THE UNITED REPUBLIC OF TANZANIA
MINISTRY OF EDUCATION, SCIENCE AND TECHNOLOGY
NATIONAL EXAMINATIONS COUNCIL OF TANZANIA

PUPILS' ITEM RESPONSE ANALYSIS REPORT FOR STANDARD FOUR NATIONAL ASSESSMENT (SFNA) 2020

SCIENCE AND TECHNOLOGY

THE UNITED REPUBLIC OF TANZANIA

MINISTRY OF EDUCATION, SCIENCE AND TECHNOLOGY

NATIONAL EXAMINATIONS COUNCIL OF TANZANIA

PUPILS' ITEM RESPONSE ANALYSIS REPORT FOR STANDARD FOUR NATIONAL ASSESSMENT (SFNA) 2020

05 SCIENCE AND TECHNOLOGY

TABLE OF CONTENTS

PREFACE

This report on the pupils' Item Response Analysis (PIRA) for the Standard Four National Assessment for Science and Technology subject in 2020 has been prepared to provide feedback to all educational stakeholders on how the pupils responded to the assessment questions. Pupils' responses to the assessment questions serve as an indicator of what knowledge and skills were attained by the pupils for the period of two years (Standard III and IV) of primary education. The general performance in Standard Four National Assessment was good since 87.87% passed.

This report, shows the analysis in each question in which the revealed strength and weakness in pupils' answers has been indicated. The report also indicates reasons for the pupils ability and inability to provide correct responses according to the requirement of the questions. The reasons for the pupils to respond correctly include being competent in the tested concepts. However, the reasons that led the pupils fail to respond correctly include being incompetent in the assessed content; poor reading, writing and arithmetic skills; failure to interpret pictures and demands of the questions.

The National Examinations Council of Tanzania believes that, this feedback will enable different stakeholders in education to take appropriate measures in order to improve the teaching and learning process. The Council believes that, the respective authorities will make sure that the shortcomings identified in this report are addressed in order to improve the competencies of the pupils who are expected to join standard five.

Lastly, the National Examinations Council would like to convey sincere gratitude to examination officers and other stakeholders who participated in the preparation of this report.

Dr. Charles E. Msonde
EXECUTIVE SECRETARY

1.0 INTRODUCTION

The report is focused on Standard Four National Assessment for Science and Technology subject conducted on 26th November 2020. The assessment intended to measure pupils' competencies stipulated in 2016 Science and Technology syllabus for Basic Education Standard III-IV prepared by Tanzania Institute of Education.

The assessment paper consisted of five (5) questions each carrying 10 marks. The questions were divided into sections A and B. Section A comprised 3 questions while section B comprised 2 questions and the pupils were required to answer all questions.
The analysis of the assessment results shows that the general performance in Science and Technology Subject was good as out of 1,702,970 pupils who sat for the paper, 1,496,379 (87.87%) passed the assessment and 206,591 (12.13%) failed.

The pupils' performance in this report is categorized into four groups depending on the marks scored by pupils which are weak (0-2), average (4-6), good (8) and very good (10) marks. Pupils with weak performance are considered to have failed the assessment while pupils with average, good and very good performance are considered to have passed the assessment.

The report analyses the quality of performance of each question. The performance is ranked as weak, average or good if the percentage of the pupils who passed the question lies in the range 0–33, 34–66 or 67–100 respectively. The report also pinpoints some possible reasons for observed pupil's performance in each question. In addition, statistical charts were used to show pupils' performance

in each question. However, samples of pupils' good and weak responses have been extracted and used to exemplify the pupils' performance in some questions.

2.0 ANALYSIS OF PUPILS' PERFORMANCE PER QUESTION

This part of the report analyses the performance of pupils on sections A and B.

2.1 Section A: Multiple Choice, Matching Items and Filling in the Blanks Items

Section A comprised multiple choices, matching and filling in blanks using provided words items. All questions in this section were compulsory.

Question 1: Health Care and Environment

This question comprised five multiple choice items. In item (i) to (v), the pupils were required to choose the letter of the correct answer from the four given alternatives (A-D) and write its letter in the box provided. This question assessed the pupil's ability to apply specific knowledge, skills and attitudes in the concept of balanced diet and its components.

Statistics show that, the pupils' performance in this question was average since out of 1,702,779 pupils who attempted the question, 761,160 (44.70%) pupils passed and 941,619 (55.30%) failed. The performance of the pupils in this question is summarized in Figure 1.
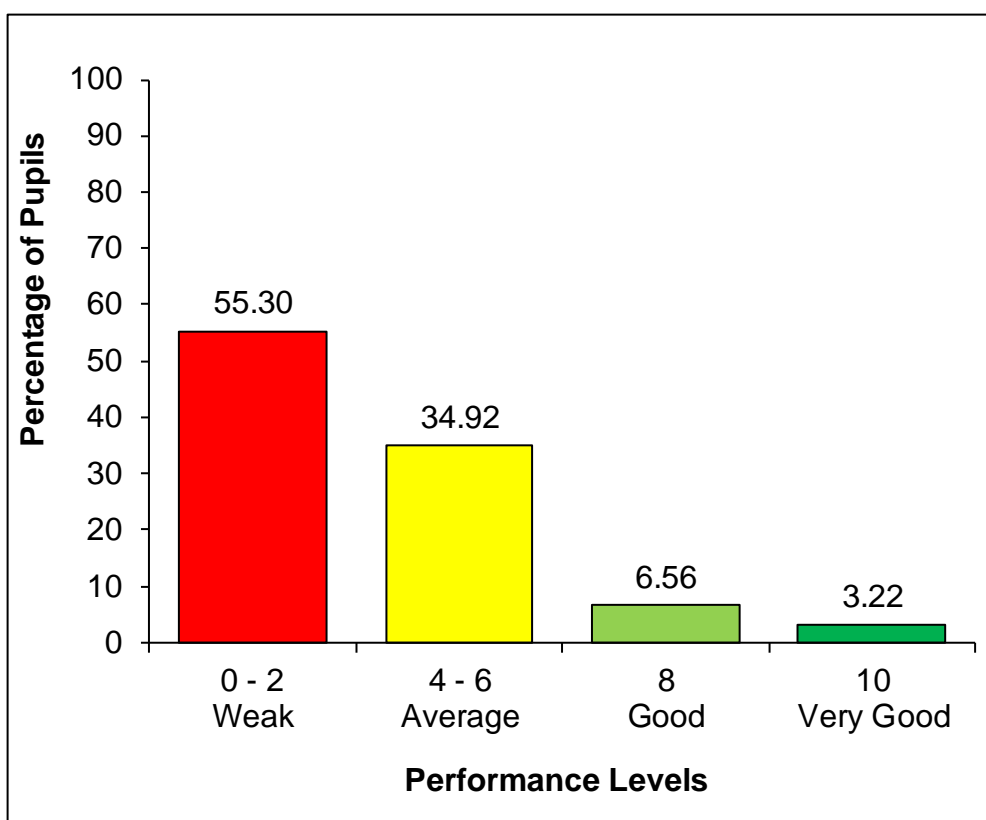
Figure 1: Summary of Pupils' Performance in Question 1

Figure 1 shows that the pupils who scored from 4 to 10 marks were 44.70 per cent. Among these pupils 34.92 per cent scored from 4 to 6 marks, 6.56 per cent scored 8 marks and 3.22 per cent scored 10 marks. Pupils who performed well in this question were competent in the concept of balanced diet and its components.

Figure 1 also shows that 55.30 per cent of the pupils failed by scoring 0 or 2 marks. These pupils failed to make correct choices in almost all items or scored only one item. The analysis of the pupils' responses indicated that, the pupils' failed to perform well in this question due to lack of competence in the concept of balanced diet and its components. For example, in item (i) which assessed pupils'

ability to identify foods that are rich in vitamins and proteins, the question asked:

(i)   Foods that are rich in vitamins and proteins are
- A   milk, meat and fish.
- B   tomato, onion and carrot.
- C   mango, fish and carrot.
- D   fish, rice and maize.

The analysis showed that, the pupils who were able to choose the correct response C, *mango fish and carrot*, had good understanding about different groups of food namely; carbohydrates, proteins, fat and vitamins. Hence, they recognized the food rich in protein. This included fish and vitamins which are found in fruits and vegetables like mangos and carrots.

On the other hand, the pupils who failed to respond correctly to this item, chose distractors A, *milk, meat and fish*, B, *tomato, onion and carrot* and D, *fish, rice and maize*. These pupils had insufficient competence on identifying different foods rich in vitamin and protein. For example, the pupils who chose distractor A, failed to understand that, milk, meat and fish are food rich in protein. Also those who chose distractor B, failed to understand that, tomato, onion and carrot are foods rich in vitamins. The pupils who chose distractor D, failed to understand that, fish have protein while rice and maize have carbohydrates.

Item (ii) assessed the pupils' ability to identify the food that provides energy to the body. The question asked:

(ii)   Which type of food provides energy to the body?

    A   Cassava

    B   Fish

    C   Milk

    D   Fruit.

The correct response for this item was A, *cassava*. The pupils who chose A, understood that, cassava is found in the food group of carbohydrates which provide energy to the body.

On the other hand, some pupils chose among the distractors B, *fish*, C, *milk* and D, *fruits*. These pupils failed to understand that milk and fish are foods rich in protein which repair and build the body while fruits are food rich in vitamins and protect the body against diseases. In addition, these pupils failed to realize that fish, milk and fruits do not provide energy to the body.

Item (iii) assessed pupils' ability in identifying food nutrients found in milk. The question asked:

(iii)   Which food nutrients are found in milk?

    A   Protein and vitamin

    B   Fat and vitamin

    C   Carbohydrate and fat

    D   Protein and fat.

Most of the pupils chose the correct response D, *protein and fat*, because they had good understanding on the types of nutrients found in milk.

On the other hand, the pupils who chose incorrect responses A, B, or C, had no understanding about food nutrients found in milk. For example, the pupils who chose distractor A, *protein* and *vitamin*, B, *fat and vitamin* and C, *fat and carbohydrates*, failed to understand that, the main nutrients found in milk are fat and protein.

Item (iv) assessed pupils' ability to identify the function of food rich in protein. The question asked as follows:

(iv)   What is the function of food rich in protein?
   A   To give the body energy and heat
   B   To build and repair the body
   C   To give the body heat and mineral
   D   To build and protect the body.

The pupils who chose the correct response B, *to build and repair the body*, had enough understanding about the importance of protein in the body.

However, some pupils failed to answer this item correctly by choosing distractors A, C, or D. These pupils lacked enough understanding on the function of food rich in protein. For example, the pupils who chose distractor A, *to give the body heat and energy*, did not realize that this is the role of food rich in carbohydrates. Pupils who chose distractor C, *to give the body heat and minerals* and D, *to build and protect the body*, lacked enough understanding on the different groups of food and their respective functions; since to give the body energy is done by food rich in carbohydrates and to protect the body is done by food rich in vitamins.

Item (v) assessed pupils' ability to identify a disease that is not caused by eating contaminated food. The question asked:

(v) The following diseases are caused by eating contaminated food, **except**

A typhoid

B diarrhoea

C cholera

D malaria.

The analysis shows that, many pupils chose the correct response D, *malaria*, because they had good understanding about the causative agents of diseases. These pupils understood that, malaria is caused by a microorganism that is spread by a female anopheles mosquitoe and not by eating contaminated foods. However, some of the pupils chose distractors A, *typhoid*, B, *diarrhea* and C, *cholera*. These pupils, did not understand the demand of the question as the word "**except**" was not considered. Thus, the pupils gave answers by considering only the diseases that are caused by eating contaminated food.

Question 2: Perform Scientific Investigation and Technological Discovery

The question was a matching items, comprised five premises in List A and seven responses in List B. The pupils were required to write the letter of the correct answer in the given brackets. The question asked as follows:

Answer items (i) - (v) by matching statements on the actions of environmental destruction in **List A** with their corresponding

meaning in **List B**. Write the letter of the correct answer in the given brackets.

List A	Answer	List B
(i) Pouring chemicals and garbage into ponds and rivers.	( )	A. Environmental destruction
(ii) Keeping many animals in a small piece of land.	( )	B. air pollution
(iii) The result of water, air and land pollution.	( )	C. water pollution
		D. soil erosion
(iv) Spreading of garbage and chemicals into the soil.	( )	E. soil becomes fertile
(v) Increased smoke and dust in the atmosphere.	( )	F. land pollution
		G. increased amount of rainfall

The question assessed the pupils' ability to identify the effects of the actions of environmental destruction. The statistics indicate that the general performance of the pupils in this question was good since out of 1,702,779 pupils who attempted this question 1,086,723 (63.82%) passed. However, 616,056 (36.18%) of the pupils failed. The distribution of the pupils' performance is shown in Figure 2.
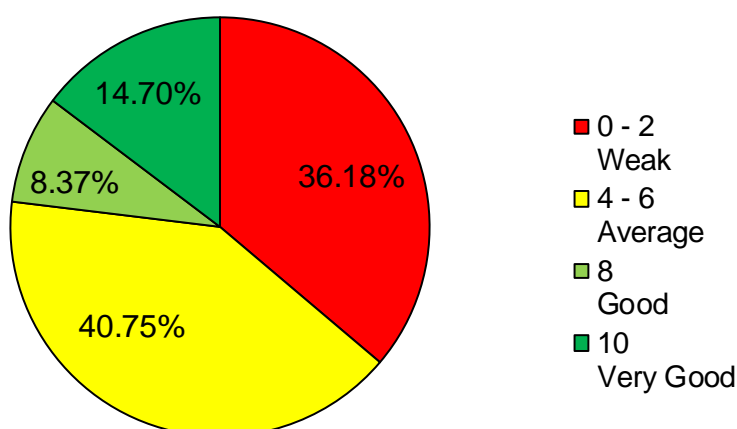
Figure 2: The Summary of the Pupil's Performance in Question 2

Figure 2 shows that 63.83 per cent of the pupils performed well in this question by scoring from 4 to 10 marks. Among the pupils who performed well, 14.70 per cent scored all the 10 marks. These pupils were competent enough in identifying the effects of the actions of environmental destruction.

Despite the good performance in this question, 36.18 per cent of the pupils performed poorly as they scored from 0 to 2 marks. These pupils failed to choose the correct responses in almost all of the items or managed to answer just only one item. The analysis of the pupils' responses showed that, they failed to make correct matches because they were not keen enough in reading and understanding the demand of the question. For example, in responding to part (i) which asked, *pouring chemicals and garbage into ponds and rivers*, majority of the pupils chose distractor A, *environmental destruction*, instead of C, *water pollution*. These pupils failed to recognize that any action that involves addition of unwanted materials in ponds and rivers leads to water pollution. This signified that, these pupils had a general understanding on the concept of environmental destruction

which in turn influenced them to provide a collective response in this part of the question. Others who chose distractor F, *land pollution*, failed to understand that, pouring of chemicals into the ponds and rivers pollute water and not land.

Item (ii) required the pupils to match the results of keeping many animals in a small piece of land with their corresponding meaning. The correct answer was D, *soil erosion*. Some of the pupils who failed in this item chose F, *soil pollution*. These pupils did not have clear understanding about the effects of keeping many animals in a small piece of land. As a result, they failed to differentiate between soil erosion and soil pollution. Besides, there were pupils who chose distractor E, *soil becomes fertile*. These pupils failed to understand that, a large number of animals reared in a small land affect the soil hence, it is easier to be eroded by water or wind. In addition those who chose A, *environmental destruction*, failed to recognize the specific effect resulting from raising a large number of animals in a small land.

Item (iii) required the pupils to match the result of water, air and land pollution with its corresponding meaning. The correct response was A, *environmental destruction*. Many pupils who failed to answer correctly on this item chose D, *soil erosion*, and some wrote G, *increased amount of rainfall*. These pupils failed to understand that, in totality, environmental pollution is the act which pollutes water, air and land. Thus, they wrote responses that were conflicting with the requirement of the question. Moreover, some pupils chose distractor C, *water pollution*, B, *air pollution*, E *soil becomes fertile* and F, *land pollution*. These pupils were not keen in reading the items and understand them, since they used only one word which was present

in the actions of environmental destruction, for example, water and correlate it with the meaning in list B.

Item (iv) required the pupils to match the action of spreading garbage and chemicals into the soil with its corresponding meaning. The correct answer for this item was F, *land pollution*. Many pupils who got right on this item had sufficient knowledge on different actions that may cause land pollution.

On the other hand, some pupils chose distractor E, *soil become fertile.* These pupils failed to understand that, garbage which cause soil fertility are those from animals and plants remains and not chemicals. Likewise, the pupils who chose distractor D, *soil erosion*, did not understand about the sources of soil erosion which are cutting down trees, keeping large number of animals in a small area, failure to adhere to the principle of good farming and not spreading garbage.

Item (v) required the pupils to match the action of increasing smoke and dust in the atmosphere with its corresponding meaning. The correct response was B, *air pollution*. Pupils who chose the correct answer had clear understanding on the effect of smoke and dust in the air.

On the other hand, most of the pupils who failed to choose the correct answer wrote A, *environmental destruction*. These pupils provided the collective answer because environmental destruction is divided into various forms including air, water and land. Likewise, some pupils selected distractor G, *increased amount of rainfall.* These pupils had a wrong concept that, the presence of smoke and dust on the atmosphere increases the amount of clouds hence

increased rainfall which is not true. Moreover, some pupils selected distractors C, *water pollution* and F, *land pollution*. This signified lack of enough knowledge regarding the corresponding meaning of the action of increasing dust and smoke in the atmosphere.

Question 3: Perform Scientific Investigation and Technological Discovery

The question consisted of five items. The question asked: Answer items (i) - (v) by choosing the correct word from the box and write it in the space provided.

reflection, refraction, absorption, blocking, dispersion, penetration

(i)   What happens when light passes through one medium to another?
         _____

(ii)   What happens when light meets a transparent object?
         _____

(iii)   What happens when light hits a shinning object?
         _____

(iv)   What happens when light hits a black coloured object?
         _____

(v)   What happens when the light meets drops of water in the air?
         _____

The question tested pupils' ability to identify the properties of light as it passes through one media to another or meets different objects. Statistics indicate that out of 1,702,779 (100%) pupils who attempted this question, only 492,619 (28.93%) passed the

question. A large per cent of the pupils (71.07%) failed. Generally, this question was the most poorly performed as compared to all other questions in this assessment. The statistics of the pupils' performance in this question are as shown in Figure 3.
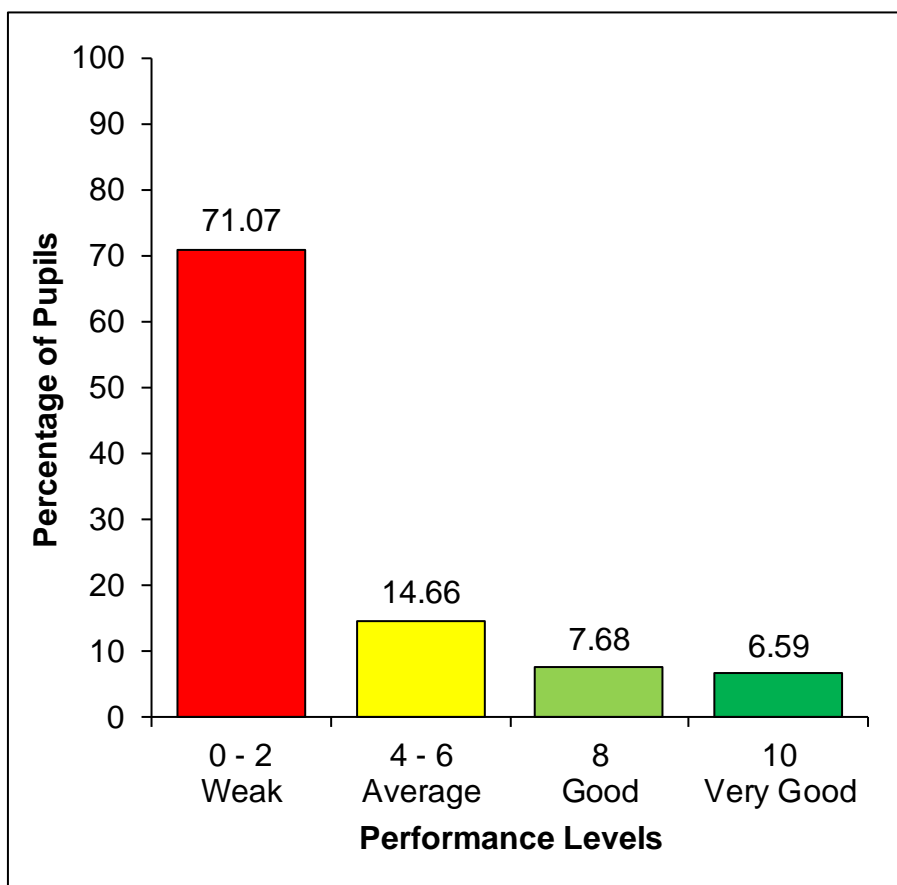

Figure 3: The Summary of Pupil's Performance in Question 3

Figure 3 shows that 71.07 per cent of the pupils failed as they scored 0 to 2 marks. On the other hand, 14.66 per cent of the pupils scored from 4 to 6 marks, 7.68 per cent scored 8 marks and 6.59 per cent scored all the 10 marks allocated for this question.

The analysis of the pupils' responses indicates that, the pupils who scored from 0 to 2, failed to fill the correct responses in almost all the items and some of them got only one item correct. These pupils

were incompetent in identifying different characteristics of light as it passes or meets various objects. For example, they failed in item (i), which required them to choose the word that implied the action of light when it passes from one medium to another. Though the correct answer was *refraction*, most of the pupils selected a distractor, *penetration*. These pupils did not understand that, when light passes from one medium to another, it bends. This is caused by the change in velocity of light due to difference in density between the two media.

Item (ii) required the pupil to choose the word that explained the action of light when it meets a transparent object. The correct response was *penetration*. Majority of the pupils chose distractor, *absorption,* instead of the correct response *penetration*. These pupils did not know that absorption occurs when light hits black objects. Transparent objects allow light to penetrate through them and the light continues travelling in a straight line. In addition, pupils who chose the distractor, *reflection,* did not know that reflection is the act of bringing back the light rays after they hit a shining object.

Item (iii) required the pupils to choose the word that referred to the action of light hitting on the shinning object. The pupils who chose the word, *reflection,* were correct. These pupils had sufficient understanding on the behaviour of light when it hit a shining object like a mirror. They realized that shining objects tend to reflect light. Analysis of the pupils' responses showed that majority of them chose the distractor, *dispersion*. These pupils did not understand that light rays are dispersed after penetrating a medium which allows them to pass. For example, when light rays meet a drop of water, they will penetrate and then spread into seven different

colours which make a rainbow. Thus, light cannot be dispersed by the shining object rather it will be reflected. Moreover, some of the pupils chose the distractor, *penetration.* These pupils did not know that shining objects are normally covered at one side thus, they cannot allow light to penetrate. For example, mirrors are painted on one side different from glasses which are free for light penetration in all sides. Moreover, some pupils chose distractor, *refraction*. These pupils did not know that refraction goes together with penetration. Light is refracted after passing through a different media which allows it to penetrate like water and glass.

Item (iv) required the pupil to choose a word that implied the action of light to hit a black object. Pupils who chose the word, *absorption,* were correct. These pupils had adequate understanding on the behaviour of light when it hit black objects. Most of the pupils who failed in this item, chose the word, *dispersion*. These pupils did not understand that black colour is like a barrier that hinders the passage of light and hence, it tends to absorb it. Also, they failed to integrate the knowledge they have learnt in classes with real life situations. The pupils were supposed to remember that, if you wash both black coloured and white coloured clothes, the black coloured cloth will dry much faster than the white because of their ability to absorb light energy. Moreover, the pupils who chose the distractors, *refraction* and *reflection,* were not aware of the correct property of light rays when they meets a black object.

Item (v) required the pupil to choose a word that referred to the action that happens when light meets drops of water in the air. The correct answer was, *dispersion,* because when the light rays hit a drop of water, it disperses into seven different colours. The pupils

who answered correctly had adequate knowledge of the properties of light which helped them to differentiate one property from the other. Majority of the pupils who failed in this question chose the distractor, *penetration*. These pupils did not understand that the penetrated light must continue to travel in straight line without changing its velocity. These responses from the majority of the pupils show that, they were not competent regarding the behaviours of light. The pupils failed to associate the local experience of observing the rainbow during and after rains with what they have learnt in the classroom. Extract 3.1 presents a sample of weak responses provided by one of the pupils.

(i)	What happens when light passes through one medium to another?
	Reflection .
(ii)	What happens when light meets a transparent object?
	Refraction . blocking .
(iii)	What happens when light hits a shinning object?
	penetraction :
(iv)	What happens when light hits a black coloured object?
	abo ,
(v)	What happens when the light meets drops of water in the air?
	Refraction .

Extract 3.1: A sample of pupils' poor responses in question 3.

In Extract 3.1 a pupil filled the blanks for all items of the question by choosing the words which were not representing the named behaviour of light.

Nevertheless, few pupils (28.93%) were able to answer 2 to 5 items correctly, and scored 4 to 10 marks. Among them, only 6.59 per cent answered correctly 4 to 5 items hence scored 8 and 10 marks which

16

indicates good and very good performance, respectively. These pupils were competent in identifying the properties of light. They were able to recognise the correct words related to the behaviour of light when it hits various objects. Extract 3.2 represents a sample of good response from one of the pupils.

(i)	What happens when light passes through one medium to another?
	refraction
(ii)	What happens when light meets a transparent object?
	penetration
(ii)	What happens when light hits a shinning object?
	reflection
(iv)	What happens when light hits a black coloured object?
	absorption
(v)	What happens when the light meets drops of water in the air?
	dispersion

Extract 3.2: A sample of pupils' correct responses in question 3.

In Extract 3.2, a pupil correctly identified the behaviours of light when it passes or hits various objects.

2.2 Section B: Short Answer Questions

The analysis of the pupils' responses in section B was based on the questions which required the pupils to rearrange the given statements in chronological order and fill in the blanks by interpreting the pictures provided. The pupils were required to attempt all the questions in this section.

Question 4: Health Care and Environment

The question comprised five jumbled statements describing the steps of the digestion process in the alimentary canal. The pupils were required to rearrange the statements to form a logical flow step by step and fill in the blank space provided. The question asked:

You are given steps A - E of the digestion process in the alimentary canal. Arrange the steps by **writing sentences** in good serial order. Write the sentences in the space provided.

A   The faeces get out of the body through the anus.
B   Food is digested and absorbed in the small intestine.
C   Food enters in the mouth.
D   Food passes through the gullet/oesophagus to the stomach.
E   Water and minerals are absorbed in the large intestine and leave food leftovers.

The question assessed pupils' ability to identify the steps involved in the digestion of food from ingestion to egestion. The pupils' performance in this question was average since out of 1,702,779 (100%) pupils who attempted this question, 786,572 (46.19%) passed. The rest, 916,207 (53.81%) pupils failed. Figure 4 presents the summary of the pupils' performance in this question.
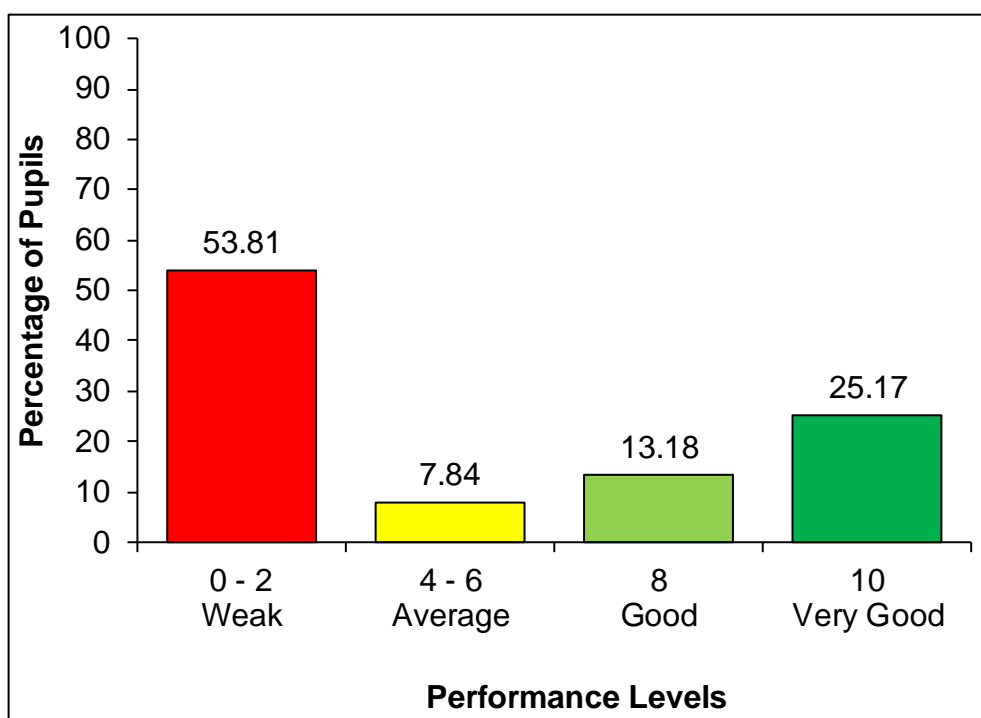
Figure 3: Summary of Pupils' Performance in Question 4

Figure 4 shows that out of 46.19 per cent of the pupils who passed this question, 25,17 per cent scored all the 10 marks allocated to this question. Moreover, 18.88 per cent scored 4 to 6 marks and 2.14 per cent scored 8 marks. The pupils who scored 10 marks, were competent in identifying steps of the digestion process in the alimentary canal thus, they managed to rearrange the steps 1 to 5, logically. In addition, these pupils showed to have mastered properly the reading and writing skills which enabled them to read the sentences, understand and hence write the sentences in sequence from the first step to the last step. Extract 4.1 is a sample of good responses from one of the pupils.

Steps	Sentence
(i) Step 1	Food enters in the mouth
ii) Step 2	food passes through the gullet/oesophagus to restomich
(iii) Step 3	Food is digested and absorbed in the small intestine
(iv) Step 4	Water and minerals are absorbed in the large intestine and leftovas
(v) Step 5	The faeces get out of the body through the anus

Extract 4.1: A sample of correct response in question 4.

In Extract 4.1, the pupil correctly arranged all the steps of digestion process in the alimentary canal from step one to five.

Further analysis of Figure 4 also shows that, 53.81 per cent of the pupils failed to respond correctly to this question. These pupils could not rearrange correctly any of the steps. Some pupils got only the first statement correctly thus, scored 2 marks. The pupils who scored lower marks in this question, were incompetent in identifying the correct steps of the digestion process. Some of them could not read and comprehend the statements thus, arranged them incorrectly. In rearranging the sentences, most of them started with step D, *Food passes the oesophagus to the stomach,* instead of C, *Food enters in the mouth*. This rearrangement was due to lack of concentration in reading sentences and understanding steps of digestion process. In addition, analysis of pupils' responses shows that, those who failed in this question wrote unclear sentences while others did not write anything. This suggests lack of Reading, Writing

and Arithmetic (3R) skills. Extract 4.2 shows a sample of weak responses from one of the pupils.

Steps	Sentence
Step 1	water and minerals are absorbed in the large inte Stine and leave food leftovers
Step 2	Food enters in the and absorbed in the same sma ll intestine
Step 3	FOOd enters in the mouth
Step 4	Food passes through the Bullet /085 ophagus to the stomach
Step 5	The Factes getd and and absorbed in the small intestine

Extract 4.2: A sample of pupils' poor responses in question 4.

In Extract 4.2, a pupil rearranged all the statements incorrectly. The pupil could not properly create the letters which can easily be read, implying incompetency in 3R skills.

Question 5: Understanding the Basics of Science and Technology

The question had five items. In each item (a) to (e), a pupil was required to study the picture and answer the question that followed. The question asked:

Observe the following pictures and then answer the questions that follow:

(a) Which two devices represent modern ways of communication?

   (i) _____

   (ii) _____

(b) Which two devices are used as traditional ways of communication?

   (i) _____

   (ii) _____

(c) Which device is **no**t used in communication?

   _____

(d) How is the device with an antenna useful in daily life?

   _____

(e) Which device gives information without producing sound?

   _____

The question assessed pupils' understanding of the devices used for communication. The statistics show that out of 1,702,779 (100%) pupils who attempted the question 1,219,990 (71.65%) pupils

passed and 482,789 (28.35%) failed. Generally, this question was the most well performed as compared to others in this assessment. The analysis of the pupils' performance in this question is summarized in Figure 5.
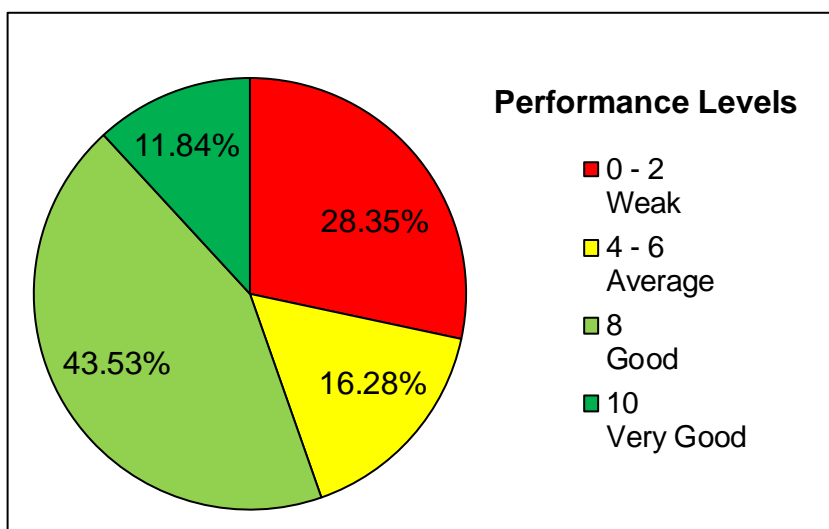

Figure 5: Summary of the Pupils' Performance in Question 5

Figure 5 shows that out of 71.65 per cent of the pupils who passed this question, 33.63 per cent scored from 4 to 6 marks, 26.18 scored 8 marks and 11.84 scored all the 10 marks allotted to this question.

The pupils who got high scores in all parts of the question were competent in identifying different devices that are used in communication. Also, they were competent in observing and interpreting the pictures. Thus, they managed to answer most of the items of the question correctly. Extract 5.1 shows a sample of correct responses from one of the pupils..

(a) Which two divices respresent modern ways of communication?
  (i) __Television__
  (ii) Telephone

(b) Which two devices are used as traditional ways of communication?
  (i) __Horn__
  (ii) __Drum__

(c) Which device is **not** used in communication?
  _____ ⚡ __Car__ _____

(d) How   is   the   device   with   an   antenna   useful   in   daily   life?
  __To watch Some news__

(e) Which device gives information without producing sound?
  __Newspapper__

Extract 5.1: A sample of pupils' correct responses in question 5.

In Extract 5.1, a pupil answered all the items correctly. The pupil was able to identify modern and traditional ways of communication.

On the other hand, 28.35 per cent of the pupils had low performance as they scored 0 or 2 marks. These pupils failed to fill-in the correct responses in almost all the items. While a few of them managed to answer correctly only one item. The analysis of the pupils' responses shows that, majority of them were incompetent in identifying the communication devices provided. Hence, they failed to interpret the pictures and yet others failed to recognize the demand of the question.

For example, in responding to part (a) of the question which asked: Which two devices represent modern ways of communication? Most of the pupils who failed to answer this question, wrote a *car,* instead of the *mobile phone, newspapers or television.* These pupils did not recognize that the car is a device used for transport and not for communication. Moreover, some of them wrote a *drum* and *horn* demonstrating that they lacked knowledge on the modern

24

communication devices. The drum and horn are traditional ways of communication. The Pupils who responded correctly to this part of the question, understood the demand of the question and were aware of the modern communication devices thus, they managed to observe and interpret the pictures correctly.

Item (b) asked as follows: Which two devices are used as traditional ways of communication? Majority of the pupils answered well this part of the question by writing, *horn* and *drum*. These pupils had adequate knowledge of traditional ways of communication. However, some of them wrote *television, a car* and *magazine*. These pupils did not know that the television and magazines are modern ways of communication while a car is for transportation and not for communication.

Item (c) asked: Which device is **not** used in communication? Most of the pupils failed to answer correctly this part of the question because they were mentioning the devices that are used for communication such as a *phone, television, horn and drum,* contrary to the requirement of the question. This suggests that, some pupils did not understand the requirement of the question. They were expected to identify the device which is **not** used for communication. Besides those, some of them wrote different answers such as; *a watch, refrigerator* and *a pen* which were not part of the given pictures. This again suggests that these pupils could not follow the demand of the question. They were supposed to answer all the parts of this question by using the pictures provided. These pupils did not realize that, of all the given devices, the car was not a device for communication.

In part (d), the pupils were required to explain the way in which a device with an antenna is important in daily life. Majority of the pupils failed to mention the importance of the device with an antenna. Some of them wrote incorrectly, *horn* and *car*. Others wrote *phone, drum* and *magazine.* These responses suggest that, the pupils did not understand the meaning of the word antenna. They failed to recognize a device with an antenna hence, failed to answer the question correctly. Some pupils who scored high marks in this part of the question wrote correct responses such as; to provide news, educating and entertaining. This shows that these pupils were competent enough as they were able to identify a device with an antenna which was a *television* and managed to explain its importance.

Part (e) of the question required a pupil to name a device that gives information without producing any sound. Majority of the pupils were able to identify a correct device as they wrote, *newspapers*. These pupils were competent in identifying the communication devices that do not produce sound. The pupils who wrote incorrect responses gave a variety of devices that produce sound like *drum, television* and a *phone*. This shows that these pupils did not understand how those devices operate in communication. Extract 5.2 illustrates a sample of incorrect responses from one of the pupils.

```
(a) Which two divices respresent modern ways of communication?
    (i) foni
    (ii) Drawh
(b) Which two devices are used as traditional ways of communication?
    (i) Drawm
    (ii) Car

(c) Which device is not used in communication?
    foni The oNff

(d) How   is   the   device   with   an   antenna   useful   in   daily   life?
    maShine

(e) Which device gives information without producing sound?
    fovotwn Prane
```

Extract 5.2: A sample of pupils' poor responses in question 5.

In Extract 5.2, the pupil failed to identify and name the devices correctly in all the items of the question. He/she incorrectly wrote the word phone as "foni" and drum as "drawn".

3.0 EVALUATION OF THE PUPILS' PERFORMANCE IN EACH COMPETENCE

Science and Technology subject paper assessed the competencies of *Health Care* and *Environment*, *Understand the Basics of Science and Technology* and *Perform Scientific Investigation and Technological Discovery*.

The analysis of statistics of each competence shows that, the competence of *Understand the Basics of Science and Technology* had good performance of 71.65 per cent. However, the competence of *Perform Scientific Investigation and Technological Discovery* and *Health care and Environment* had an average performance of 46.38 and 45.45 per cent, respectively.

Further analysis of the competence shows that, the competence of *Understand the Basics of Science and Technology* has decreased by 0.85 per cent as compared to the year 2019. Also, the competence of *Perform Scientific Investigation and Technological Discovery* and *Health Care and Environment* have decreased by 4.52 and 28.93 per cent, respectively. The summary of the performance of the pupils has been shown in Appendices A and B in each competence. Furthermore, the pupils achieved the highest performances of 71.65 in question 5 while question 3 had the least performance of 28.93 per cent.

4.0 CONCLUSION

The general performance of the pupils for the 05 Science and Technology subject in 2020 Standard Four National Assessment was average since 54.49 per cent of the pupils, passed the assessment. The pupils who passed had adequate knowledge about the competences assessed. The pupils who performed poorly did not have sufficient understanding about the different competences assessed. In addition, some of them failed to adhere to the demand of the question.

5.0 RECOMMENDATIONS

In order to improve the performance of the pupils in the National Assessment from the average performed competences to good and very good, the following are measures recommended:

(a)   Teachers should guide pupils to perform different experiments regarding characteristics of light in the competence of *Perform Scientific Investigation and Technological Discovery*. This will help the pupils to

understand and have long term memory. Also, the competence should be taught by relating daily life environment about characteristics of light, such as the occurrence of rainbow and images on mirrors.

(b)   In teaching the competence of *Health care and Environment*, teachers should use the approach of learning by doing like arranging of groups of natural food stuffs and using charts to show different groups of foods.

A COMPARISON OF THE PUPILS' PERFORMANCE IN EACH COMPETENCE IN 2019 AND SFNA 2020 SCIENCE AND TECHNOLOGY

S/N	Competence	SFNA 2019				SFNA 2020			
		Performance on each Question		Average Performance	Remarks	Performance on each Question		Average Performance	Remarks
		Question Number	% Performance			Question Number	% Performance		
1	Understand the Basics of Science and Technology	5	70.80	70.80	Good	5	71.65	71.65	Good
2	Perform Scientific Investigation and Technological Discovery	4	64.00	50.90	Average	2	63.83	46.38	Average
		2	37.80			3	28.93		
3	Health care and Environment	1	88.10	74.80	Good	1	44.70	45.45	Average
		3	61.50			4	46.19		

A SUMMARY OF THE PUPILS' PERFORMANCE IN EACH COMPETENCE IN 2019 AND SFNA 2020 SCIENCE AND TECHNOLOGY