and magazines... **FALSE**.....

(ix) All living things are made up of small units known as cells **FALSE**.....

(x) Biology is the study of non-living things..... **TRUE**.....

In extract 2.2 the student failed to identify whether the statement is true or false. Hence he/she wrote TRUE in wrong statements and FALSE in correct statement. He/she lacked knowledge of the topic tested as all responses were wrong.

2.1.3 Question 3: Matching Items

The question consisted of matching items derived from the topic of *Nutrition*. The question required the students to match the phrases in list A with responses in List B by writing the letter of the correct response from List B below the item number of List A in the table provided.

List A		List B
(i)	A term used for organisms with four chambered stomach	A Night blindness
(ii)	Malnutrition disorder caused by deficiency of protein in children.	B Scurvy
(iii)	Enzymes responsible for digestion of protein	C Pepsin
(iv)	Malformation of bone caused by deficiency of vitamin "D" in the diet	D Pellagra
(v)	Failure to see in deem light due to deficiency of vitamin "A" in the diet	E Beriberi
(vi)	Painful sensation caused by regurgitation of stomach contents	F Ulcers
(vii)	Bleeding of gums and poor healing of the wound due to the deficiency of vitamin "C"	G Rickets
(viii)	Painful sore in the lining of the digestive system	H Kwashiorkor
(ix)	The substance responsible for coagulation of milk	I Marasmus
(x)	A person has loss of appetite, loss of nervous sensation due to the deficiency of vitamin "B1" in a diet.	J Dental caries
		K Heartburn
		L Rennin
		M Anorexia nervosa
		N Ruminants
		O Bulimia nervosa

Generally, the performance in this question was good since a total of 52.4 percent scored 30 percent and above. Data analysis indicates that, 100 percent of students attempted this question of which, 47.6 percent scored 0 - 2.0 marks and 30.7 percent scored from 5.0 - 10 marks. Of the last category, 2.3 percent scored full (10) marks allocated to this question. The percentage of student who scored 3.0 - 4.0 marks was 21.7.

A few students who scored 7.0 - 10.0 marks were able to correctly match most of the items. This implies that, the students had adequate knowledge of the concept of nutrition in animals. Extract 3.1 displays a sample of students' good responses.

Extract 3.1

ANSWERS										
List A	(i)	(ii)	(iii)	(iv)	(v)	(vi)	(vii)	(viii)	(ix)	(x)
List B	N	H	C	G	A	K	B	F	L	E

Extract 3.1 represents correct responses of a student who was able to get right all the items.

The majority of the students (47.5%) who scored low marks in this question failed to respond to items (vi) and (viii). Item (vi) required the students to select the response which matches with painful sensation caused by regurgitation of stomach contents. The correct response was ‘K’ (heart buns). In this item, most of the students selected ‘F’ (ulcers) which is a wrong response. The students seem to have concentrated on the word *painful sensation* in the stem and ignored the important word *regurgitation*. They might have also lacked understanding of the meaning of the word *regurgitation*, which is the process in which some material from the stomach come back to the esophagus, and since the stomach contents are acidic, it causes burning sensation beneath the breast bone, resulting into heartburn. They failed to recall that, ulcers are sores in the stomach lining caused by the erosion of the stomach’s mucus coating, exposing the stomach to the action of digestive enzymes and acid; therefore ‘ulcers’ has no connection with painful sensation caused by regurgitation.

In item (viii) which required the students to select the response that matched with the phrase ‘Painful sore in the lining of the digestive system’, majority of students selected ‘K’ (Heartburn) instead of the correct response which was ‘F’ (ulcers). This implies that, the students had misconception on some of the contents concerning nutrition in animals. Extract 3.2 shows a sample of poor responses from a student.

Extract 3.2

ANSWERS										
List A	(i)	(ii)	(iii)	(iv)	(v)	(vi)	(vii)	(viii)	(ix)	(x)
List B	G	C	K	F	H	N	G	A	N	I

In extract 3.2, the student failed to match the items, hence all the answers provided were wrong.

2.2 Section B: Short Answer Questions

2.2.1 Question 4: Classification of Living Things

The question had three parts, (a), (b) and (c). In part (a), the students were required to list the major groups of living organisms. In part (b), the students were provided with a figure representing an organism which feeds on dead organic matter and they were required to (i) name the organism in

the figure (ii) name the part labeled with letter A, and (iii) mention the phylum in which the organism mentioned in the figure belongs. In part (c), they were required to outline two disadvantages of Kingdom Fungi.

The data shows that, all students (100%) attempted this question of which 37.0 percent scored 0 mark and 20.6 percent scored 1.0 - 2.5 marks. The ones who scored 3.0 - 4.0 marks were 17.4 percent, while 24.2 percent scored 5.0 - 10.0 marks. Only 1.5 percent scored all 10.0 marks. From the information above, it can be deduced that, the general performance of students in this question was average.

A few students, who performed well, demonstrated good mastery of the concepts taught under the topic *Classification of Living Things*, as they were able to correctly answer all or most parts of the question. Extract 4.1 shows a sample of a good response from a student.

Extract 4.1

4. (a) List the major groups of living organisms.

(i) Monera..... (ii) Fungi.....

(iii) Animalia..... (iv) Plantae.....

(v) Protista.....

(b) Figure 1 represents an organism which feed on dead organic matter. Study the diagram carefully then answer the questions that follow:

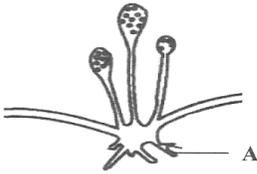


Figure 1

(i) What is the name of organism in Figure 1?
Mucor.....

(ii) Name the part labelled with letter A.
Rhizoids.....

(iii) Mention the Phylum in which the organism you named in (a)(i) belongs.
Phylum Zygomycota.....

(c) Outline two disadvantages of Kingdom Fungi.

(i) Some mushrooms are poisonous.....

(ii) Mucor make food to spoil.....

Extract 4.1 shows good responses from a student who was able to name groups of living things, the organism in figure 1 and outline advantages of Kingdom Fungi.

Students who scored low marks had insufficient knowledge as they failed to correctly answer all or most of the parts especially in parts (a) and (b) (i). In part (a), some of the students listed classes of the Kingdom Animalia, and the five Kingdoms of living things while other students listed the names of organism such as insects. Such students did not understand the demand of the question as they overlooked the word ‘major’ in the stem. In addition, some students gave wrong answers which did not relate in any way to the question. Such answers include; *head*, *scurvy* and *enzyme*. This implies that they lacked knowledge of classification.

In part (b) (i), a variety of wrong names which do not relate to the name of the part asked were provided. Some students mistakenly named the part as a root. In part (c), some students provided advantages instead of disadvantages of the Kingdom Fungi. For example, one student wrote *source of food, bread making, decompose dead organic matter*. In addition, few students wrote the characteristics instead of providing disadvantages of Kingdom Fungi. All these responses indicate that, the students did not read the question carefully to understand the demand of the question. In addition, the results indicate that students had inadequate knowledge of the topic of Classification of Living Things. Extract 4.2 shows a sample of a poor response from a student.

Extract 4.2

4. (a) List the major groups of living organisms.

(i) Cell wall (ii) Botany

(iii) Cell cellulose (iv) Zoology

(v) Non-living

(b) Figure 1 represents an organism which feed on dead organic matter. Study the diagram carefully then answer the questions that follow:

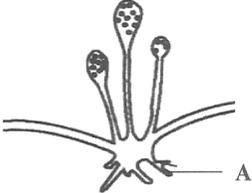


Figure 1

(i) What is the name of organism in Figure 1?
Kingdom Fungi

(ii) Name the part labelled with letter A.
Cell wall

(iii) Mention the Phylum in which the organism you named in (a)(i) belongs.
kingdom plantae

(c) Outline two disadvantages of Kingdom Fungi.

(i) Simple task kingdom Fungi
kingdom Fungi

(ii) division of labour kingdom Fungi

In extract 4.2, the student failed to state the name of the organism and to name the part labeled A. Also, the student failed to outline advantages of Kingdom Fungi.

2.2.2 Question 5: Health and Immunity

The question consisted of three parts, (a), (b) and (c). In part (a), the students were required to explain the meaning of the term *Personal Hygiene*. In part (b), the students were required to state four principles of personal hygiene, while in part (c), they were required to state four principles of good manner.

The data analyzed indicated that all students (100%) attempted this question. The performance was good as 42.2 percent scored 5.0 - 10.0 marks, 12.2 percent scored 3.0 - 4.0 marks, 36.2 percent scored 0 mark and 9.4 percent scored 1 - 2.5 marks.

The students who scored high marks in this question had adequate knowledge of the topic of Health and Immunity, as all or most of their responses were correct. Furthermore, these students met the demand of the question as exemplified in extract 5.1.

Extract 5.1

5.	(a)	What do you understand by the term "personal hygiene"?	Personal hygiene is the practice of keeping your body belonging and environment clean.
	(b)	State four principles of personal hygiene.	
	(i)		Wash your body everyday
	(ii)		Keep your nails short and clean
	(iii)		Brush your teeth atleast twice a day
	(iv)		Wear clean clothes everyday
	(c)	State four principles of good manner.	
	(i)		Say thank you when you are given something
	(ii)		Say Please if you are request something
	(iii)		Maintain good posture when you are sitting
	(iv)		Don't talk when you are eating

In extract 5.1, the student comprehended well the concepts of health and immunity by stating the principles of personal hygiene and good manner.

Of the students who scored 0 - 2.0 marks, some of them failed to provide correct responses to all parts of the question, while others were able to define the term person hygiene but failed to explain the principles of personal hygiene and good manner. This indicates that the students did not have enough insight on the term personal hygiene. Some students wrote wrong responses which did not relate in any way to the questions asked in part (b) and (c) respectively. For example, one student wrote *use of landfills, use of land pits, and latrines* while another student mentioned groups of food such as *carbohydrates, lipids protein and mineral salts*. These responses indicate that the students completely lacked knowledge about the topic of *Health and Immunity*. Extract 5.2 presents a sample of students' poor responses.

Extract 5.2

5. (a) What do you understand by the term "personal hygiene"?
Is the step where by people they are support to get their health in proper way.

(b) State four principles of personal hygiene.
(i) To eat good food
(ii) To study
(iii) To keep remove waste from the body
(iv) To you knert.

(c) State four principles of good manner.
(i) To conduct the good manner
(ii) To conduct the health
(iii) To recove from shock
(iv) To understand the blood measure

Extract 5.2 present's student's poor responses. The student gave a wrong definition of personal hygiene, and wrong principles of personal hygiene and good manner.

2.2.3 Question 6: Transport of Materials in Living Things

The question consisted of three parts. In part (a), the students were required to define the term diffusion and osmosis. In part (b), the students were required to explain why a red blood cell immersed in low concentrated solution burst, while in part (c), the students were required to state one function of red blood cell (erythrocyte) and platelets cells.

The statistical analysis revealed that out of 100 percent of students who attempted this question, 59.6 percent scored 0. In addition, 19.4 percent scored from 1 - 2.0 marks, whereas 12.7 percent scored 3.0 - 4.0 marks and 8.3 percent scored 5.0 - 10.0 marks. The data indicates that the general performance of the students in this question was weak since only 21.0 percent of students scored 30% and above.

Few students who performed well in this question had adequate knowledge on the topic of *Transport of Materials in Living Things*, particularly on osmosis, diffusion and blood cell. Therefore, they were able to correctly answer most or all parts of the question. Extract 6.1 displays a sample of student's good responses.

Extract 6.1

6. (a) Define the following terms:

(i) Diffusion
Diffusion is the movement of molecules from a region of high concentration to that of low concentration.

(ii) Osmosis
Osmosis is the movement of molecules from a region of low concentration to that of high concentration across semi-permeable membrane.

(b) Explain why a red blood cell immersed in the low concentrated solution burst?
They burst because they absorb water in the low solution (hypotonic) hence they become filled and burst. This process is known as Haemolysis.

(c) State one function of each of the following blood cells:

(i) Red blood cell (Erythrocytes)
Are responsible for transport of oxygen and carbon dioxide.

(ii) Platelets
Are responsible for clotting process at the site of injury.

In extract 6.1 the student was able to comprehend the demand of the question. Also the student had adequate knowledge of transport of materials in animals.

The majority of the weak students who scored 0 in this question, gave responses which were unexpected. For example, some of the students gave the definition of photosynthesis instead of diffusion while others gave the definition of classification instead of osmosis. Furthermore, some of the students confused between osmosis and diffusion. The students in this category also, gave wrong responses on the role of red blood cell and platelets.

On the other side, students whose scores were from 1.0 - 2.0 marks were unable to complete some parts of the question. The analyzed responses showed that, some of them either left the question blank, or provided wrong responses. This scenario indicates that these students lacked knowledge of the topic of *Transport of Materials in Living Things*. Extract 6.2 shows a sample of poor responses from one of the students.

Extract 6.2

6. (a) Define the following terms:

(i) Diffusion
Is the system of diffuse plant ~~in~~ water

(ii) Osmosis
Is the movement of breaking down water from high solution to low solution

(b) Explain why a red blood cell immersed in the low concentrated solution burst
A red blood cell immersed in the low concentrated solution burst because red blood cell is the used to push blood in a heart.

(c) State one function of each of the following blood cells:

(i) Red blood cell (Erythrocytes)
To push blood into the heart

(ii) Platelets
To clean blood into the heart

Extract 6.2 reveals wrong responses from a student who failed to define osmosis and diffusion.

2.2.4 Question 7: Safety in Our Environment

The question aimed at assessing students' knowledge and skills on safety in one's environment, particularly on the meaning of First Aid, and practical skills of rendering first aid service to various victims. In part (a), the students were required to state the meaning of First Aid whereas in part (b), they were required to list four components of the First Aid Kit. In part (c), the students were required to state procedures of giving First Aid to a person who has been bitten by a snake.

The analysis of data shows that the question was attempted by 100 percent of the students. Further analysis reveals that 58.3 percent scored 5.0 - 10.0 marks, 22.4 percent scored 0 - 2.0 marks and 19.3 percent scored 3.0 - 4.0 marks. This trend indicates that the general performance in this question was good.

The majority of students, who performed well in this question, demonstrated good mastery of content knowledge on the topic of *Safety in Our Environment* and adherence to the demand of the question. Extract 7.1 displays a sample of students' good responses.

Extract 7.1

7.	(a)	What is First Aid? This is an immediately and temporary care provided to an injured person or sick people before taken to the hospital for the medical helper.
	(b)	List four components of the First Aid Kit. (i) Iodine tincture (ii) Petroleum jelly (iii) Razor blade (iv) Bandage
	(c)	State the procedures of giving First Aid to a person who has been bitten by a snake. (i) - First tie the bitten area in order to prevent the spread of poison, (ii) - Second cut the bitten area using a razor blade then wash the wound with clean water

In extract 7.1 the student adhered well to the demand of the question by providing correct responses to all the items.

The students who scored low marks in this question had insufficient knowledge and skills concerning the topic of *Safety in Our Environment*. As a result, they were able to state the meaning of First Aid Kit in part (a) but failed to list any components of First Aid Kit in part (b). Instead, they listed other things which were not related to components of First Aid Kit. For example, one student listed names of subjects like *Chemistry, Biology and Physics* while another listed components of taxonomic hierarchy such as *Kingdom, Phylum, Class, Order and Genus*. All these responses indicated lack of adequate knowledge on the topic tested.

Apart from incompetence in knowledge content, some students experienced difficulties in responding to the question using English and decided to use Kiwahili. For example one student wrote components of First Aid as *mkasi, bandeji, maji, sabuni* and *Spiriti*. The components were correct,

except that they were given in Kiswahili instead of using the medium of instruction which is English. Other students misspelt the components. For example, in part (b) some students wrote *soup instead of soap*, *wood* instead of *wool*, and *touch* instead of *torch*. All these responses were wrong. This indicates that, the students did not master the particular measured concepts. Extract 7.2 illustrates a sample of students' poor responses

Extract 7.2

7.	(a)	What is First Aid?	is the smar bats first Aid to person who has been bitten
	(b)	List four components of the First Aid Kit.	(i) To be faste gain hospita (ii) To be first Aid kit bats - (iii) To tray the residents (iv) To be has been bitten
	(c)	State the procedures of giving First Aid to a person who has been bitten by a snake.	(i) is people nape person who has bee n. ailet first Aid kit (ii) is person has been bats first Aid kit

Extract 7.2 shows that the student failed to meet the requirements as he/she gave wrong responses which did not relate to the question.

2.2.5 Question 8: Balance of Nature

This question had three parts, (a), (b) and (c). In part (a), the students were required to define the terms food chain and food web. In part (b), the students were required to construct a food chain by using the named organisms which were Grass, Snake, Grasshopper and Frog. In part (c), they were required to explain the significance of food web and food chain respectively.

The data analyzed indicates that, 100 percent of the students made an attempt in this question, of which 47.5 percent scored 0 mark. The data also shows that, 22.8 percent scored 1.0 - 2.5 marks, and 15.9 percent scored 5.0 - 10 marks, whereas 13.8 percent scored 3.0 - 4.5 marks out of 10.0 marks. In general, 29.7 percent of the total students who attempted this

question scored 30 percent and above. Therefore, the performance in this question was average.

The students who performed well were able to provide correct definitions for the terms food chain and food web in part (a), and in part (b), they managed to construct a food chain with arrows pointing to correct directions. Furthermore, explanations about the significance of food chain and food web were clear and correct. Extract 8.1 shows a sample of student's good responses.

Extract 8.1

8. (a) Define the terms "food chain" and "food web" as used in Biology.

(i) Food chain
is a linear feeding relationship where by one organism feed on another next organism

(ii) Food web
Refer to the interconnection of food chain

(b) Construct a food chain by using the following organisms:
Grasses, Snake, Grasshopper, Frog.

Grasses → Grasshopper → Frog → Snake

(c) Explain the significance of food chain and food web in the real life situation.

(i) It enable to balance ecosystem, ecosystem contain living things and non-living things so living thing depend on non-living thing to provide energy.

(ii) It enable to the production of energy due to that food chain their is producer, consumer and decomposer this decompose dead material then to make energy in the soil maybe and material grow and consumer use it.

Extract 8.1 shows good responses from a student who was knowledgeable and was able to define food chain and web, construct food chain and explain the significance of food chain and web in real life situation.

Further analysis of students' responses indicate that, 47.5 percent of the ones who scored 0 gave wrong responses in all parts of the question as some of them confused the definition of food chain with that of food web. In part (b) some of the students listed the organisms and separated them

using commas, instead of arrows. This indicates that the students did not know how to use arrow to indicate dependence of organisms in the food chain. Also, some students arranged the organisms wrongly in the food chain. For example, some indicated that snake is eaten by frog, which is wrong. In addition, various wrong responses were written as significance of food web. Such responses include:

Food web enables us to live in good health, Food web protect the body against infections, Food web is a source of economy.

All these responses indicate that students lacked enough content knowledge in the topic of *Balance of Nature*.

The students who scored 1.0 - 2.0 marks managed to define food chain and food web, but failed to construct a correct food chain using given organisms. In addition, they failed to state the importance of food chain and food web, an indicator that they lacked enough content knowledge of the topic. Extract 8.2 shows a sample of poor responses from a student.

Extract 8.2

8. (a) Define the terms "food chain" and "food web" as used in Biology.

(i) Food chain
 Is the proces by which to arrange of animal and biral of your very much. Forexample

(ii) Food web
 Is the proces by which to arrange of food. Forexample pancreas heart pancrease juice

(b) Construct a food chain by using the following organisms:
 Grasses, Snake, Grasshopper, Frog.

Frog → Grasses → Snake → Grasshopper

(c) Explain the significance of food chain and food web in the real life situation.

(i) to support to understand of very arranged of animal and birds of our every life of human being also to control people to arranged very much

(ii) Food web also to support a person to understand very group of food web in your life

Extract 8.2 expresses a student's wrong responses. The student lacked knowledge on the content matter tested and gave wrong answers to all the items.

2.3 Section C: Essay Questions

2.3.1 Question 9: Health and Immunity

The question required a student to explain the cause, mode of transmission and prevention measures of cholera as one of the communicable diseases in Tanzania.

This question was optional, and was the most opted one as statistical analysis shows that, 350,114 (96.45%) of students attempted this question. The possible reason for being opted for by large number of students was that, during the period of assessment in November, there was a campaign through mass media against cholera outbreak which had spread in most parts of the country.

Despite the fact that this was the most opted question, statistics show that more than a half (51.1%) of the students who attempted this question scored 0 with only 18.4 percent scoring from 10 - 20 marks. According to statistics, 12.3 percent scored 1.0 - 5.5 marks whereas 11.79 percent scored 6.0 - 9.5 marks. Based on this statistics, the performance of students in this question was generally average.

On the other hand, the majority of students who did well in this question made a good description of the causes, mode of transmission and prevention of cholera, suggesting that they were knowledgeable in communicable diseases. In addition, they observed essay writing procedures such as beginning with an introduction and then proceeding with main body, and conclusion. Therefore, the students provided correct responses which were clear, logical and systematically presented. Extract 9.1 shows a sample of a student's good response.

Extract 9.1

9. Explain the causes, mode of transmission and prevention measures of cholera as one of the communicable disease in Tanzania.

Cholera is a bacterial disease caused by a Bacteria called *Vibrio Cholerae*.

Cholera is one of the epidemic diseases transmitted by vectors through contaminated foods and waters. The most agent of transporting cholera is a house fly. A house fly carries bacteria from different areas and comes in contact with foods.

Cholera can be prevented through various ways which are:

Washing our hands after visiting toilets using clean water and soap. A soap helps to kill bacteria which remains in the hands that can cause cholera.

Drinking and washing our hands using boiled water. Boiled water kills microorganisms which are harmful to human and which may cause cholera.

We are also advised to eat hot boiled foods since a bacteria causing cholera die when a temperature is at 56°C.

We should also eat washed fruits and vegetables using clean water.

Also cholera is prevented by vaccination since vaccine helps the immunity of the body hence a vaccinated ^{person} is likely not to suffer from cholera.

To conclude the discussed points above I would like to suggest that people should clean their surroundings so as not to allow house flies come at that area. Apart from these measures we are also advised to use anti drugs in treating cholera.

In extract 9.1, the student was able to correctly explain the cause, transmission and prevention of cholera.

Students who scored 0 lacked knowledge on causes, transmission, and prevention of cholera, as all the responses they provided were wrong. However, of the few students who scored 1.0 - 5.0 marks, some were able to state the cause of cholera and few ways of prevention, but they failed to state ways in which cholera is transmitted. Other students in this category stated the symptoms instead of mode of transmission of cholera. In addition, some students spelt wrongly the causative agent of cholera by writing *vibriz* instead of *vibrio* in the name *Vibrio cholera*. All these incorrect responses show that students lacked mastery of content knowledge on the causes and transmission of various diseases. Others had

their responses affected by poor command of English. Extract 9.2 displays a sample of student's poor responses.

Extract 9.2

9. Explain the causes, mode of transmission and prevention measures of cholera as one of the communicable disease in Tanzania.

Afer m stomach used for organism with for Chombraded Malnutrition disorder caused by deficiency of protein chain enzymes responsible for designed protein. Malformation of bones called deficiency of Vitamin D. In the diet:

panful sore in the lining of the digestive system the substance responsible for coagulation of milk. A person has loss of appetite loss of nervous sensation due to deficiency of Vitamin B in diet. Night bleedings, security, pellagra, Beri-beri, ulcers, Dieters, kwashiorkor, marasmus, dental caries, Heartburn, Penim, Anorexia, nevada, Runimonts, Bulimia, nervosa, living things.

Wash the wound with plenty water to remove blood. Loosen tight clothes to supply oxygen to victim. Use finger to apply pressure direct to the bleeding point. Ask person to go to hospital immediately. A viral disease transmitted through sexual intercourse is known as gonorrhoea. Typhoid, AIDS, small pox is the human digestive system the stomach is known as a tissue or cell or organ or organism which of the following is proper method of waste disposal use of landfill, make pit latrine, recycling of materials and burning plastic waste at home.

Extract 9.2 displays a sample of poor responses from the student. The student failed to explain the cause, transmission and prevention of cholera. All the provided points were irrelevant and did not meet the requirement of the question.

2.3.2 Question 10: Health and Immunity

This was an optional question which carried twenty (20) marks. In this question students were required to describe the causes, mode of transmission and prevention measures of Tuberculosis in the respiratory system.

This question was the least chosen as only 13,102 (3.6%) of students attempted it. The performance in this question was poor as 73.9 percent of the students scored 0, 13.2 percent scored 1.0 - 5.5 marks and 6.3 percent scored 6.0 - 9.5 marks. Very few students (6.6 percent) scored 10 - 20 marks.

Few students who performed well in this question had adequate knowledge on the topic of *Health and Immunity*. In addition, the students had good skills on essay writing. They were able to describe the causes, mode of transmission, and prevention measures of Tuberculosis. In addition, their responses were clear, correct and systematically arranged. Extract 10.1 displays a sample of good responses.

Extract 10.1

10. Describe the causes, mode of transmission and prevention measures of Tuberculosis diseases in the respiratory system.

ANSWER

10: TUBERCULOSIS DISEASES IN THE RESPIRATORY SYSTEM

Tuberculosis is a communicable disease caused by slender tubercle bacterium called mycobacterium tuberculosis. The bacteria can attack any part of the body and destroy tissues but the common site is lungs where they cause pulmonary tuberculosis.

Transmission of tuberculosis disease, firstly tuberculosis is an airborne disease and so when the patient with the active illness coughs and sneezes, Tuberculosis bacteria carried in the air and when the healthy person breathes in such air, they can get infection. People with a healthy immunity can not control the infection but once the body immunity is lowered, he or she can not control such infection.

Extract 10.1 continues

The following are the prevention measures of Tuberculosis diseases in the respiratory system such as,
Vaccination: Children should be vaccinated against TB using the *Bacillus Calmette Guerin* (BCG) vaccine.
Conducting regular checkups for the disease each time one observes its signs and symptoms.
Treating the disease once diagnosed. Above using the patient treating the disease also prevent its transmission to new vaccines.
Consumption of balanced diet and regular body exercise to ensure healthy of the body.
Avoiding harmful lifestyle such as excessive drinking, smoking, persistent, overworking and poor diet.
Upholding life styles.
Therefore, these were the causes, transmission and prevention measures of Tuberculosis diseases in the respiratory system. If you will follow those prevention measures it can lead to good health, and lead to the development of our country since it needs people who are healthy so that they can charge their duties.

Extract 10.1 displays good responses from a student who managed to describe the cause, mode of transmission and prevention measures of Tuberculosis.

Majority of students (73.9%) who scored 0 in this question failed to state causes, mode of transmission and prevention measures of Tuberculosis. These students wrote vague responses, with some of which not relating at all to the question. Examples of such responses were on causes of tuberculosis where some students wrote *smoke, milk, virus, and cigarette*. Moreover, some of the students who scored 1.0 - 5.5 marks, were able to state the cause of Tuberculosis but on the aspect of transmission they confused with HIV. Example of such observation is shown by a student who wrote the mode of transmission of tuberculosis as '*sharing razor blade, blood transfusion and sexual intercourse*'. In addition, some students mistook the modes of transmission for prevention measures of Tuberculosis. Some were able to state the ways of transmission but failed to

state the prevention measures. Extract 10.2 displays a sample of poor responses from a student.

Extract 10.2

10. Describe the causes, mode of transmission and prevention measures of Tuberculosis disease in the respiratory system.

ANSWER

(10) Tuberculosis or (TB) is disease which is many people getting in this world and getting for way of chest. Causes of Tuberculosis of disease.

Population of people

If you go anywhere in town if sitting in the bus then people many have in the bus another we sick chest if you chest is that cell is come to in your body and you sick. For example dar as salaan many people lives so if you get that disease do you do not know who is give you because many people we lives and many people getting.

Sickness any time

This disease is not good for people. Many people you hospital say i'm feel bad and you get painful in the chest, sickness of legs and body that is causes.

Transmission and Prevention measures of Tuberculosis disease in the respiratory system.

If you go hospital you take bottle and then you put you chest in the morning you go to doctor or nursing in hospital then you go measure of room for laboratory room.

Microscope is used to measure and show bacteria then check up again then you get medicine that medicine you drink 6 month every day morning. Conclusion in my side i'm want to say that government of this country find another cars because if i did not do that every day people sickness.

Extract 10.2 shows a sample of a student's response which contained unclear explanations. This is an indication that the student lacked knowledge of Tuberculosis disease.

Although question 9 and 10 were optional, students' performance in these questions was not impressive. However, when performance in question 9 is compared with that of question 10, that of question 9 is better. The following graph compares students' performance in the two questions.

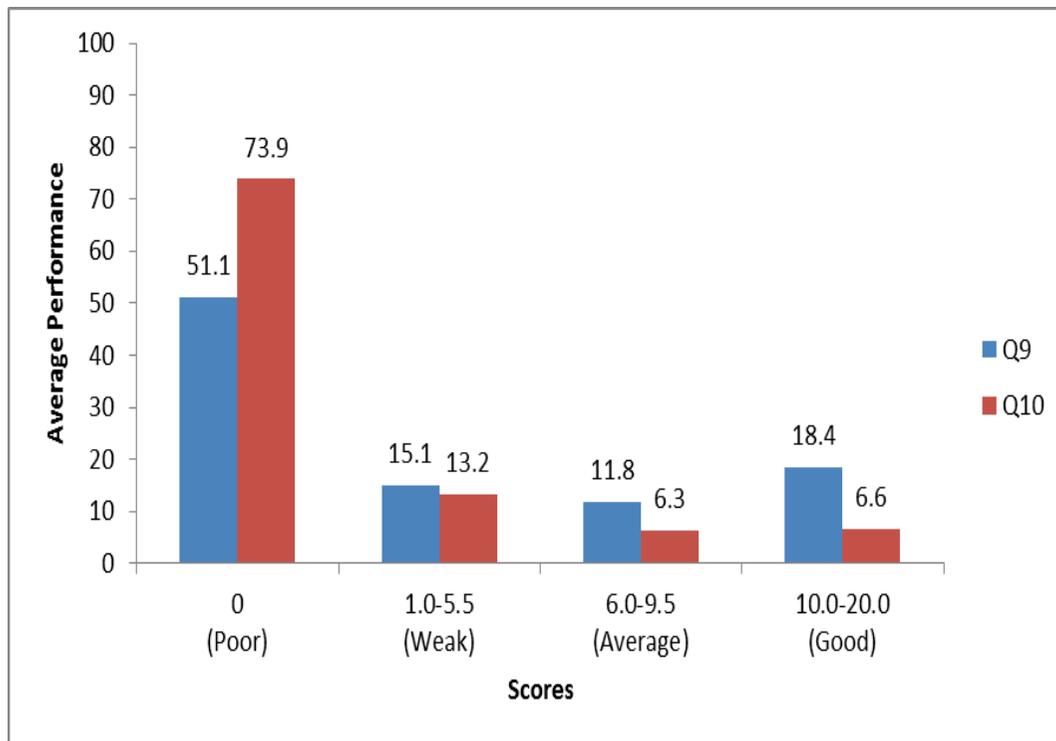


Figure1: Comparison of students' performance in question 9 and 10

From the graph, majority of the students (73.9%) scored 0 in question 10, while 51.1 percent scored the same in question 9. In addition, the graph reveals that there is no significant difference between the percentages of students who scored between 1.0 to 9.5 marks. However, more students scored higher (10 - 20) marks in question 9 than in question 10. Thus, in general the performance in question 9 was better than in question 10. This may be attributed to the fact that, question 9 was about Cholera whereas question 10 was about Tuberculosis. Cholera is more common in our environment than Tuberculosis. In this case students seem to be more knowledgeable on Cholera than on Tuberculosis.

3.0 STUDENTS' PERFORMANCE IN DIFFERENT TOPICS

The analysis of the students' responses in each question revealed that, question 1 (multiple choice) was well performed. The items of the question were derived from various topics which included: *Introduction to Biology, Safety in Our Environment, Health and Immunity, Cell Structure and Organization, Classification of Living Things, Transport of Materials in Living Things, Nutrition, and Gaseous exchange and Respiration*. Students' mastery of content knowledge in this question led them to perform well.

Other questions which were well performed include questions 2, 3 and 7. Question 2 contained matching items derived from the topics of *Introduction to Biology, Cell Structure and Organization, Safety in Our Environment, Respiration and Gaseous Exchange, and Nutrition*. Questions 3 and 7 were short answer questions derived from the topics of *Safety in Our environment and Nutrition* respectively.

Questions 4, 5, 8 and 9 were moderately performed. The questions were set from the topics of *Classification of Living Things, Health and Immunity, and Balance of Nature*. This moderate performance was attributed to insufficient knowledge possessed by the students.

On the other hand, the poorly performed questions were questions 6 and 10 which were derived from the topics of *Transport of Materials in Living Things* and *Health and Immunity* respectively. The poor performance was generally attributed to lack of content knowledge among students and their inability to identify the demand of the question. The summary of the performance in each topic is shown in the Appendix.

4.0 CONCLUSION AND RECOMMENDATIONS

4.1 Conclusion

The overall performance of students in Biology subject in FTNA 2015 was average. However, there are some factors which made students fail to score good marks in some topics. Students' insufficient knowledge on the topic concerned was one of the factors identified. This may have been contributed by failure of teachers to cover all the assessed topics or failure of students to revise all the assessed topics before commencement of the national assessment.

Failure to identify the demand of the question was another factor. Generally, this may be attributed to lack of enough exercises assigned to students to enable them gain experience on how to identify question demand. In addition, lack of students' seriousness when reading questions before attempting might have made the students fail to recognize the question demand.

Another factor which led some students to score low marks was inadequate English Language proficiency. This might be attributed to failure of students to read English Language books, magazines, blogs, posts, and lack of exercises in using English Language during discussion to increase their level of English proficiency.

4.2 Recommendations

Based on the observation made through the analysis of this report, the following recommendations are put forward in order to improve the performance in Biology subject.

- (a) Head of schools in collaboration with education quality assurers should ensure thorough supervision of teaching-learning process. This includes seeing that teachers help students to cover the syllabus before commencement of FTNA. The aim here is to equip students with all knowledge required for FTNA.
- (b) Teachers should provide continuous assessment in form of tests, homework, group assignments, and quizzes with corresponding feedback in order to help students to acquire Biology content knowledge.

- (c) Students should be advised to read questions carefully in order to identify their demands before attempting them.
- (d) Students should be encouraged to read English novels, English Dictionaries, English magazine, blogs and posts, and use of English Language in communication so as to improve their English proficiency.
- (e) Students should be encouraged to make effective revision in Form One and Form Two Biology topics so as to ensure that they have enough knowledge on the topics taught.

APPENDIX

Summary of Students' Performance in FTNA 2015, According to Topics

S/N	TOPIC	QUESTION NUMBER	PERCENTAGE OF STUDENTS WITH A SCORE OF 30% AND ABOVE	REMARKS
1	Introduction to Biology, Cell Structure and Organization, Safety in Our Environment, Respiration and Gaseous Exchange, and Nutrition	2 (True and False)	98.8	Good
2	Introduction to Biology, Safety in Our Environment, Health and Immunity, Cell Structure and Organization, Classification of Living Things, Transport of Materials in Living Things, Nutrition, and Gaseous exchange and Respiration.	1 (Multiple choice)	86.6	Good
3	Safety in Our Environment	7	77.6	Good
4	Nutrition	3 (Matching Items)	52.4	Good
6	Classification of Living Things	4	42.4	Average
5	Health and Immunity	5	54.4	Average
		9	33.7	
		10	13.9	
7	Balance of Nature	8	29.7	Average
8	Transport of Materials in Living Organisms	6	21.0	Weak

