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) 2021

SCIENCE AND TECHNOLOGY

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05E SCIENCE AND TECHNOLOGY

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PREFACE

This report has been prepared to give feedback to pupils, teachers, policy makers, curriculum developers and other education stakeholders on how pupils responded to the assessment questions.

The report shows the analysis of the response to each question and identifies how pupils were able or not able in various competence faced during answering respective questions. The report also has identified the reasons which made the pupils to respond correctly or incorrectly as per the needs of the question. The analysis of pupils' responses shows that the pupils who performed well had enough knowledge on the competences that were assessed. On the other hand, the pupils who did not perform well, lacked knowledge on the competences assessed. Moreover, some pupils lacked reading and writing skills and failed to make description on the requirements of the question.

National Examinations Council of Tanzania believes that, this report will give light to different education stakeholders and other concerned authorities so as to improve Teaching process and thereafter results of standard four pupils in the coming assessments.

The National Examinations council of Tanzania would like to convey sincere gratitude to examination officers and all others stakeholders who participated in the preparation and completion of this report.

Dr. Charles E. Msonde

EXECUTIVE SECRETARY

1.0 INTRODUCTION

This report deals with the Standard Four National Assessment in the Science and Technology subject conducted on 28th October 2021. The assessment aimed at measuring the competence stipulated on the Science and Technology syllabus for standards III and IV.

A total of 1,560,615 pupils which is equal to 92.80 per cent sat for this assessment. A total of 1,369,606 pupils which was equivalent to 87.76 % passed. On the other other hand 190,950 pupils (12.24 %) failed. The statistics show that the performance of the pupils in 2021 decreased for 7.42 and 0.11 per cent compared to year 2019 and 2020.

The assessment paper consisted of five (5) questions which further contained 25 items. The paper had two sections; A and B. Section A had three (3) questions with a total of fifteen (15) items. Each item was worth 2 marks to make a total of 30 marks in this section. Section B constisted of two (2) questions with a total of ten (10) items, and each item was worth two (2) marks to make a total of 20 marks. Therefore, the total marks for all the questions in this assessment were 50. Pupils were supposed to attempt all the questions.

Section A consisted of multiplechoice items, matching items, and filling in the blanks by using the words provided in the box. In section B, pupils were supposed to read a passage and then to answer questions by writing the correct answers in the spaces provided. Also, they were supposed to study the picture and answer the questions.

Analysis of pupils' responses in this assessment was based on assessing the quality of responses supplied by the pupils in responding to questions. Also, the analysis has provided the number of pupils who attempted each question and the percentage of their performance. Furthermore, the reasons for pupils' ability or inability to supply correct responses according to the questions are provided in this report.

In analysing the performance of the pupils on each question, three parameters have been used. For the per centage 0-33, 34-66 and 67-100 the performance is considered to be poor, average or good, respectively. Moreover, the charts used to show the perfomances on individual questions. Also, extracts of samples of good and poor responses have been provided to present the quality of responses given by the pupils in response to particular questions.

2.0 ANALYSIS OF PUPILS' PERFORMANCE PER QUESTION

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

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

Section A comprised multiple choice questions, matching items and filling in the blanks. Each question constisted of five items. Pupils were required to answer all questions. Analysis of pupils' performance on those questions is as follows;

Question 1: Applying Fundamentals of Science and Technology

This question consisted of 5 items. In each item (i - v) the pupil was required to choose the letter of the correct response from the given four alternatives (A – D) and to write it in the box provided. This question assessed the pupils' competence in the application of Information and Communication Technology (ICT) specifically in communication.

A total of 1,560,631 pupils attempted this question of whom 1,096,444 (70.3%) responded correctly to most parts of the question. On the other side, 464,187 (29.7%) pupils failed to identify the correct response. Generally, pupils had good performance on this question compared to other questions in this assessment since 70.3 per cent of the pupils were able to answer 2 to 5 items correctly. Figure 1 shows the summary of pupils' performance on this question.

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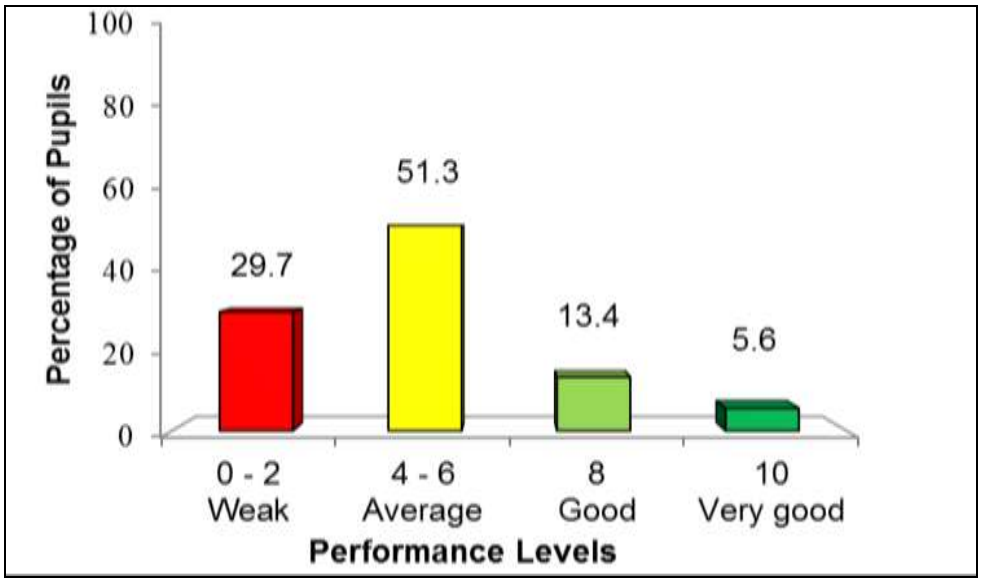


Figure 1: *The summary of pupil's performance on question 1*

Figure 1 shows that most of the pupils (51.3%) scored 4 to 6 marks. Moreover, 13.4 per cent of the pupils scored 8 marks and 5.6 per cent scored all the 10 marks allocated for this question. On the other side, 29.7 per cent of the pupils failed to provide correct responses in all items or scored only one item correctly. Thus, they scored 0 or 2 marks.

Analysis of pupils' responses showed that, most of the pupils (70.3%) were competent in applying the knowledge of information and communication technology. The pupils who failed (29.7%) chose incorrect responses in most parts of the assessment. These pupils were incompetent in applying information and communication technology, since they either failed in all the five items or got only one item correctly.

For example, in item (i) which assessed pupils' ability to identify the function of an antenna in the radio by asking:

(i) What is the function of an antenna in the radio?
   A Tuning the sound
   B Receiving signals
   C Tuning stations
   D Amplifying volume

The analysis shows that, the pupils who were able to choose the correct response B, *receiving signals,* had good understanding about the parts of the radio and their functions. Hence, they recognized

that the function of an antenna in the radio is to receive electromagnetic signals from the communication station.

On the other hand, the pupils who responded incorrectly were incompetent in understanding the parts of the radio and their functions. For example, those who opted for distractor A, *tuning the sound* did not understand that, tuning the sound in the radio is done by the volume control button and not the antenna. Also, those who opted for distractor C, *tuning stations,* had insufficient knowledge that, the function of tuning stations in the radio is done by the tuning knob. Those who chose distractor D, *amplifying volume,* failed to understand that the function of amplifying volume in the radio is done by the speaker. This signifies that those pupils were incompetent on the parts of the radio and their functions.

Item (ii) assessed the pupils' ability to identify communication devices. The question asked:

(ii) Which modern devices are used for communication?

A Telephone, radio and television

B Drum, whistle and television

C Radio, newspaper and horn

D Telephone, drum and horn

The correct response for this item was A, *telephone, radio and television*. The pupils who chose A, had sufficient knowledge concerning modern and traditional devices of communication. They understood that telephone, radio, television, computer internet and newspaper are modern communication devices while drum, whistle

and horn are traditional tools used in communication. Hence, they managed to differentiate modern devices from traditional devices.

On the other hand, pupils who did not perform well on this question were incompetent in modern and traditional communication tools. For example, those who chose distractor B, *drum, whistle and television,* did not understand that drum and whistle are traditional communication devices. Likewise, those who chose distractor C, *radio, newspaper and horn* and distractor D, *telephone, drum and horn*, did not understand that drum and horn are traditional communication devices.

Item (iii) assessed pupils' ability to identify how pictures and texts are communicated in the television. The question asked as follows

(iii) How are pictures and texts communicated in the television?

A Through the speaker

B Through the screen

C Through the antenna

D Through the remote

Pupils who chose the correct response B, *through the screen,* were competent enough in understanding parts of the television and their uses. They were able to identify that pictures and texts are communicated through the screen in the television. Also, they were able to relate the content of the question with what they normally see when watching television at their homes or other places.

However, some pupils failed to answer this item correctly by choosing distractors A, C or D. These pupils were incompetent in

understanding the parts of the television and their functions. For example, the pupils who chose distractor A, *through the speaker*, did not realize that the role of the speaker is to amplify volume and not to display text and pictures. Pupils who chose distractor C, *through* the *antenna*, lacked enough knowledge on the function of the antenna in the television since the antenna collects/receives sound and picture signals. Those who chose distractor D, *through the remote,* lacked understanding on the roles performed by the remote in the television which are to adjust volume, search for channels and operating external devices like the DVD.

Item (iv) tested pupils' understanding on companies that provide cellular network services in Tanzania, by asking:

(iv) Which company **does not** provide cellular network service in Tanzania?
A TTCL
B VODACOM
C TECNO
D TIGO

The correct response for this item was C, *TECNO*. The pupils who chose C had adequate knowledge regarding companies which provide cellular network services in Tanzania. These pupils understood that the TECNO Company is a telephone company which produces TECNO telephones but does not provide cellular network services in Tanzania.

However, some pupils failed to answer this item correctly by choosing distractors A TTCL, B VODACOM or D TIGO. These pupils

misunderstood the question. They chose the companies that provide cellular network services in Tanzania like receiving and sending money, bill payments and communication. These pupils were not aware of the companies that provide cellular network services and those that produce telephones. They did not understand that the TECNO company produces TECNO mobiles but the cellular network is provided by communication companies such as TTCL, VODACOM and TIGO.

Item (v) tested the pupils' ability to identify the name of the calls made when assistance is needed immediately. The question asked:

(v) How do you call the calls made when assistance is needed immediately?
A Radio calls
B Important calls
C Voice calls
D Emergency calls

The correct response to this item was D, *emergency calls*. The pupils who chose response D were aware of different calls made in society. These pupils understood that emergency calls are made when an emergency event, has happened, or an event that has occured unexpected like, an accident or when someone suddenly falls sick. Either these calls have special numbers that are known within the society, for example emergency calls for a police assistance, number 112 can be used.
On the other hand, the pupils who chose distractors A, B or C, lacked enough understanding of the calls made when assistance is

needed immediately. Pupils who chose distractor A, *radio calls*, lacked enough understanding concerning radio calls. Radio calls are used by special groups (eg. the police force) for communicating particular issues/matters among themselves. Likewise, those who chose distractor B, *important calls*, had insufficient understanding concerning important calls. They did not realize that important calls are the ones made when communicating very important matters. Likewise, other pupils opted for distractor C, *voice calls*. These pupils had inadequate knowledge that all calls mentioned are voice calls used for calling and receiving so as to get quick assistance.

Question 2: Maintaining Health and the Environment

The question consisted of five (i –v) matching items. The pupils were required to match the symptoms of diseases in **list A** with the corresponding diseases in **list B** and write the letter of the correct answer in the brackets provided. The question was as follows:

Answer items (i) to (v) by matching the symptoms of diseases in **list A** with their corresponding diseases in **list B**. Write the letter of the correct answer in the brackets.

List A	Answers	List B
(i) Tightening of parts of the body and bending of the neck	(…..)	A. Tuberculosis B. Diabetes C. Tetanus D. Diarrhoea E. Measles F. Asthma G. Cholera
(ii) Occurrence of rashes in the body	(…..)	
(iii) Excreting a stool in form of rice water	(…..)	
(iv) Frequent urination	(…..)	
(v) Whistle voice during breathing	(…..)	

The question itended to assess the pupils' competence on identifying diseases and their symptoms. Pupils who perfomed well were able to match the symptoms and the corresponding diseases correctly. On the other hand, those who failed to match correctly showed incompetence in understanding diseases and their symptoms.

A total of 1,560,631 pupils attempted this question of whom, 784,449 (50.3%) responded correctly. On the other side, 776,182 (49.7%) pupils failed to identify the correct response. Generally, this question had an average performance since 50.3 per cent of the pupils were able to answer 2 to 5 items correctly. Figure 2 provides the summary of the pupils' performance on this question.

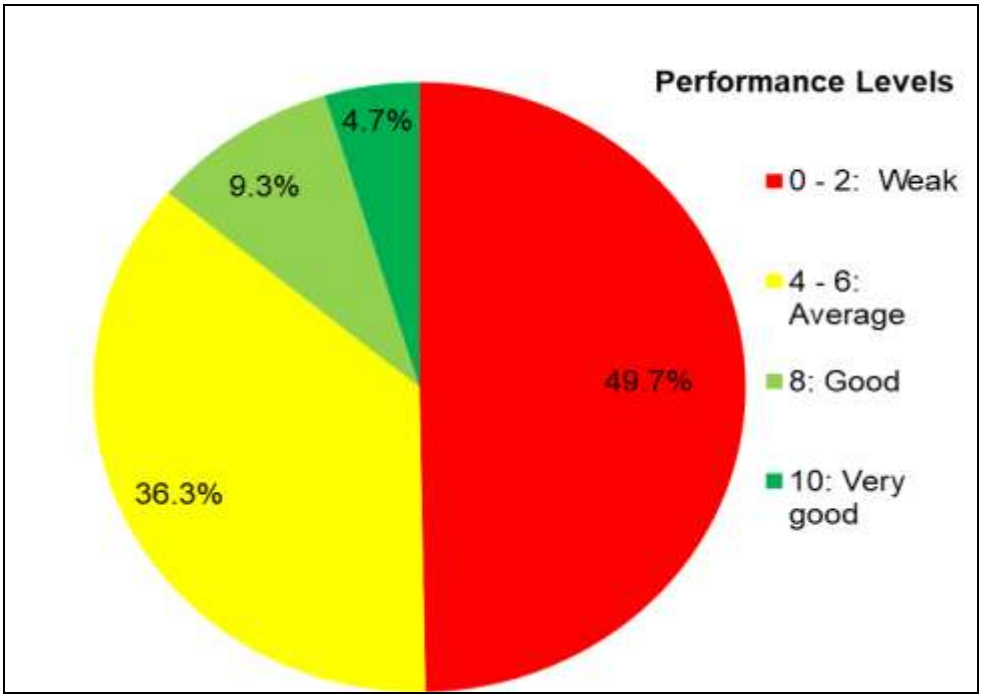


Figure 2: *The summary of pupil's performance on question 2*

Figure 2 shows that 49.7 per cent of the pupils failed this question. In this category pupils scored between 0 and 2 marks. Moreover, 36.3 per cent scored 4 or 6 marks and 9.3 percent scored 8 marks. Only few pupils (4.7 per cent) were able to score all the 10 marks allotted this question.

Further analysis of pupils' responses show that most pupils (50.3 %) were able to answer 2 to 5 items correctly. This indicates that these pupils had competence on identifying diseases and their symptoms. For example, in item (i) which required the pupils to match items pertaining to the tightening of parts of the body and bending of the neck with corresponding diseases. Pupils, who opted the correct answer C, *tetanus*, were competent in identifying the symptoms of

tetanus. They understood that tetanus is a disease characterized by high fever, headache, tightening of parts of the body like jaws, and bending of the neck.

By contrast, pupils who failed in this question (49.7%) were incompetent in identifying diseases and their symptoms. Among them 23.2 per cent failed to match all the five items. Thus, they scored 0 marks. Moreover, 26.5 per cent matched only one item correctly thus they scored 2 marks. For example, those who opted for distractor E *measles*, were not aware of the symptoms of measles which are high fever, red eyes, swollen eyelids, small skin rashes, diarrhoea and vomiting. Likewise, some opted for distractor A *tuberculosis*. These had insufficient competence on the symptoms of tuberculosis which are frequent coughing, fever, weight loss, sweating at night, tiredness and loss of appetite.

Item (ii) required the pupils to identify the disease whose symptoms include the occurance of rashes in the body. The, pupils who were able to match the correct response wrote E, *measles*, had competence on the symptoms of measles which are high fever, red eyes, swollen eyelids, small skin rashes, diarrhoea and vomiting. On the other hand, some pupils matched distractor C *tetanus*. These pupils were incompetent in the symptoms of tetanus which are tightening of the parts of the body and bending of the neck, high fever, headache and loss of consciousness.

Item (iii) required the pupils to identify the disease characterized by excreting a stool in form of rice water. Those who were able to match correctly and Chose G, *cholera*, had competence in the symptoms of

cholera which are vomiting, excreting stool in form of rice water, thirst, and body weakness. Apart from that, pupils who failed in this item chose D, *diarrhoea*. These pupils lacked knowledge of the symptoms of cholera from those of normal diarrhoea. The symptoms of normal diarrhoea include body weakness and loss of body weight. Item (iv) required the pupils to identify the disease characterized by frequent urination. Pupils who managed to identify the correct answer B, *diabetes*, had competence in the symptoms of diabetes which are thirst, frequent urination, low vision, weight loss and poor healing of wounds. On the other hand, most of the pupils who failed to answer correctly this item chose D, *diarrhoea*. These pupils had poor knowledge about the symptoms of diarrhoea which are body weakness and loss of body weight.

Item (v) required pupils to identify the disease characterized by whistle voice during breathing. The pupils who were able to match correctly F, *asthma*, had competence in the symptoms of asthma which are whistle voice during breathing, frequent coughing, difficulty to breathe, chest tightness and pain. However, some pupils who chose incorrect answer A, *tuberculosis*, had inadequate competence in the symptoms of tuberculosis which include coughing, fever, weight loss, sweating at night, tiredness and loss of appetite. Hence, they failed to differentiate the symptoms of asthma from those of tuberculosis clearly. Totally, pupils who failed to match the symptoms of diseases whith the corresponding disease correctly were not competent in understanding different diseases and their symptoms.

Question 3: Perform Scientific Investigation and Technological Discovery

The question consisted of five items. For each item (a – e), pupils were required to arrange the steps of scientific investigations provided in the box from the first step to the last (fifth one). The question asked as follows:
Answer items (a) to (e) by writing the steps of scientific investigations provided in the box.

analysis of data, interpretation of data, formulation of hypothesis, performing experiment, identification of the problem.

(a) First step _____
(b) Second step _____
(c) Third step _____
(d) Fourth step _____
(e) Fifth step _____

This question assessed pupils' competence on performing scientific investigation specifically on identifying the correct sequence of the steps involved in scientific investigation.

A total of 1,560,631 pupils attempted this question of whom 367,982 (23.6%) responded correctly to 2 to 5 items. On the other side, 1,192,649 (76.4%) pupils failed to identify the correct response in most part of the question. Thus, they scored 0 or 2 marks. Generally, this question had a poor performance as compared to other questions in this assessment since 23.6 per cent of the pupils were

able to answer 2 to 5 items correctly. Figure 3 provides the summary of pupils' performance on this question.

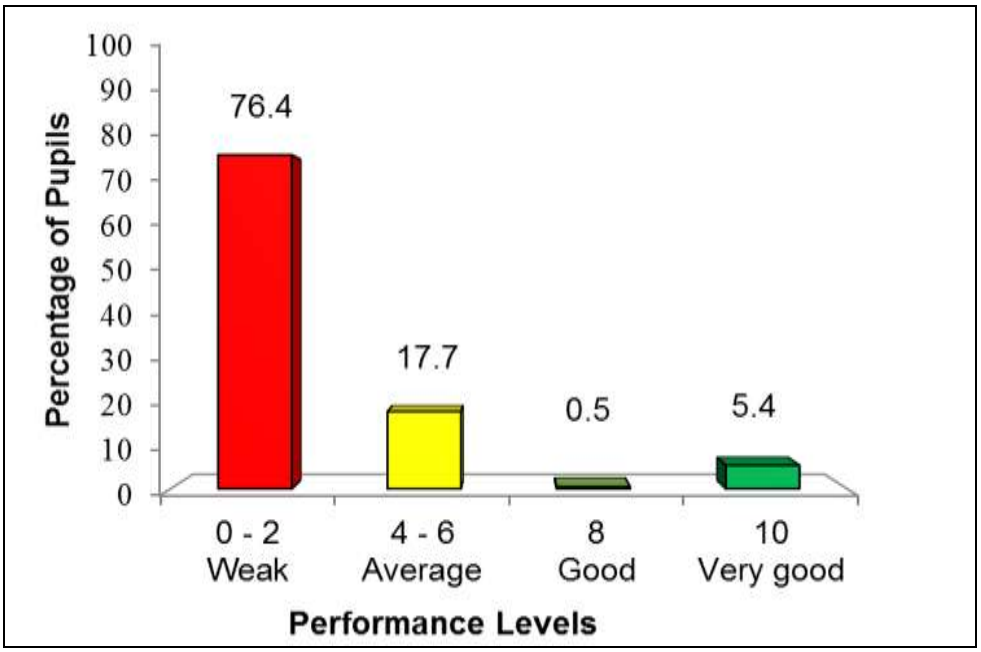


Figure 3: *The summary of pupil's performance on question 3*

Figure 3 shows that most of the pupils (76.4%) failed to identify correct steps to be followed in performing a scientific investigation. From which 55.0 per cent failed in all steps hence they scored 0 marks. However, 21.4 per cent scored only one item and got 2 marks. Also, Figure 3 shows that only 5.4 per cent were able to score all items in this question.

Most of the pupils (76.4%) could not identify the correct steps to be followed during the performance of scientific investigation. These pupils lacked enough competence on the assessed concept and others could not understand the question. For example, some of the pupils could not identify the first step in performing scientific

investigation which is *identification of the problem*. These pupils did not understand that the first step in scientific investigation involves finding out the problem to be solved. Most of them incorrectly wrote *performing experiment* as the first step in item (a). These pupils did not understand that performing experiment involves a series of steps to follow in order to identify the cause of the problem. Therefore, the first step must be to identify the problem.

In item (b), the pupils were required to identify the second step involved in scientific investigation. Some of those pupils could not identify the step which is *formulation of hypothesis.* Most of them incorrectly wrote *data analysis* as the second step. These pupils did not understand that after identifying the problem researchers do formulate a hypothesis which is an intelligent guess about the cause of the problem under investigation. Data analysis is the third step which follows after experimentation.

Item (c), required the pupils to identify the third step involved in performing a scientific investigation which is *performing the experiment*. The pupils who failed to answer correctly this item did not understand that performing an experiment involves setting an experiment to test the hypothesis if it is right or wrong. During experimentation, pupils collect data using different methods. Most of them wrote *identifying the problem* since they were incompetent in the third step involved conducting a scientific investigation. They failed to understand that this is the first step and not the third step.

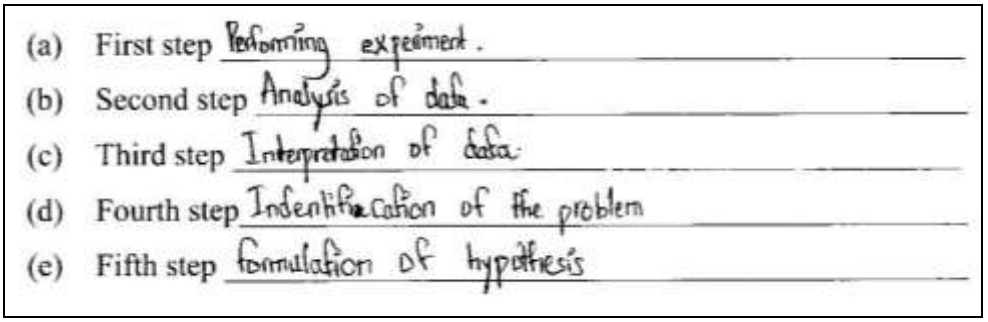
Item (d), required the pupils to identify the fourth step in performing a scientific investigation which is *data analysis*. The pupils who failed

to answer this item correctly had poor understanding of the next step after experimentation which is data analysis. They failed to understand that analysing data involves organizing, sorting and arranging data properly. The results may be presented using explanations, tables, or by using statistics presented in charts or graphs. Failure to identify the fourth step in performing scientific investigation was mainly due to failure to identify the previous steps. Thus, most of them wrote identifying the problem as the fourth step while it is the first step.

Item (e) assessed pupils' ability to identify the fifth step involved in performing a scientific investigation which is *interpretation of data*. The pupils who failed to choose the correct response were icompetent in identifying the correct sequence of steps involved in scientific investigation. They failed to understand that data interpretation involves giving the right feedback about the analysed data to get the correct meaning of the cause of the problem. Analysed data are presented in form of charts, graphs and tables so that people can easily read them without confusion. Thus, the final step in scientific investigation is interpretation of data after they have been analysed. The presence of some responses from the pupils who failed to identify the fifth step in performing a scientific investigation signifies that they had insufficient understanding of the steps to follow in conducting scientific investigation.

The pupils, who failed to identify the five steps that ought to be followed in performing a scientific investigation were incompetent in conducting scientific investigations. Hence, they failed to write the steps sequentially. Some of the pupils interchanged the steps

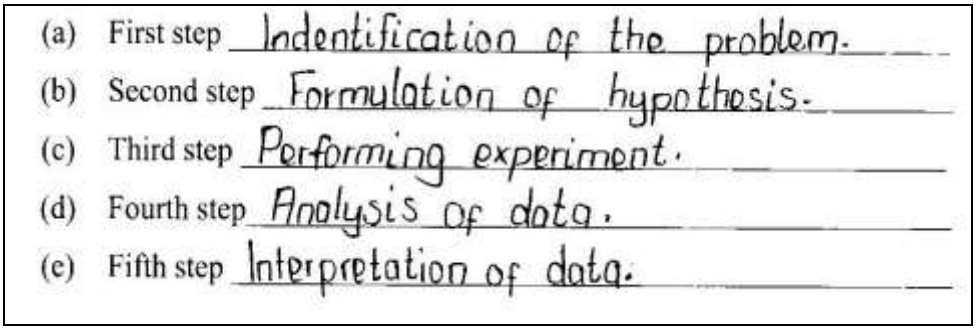
indicating that they did not know the correct sequence. Others wrote issues not related to steps of scientific investigation indicating that they did not understand the question since they were supposed to choose the steps provided in the box and not otherwise. Extract 1.1 is a sample of incorrect response from one of the candidates.


(a) First step Performing experiment.
(b) Second step Analysis of data.
(c) Third step Interpretation of data.
(d) Fourth step Indentification of the problem
(e) Fifth step formulation of hypothesis

Extract 1.1: *A sample of pupil's incorrect response to question 3*

In extract 1.1 the pupil interchanged the steps to be followed in performing scientific investigations instead of starting with identification of the problem, he/she began with performing the experiment.

The analysis of pupils' responses revealed that only a few pupils (5.4%) were competent in identifying the correct steps to follow in performing a scientific investigation. They were able to arrange correctly the steps which included identification of the problem, hypothesis formulation, performing the experiment, analysis of data and interpretation of data. Moreover, they understood the demand of the question as they wrote the given steps and not otherwise. Extract 1.2 provides a sample of a pupil who sequentially wrote correctly the steps to be followed when performing a scientific investigation.



Extract 1.2*: A sample of pupil's correct response to question 3*

Extract 1.2 shows a sample of a response of the pupil who managed to arrange all the steps involved in performing a scientific investigation in the right sequence.

2.2 Section B: Short Answer Questions

This section consisted of two compulsory questions. One of the questions required the pupils to read the passage and to answer the questions. The other question required pupils to observe the given pictures and then answer the questions.

Question 4: Maintaining Health and Environment

This question had a passage which the pupils were asked to read and answer the questions related to it. The question asked:

Read the following passage and answer items (a) to (e) by writing the correct answer in the space provided.

Wearing of dirty clothes causes bad smell to the body and sometimes skin diseases. Clean clothes make a person look smart and attractive. For clothes to be clean, they must be washed by

using clean water and soap. After drying, the clothes are supposed to be ironed so as to kill disease-causing germs. Also, ironing clothes makes a person who puts on the clothes look smart. When clothes are clean, they can be worn or kept in clean and dry place, like in the cases or drawers.

Questions

(a) What materials are required in washing clothes?

(i) _____

(ii) _____

(b) What is the effect of wearing dirty clothes?

_____

(c) Why do we iron clothes before wearing? Give one reason.

_____

(d) What kills the germs when ironing clothes?

_____

(e) Why clean clothes are kept in cases or drawers?

_____

This question assessed pupils' competence in applying principles of hygiene for good health and environment, specifically in body and garments cleanliness.

A total of 1,560,631 pupils attempted this question of whom 106,5020 (68.2%) responded correctly. On the other side, 495,611

(31.8%) pupils failed to identify the correct response. Generally, pupils had good performance on this question since 68.2 per cent of the pupils were able to answer 2 to 5 items correctly. Figure 4 gives the summary of pupils' performance on this question.

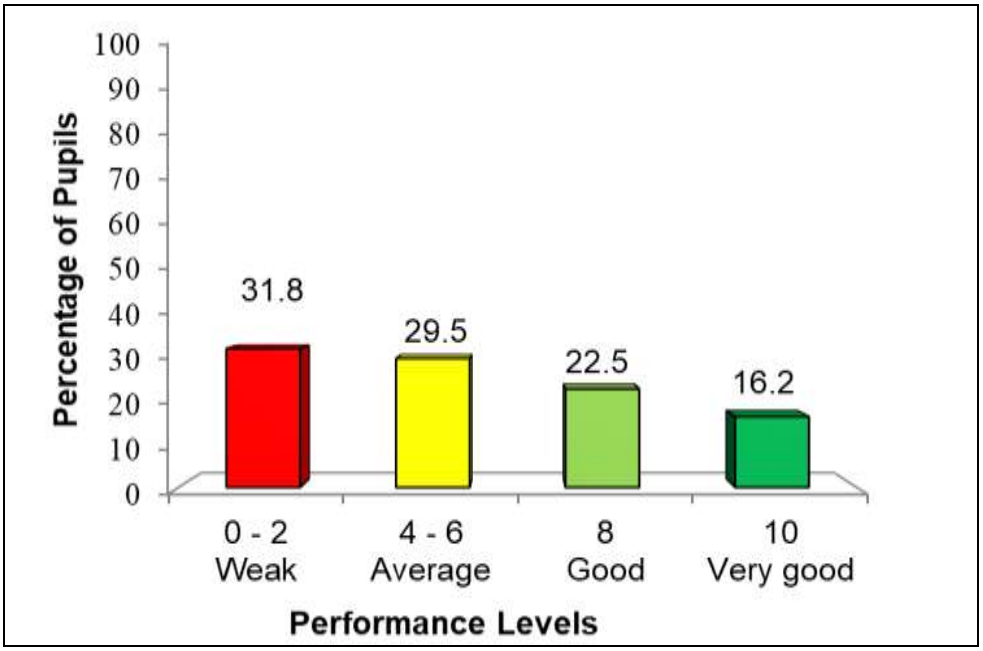


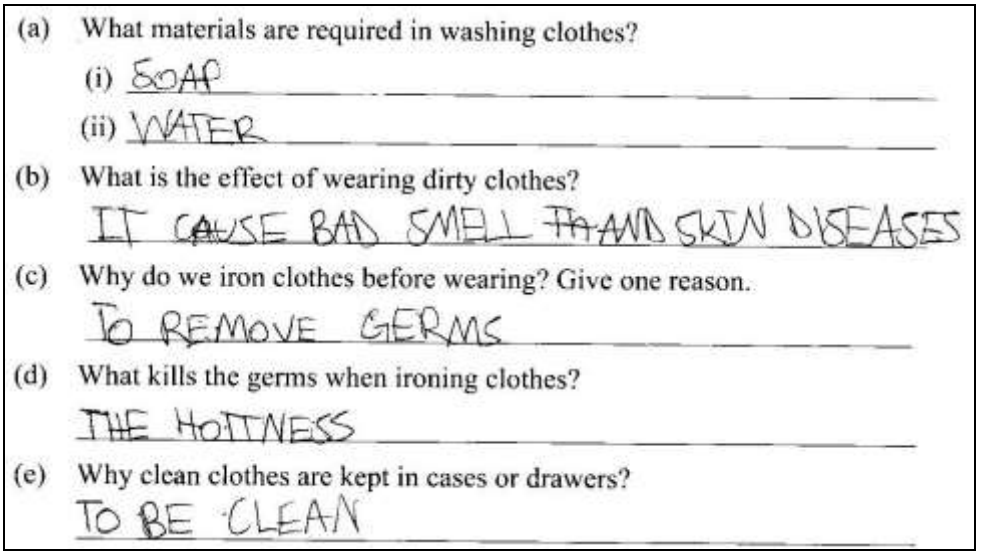
Figure 4: *The summary of pupil's performance on question 4*

Figure 4 indicates that most of the pupils (68.2%) were able to read the passage and abide by the instructions of the question about applying principles of hygiene for good health and environment. Among of them 31.8 per cent were able to score 0 to 2 marks. Also, Figure 4 shows that only 16.2 per cent managed to score all items.

Further analysis of pupils' responses shows that most of the pupils (68.2%) performed ranging from average to excellent on this question. These pupils had competence on applying principles of hygiene for good health and environment. Thus, they responded

correctly to 2 to 5 items. For example, in responding to item (a) which required pupils to mention materials required in washing. Most of the pupils responded correctly by writing *clean water and soap*. This indicates these pupils managed to read and understand the passage; hence, they were able to identify the materials required for washing clothes. In addition, these pupils had properly mastered the reading and writing skills which enabled them to read, understand and write correct responses. Moreover, that may suggest those pupils wash clothes at their home using different materials including clean water and soap.

Extract 2.1 shows a sample of pupil's correct response to question 4.



Extract 2.1: *A sample of pupil's correct response to question 4*

Extract 2.1 shows a sample of a response of the pupil who managed to read the passage and responded correctly all items in question number 4.

On the other hand, there are pupils who failed to write correct responses and gave wrong answers instead. These pupils failed to read and understand the passage and use the information obtained to answer the asked questions. For example; some of them wrote *iron.* These pupils failed to understand that iron is used to iron clothes but not to wash them. Other pupils wrote different responses such as *washing dish*, *bucket* and *rope*. This signifies that these pupils misunderstood the question. They wrote correct materials used for washing clothes although the named tools were not mentioned in the passage.

Item (b) required the pupils to state the effect of wearing dirty clothes. Most of the pupils responded correctly by writing it *causes bad smell to the body and skin diseases*. These pupils managed to read and comprehend the passage. Also, they were competent in understanding the effect of wearing dirty clothes which include bad smell, skin diseases and body itching. On the other hand, most of the pupils who failed to respond correctly to this question wrote some meaningless words. This signifies that they lacked reading and writing skills.

Item (c) required the pupils to give one reason for ironing clothes before wearing them. This item required the pupils to identify importance of ironing clothes by mentioning one reason. Most of the pupils responded correctly by writing to *kill disease-causing germs and make someone look smart*. That indicates that these pupils managed to read and comprehend the passage. Also, the responses suggest that they were competent in the importance of ironing clothes. However, some pupils did not give the right answer for this

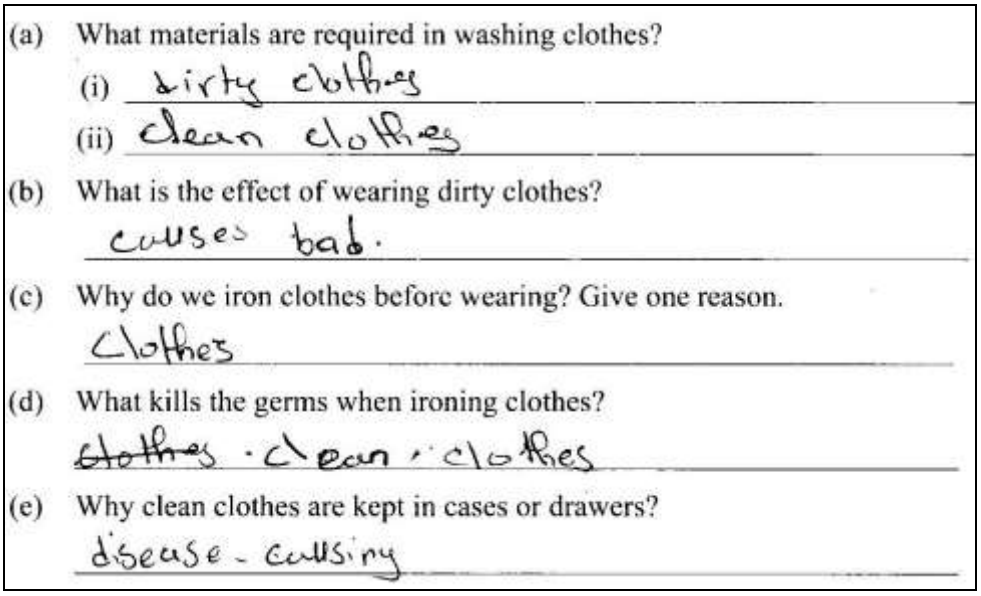
item as they lacked competence on reading and comprehending the passage, as well as understanding the question. For example, one pupil responded as follows: *We iron clothes so as to make them smart*. This was a correct response. However, it was not from the passage. Other pupils gave incorrect responses such as *catch, slaughter* and *kill.* These responses were meaningless as they did not relate to the context of the question.

Item (d) required the pupils to identify what kills the germs when ironing clothes. This item needed the pupils to apply the skills and knowledge they had regarding ironing clothes. A few pupils managed to provide a correct answer by writing *heat or fire of the iron*. This shows that these pupils had enough knowledge and skills on ironing clothes. Also, that could be indicative that ironing clothes is done at their homes frequently by using electric iron or charcoal iron. On the other hand, some of the pupils wrote incorrect responses like *iron*. These pupils had inadequate skills and knowledge regarding ironing clothes. They did not know that heat from the iron is what kills the germs but not the iron itself.

Item (e) required the pupils to give a reason on why clean clothes are kept in cases or drawers This item measured the pupils understanding regarding reasons for keeping clean clothes in cases or drawers. Most of the pupils managed to give correct reasons such as: *to be clean, avoid dusts, dry or clean places and avoid wetting*. Those pupils had good understanding on the importance of keeping clothes in cases or drawers. They knew that after washing and ironing clothes, they should be kept in clean, safe and dry places.

On the other hand, some pupils responded incorrectly by writing *to avoid diseases, to avoid dirty and to avoid bad smell* instead of *to be clean, avoid dusts, dry or clean places and avoiding wetting.* These pupils were not competent in understanding the importance of keeping clothes in clean, safe and dry places soon after washing and ironing them.

Furthermore 31.8 per cent of pupils failed to identify correct answers. These pupils failed in all five items or managed to respond correctly to only one item. This indicates that they had insufficient competence on applying the principles of hygiene for good health and environment specifically in body and garments cleanliness. Extract 2.1 shows a sample of pupil's incorrect response to question 4.


(a) What materials are required in washing clothes?
(i) dirty clothes
(ii) clean clothes
(b) What is the effect of wearing dirty clothes?
causes bad.
(c) Why do we iron clothes before wearing? Give one reason.
Clothes
(d) What kills the germs when ironing clothes?
~~clothes~~ · clean · clothes
(e) Why clean clothes are kept in cases or drawers?
disease - cutting

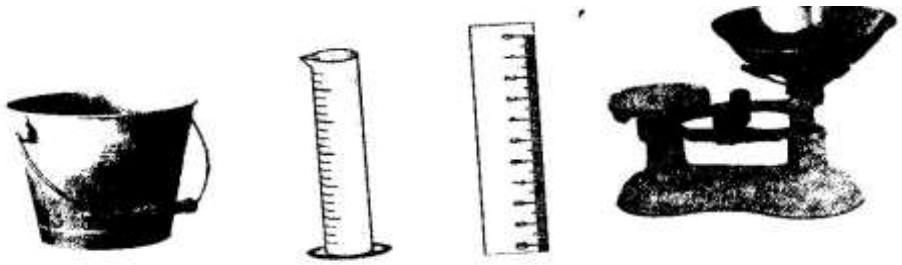
Extract 2.2 *A sample of pupil's incorrect response to question 4*

Extract 2.2 shows that the pupil failed to respond correctly to all 5 items. This may be caused by failure to understand the question.

This question required the pupil to read a given passage and use it to answer the questions given. For example, item (d) asked “what kills germs when ironing clothes? .This suggests that the pupil did not read the passage intensively and responded with “clean clothes which do not relate to the question.

Question 5: Applying Fundamentals of Science and Technology

This question had five (five) items. The pupils were required to observe the picture and then answer the questions. The question asked: Use the devices shown in the pictures to answer items (a) to (e). Write your answer in the spaces provided.



(a) Which device gives a non-standard measurement?

_____

(b) Which device measures correct volume of water?

_____

(c) Which device is used to measure the length of a desk?

_____

(d) Which device is used measure the mass of a substance?

_____

(e) Why the measurement given by the ruler is a standard measurement?

_____

The question assessed pupils' competence in identifying standard and non-standard measurement devices.

A total of 1,560,631 pupils attempted this question of whom 811,287 (52.0%) responded correctly in 2 to 5 items. On the other hand, 749,344 (48.0%) pupils failed to identify the correct response to all the five items or got only one item correctly. Generally, this question had an average performance since 52.0 percent of the pupils were able to answer 2 to 5 items correctly. Figure 5 provides the summary of pupils' performance on this question.

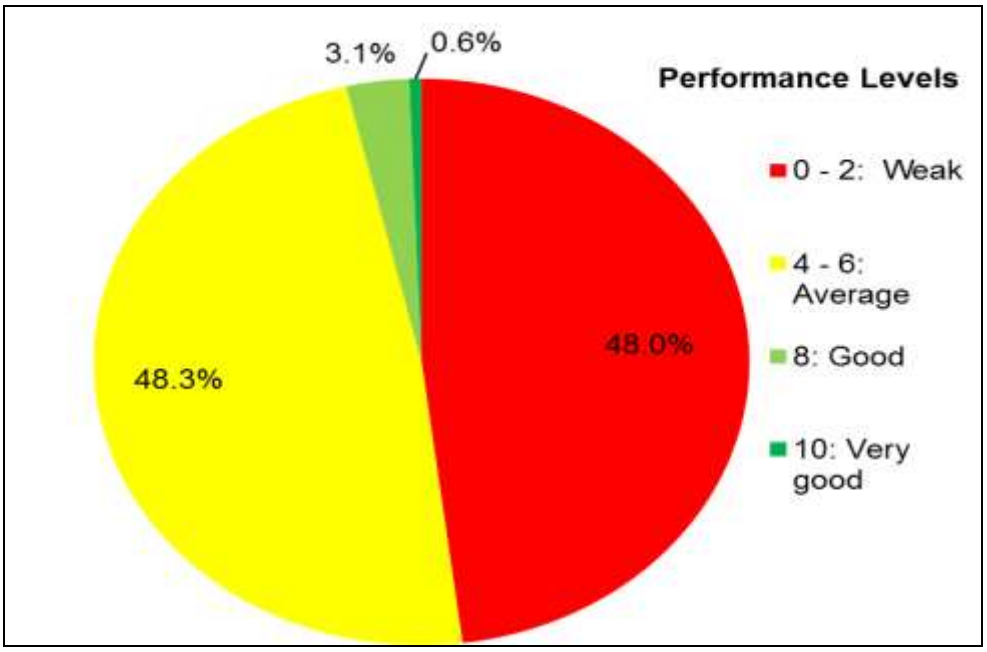
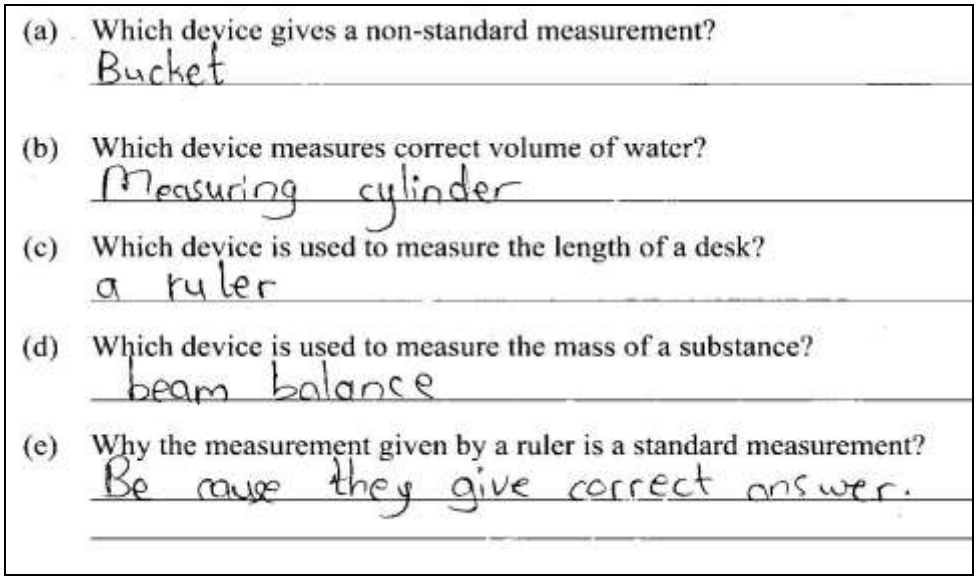


Figure 5: *The summary of pupil's performance on question 5*

Figure 5 shows that most of the pupils (48.3%) scored 4 to 6 marks. Moreover, 3.1 per cent scored 8 marks and 0.6 per cent scored all 10 marks in this question. On the other hand, 48 per cent of the pupils failed in all items or scored only one item. Hence, they scored 0 or 2 marks.

Figure 5 also shows that pupils who performed well (52%) on this question were competent in observing and interpreting pictures of instruments used in measurement clearly. Also, they were competent in relation to the uses of relevant instruments in measuring different quantities including standard and non-standard measurements. Extract 3.1 provides a sample of the pupil's correct response to question number 5.


(a) Which device gives a non-standard measurement?
Bucket

(b) Which device measures correct volume of water?
Measuring cylinder

(c) Which device is used to measure the length of a desk?
a ruler

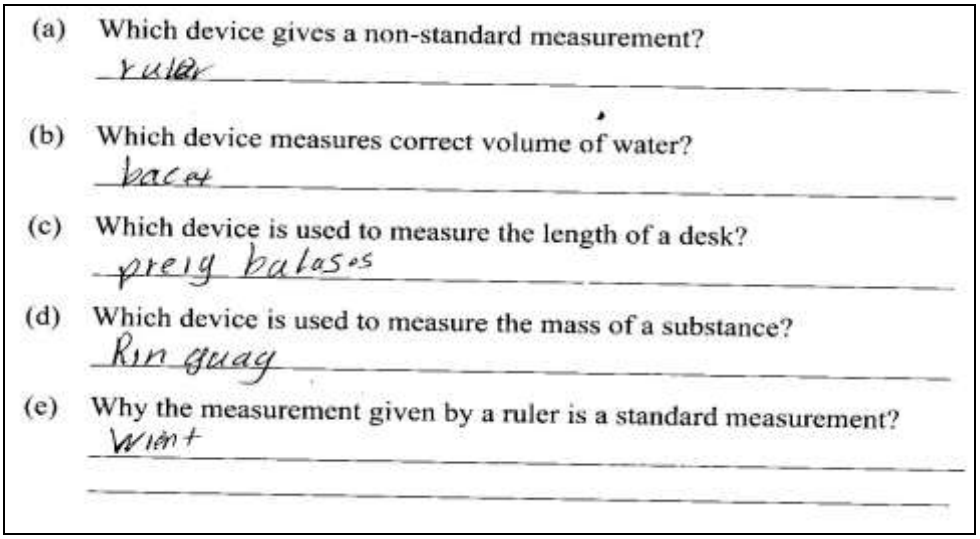
(d) Which device is used to measure the mass of a substance?
beam balance

(e) Why the measurement given by a ruler is a standard measurement?
Because they give correct answer.

Extract 3.1: *A sample of pupil's correct response to question 5*

Extract 2.1 presents a sample of the pupil who managed to respond correctly to all items in question number 5. This pupil had knowledge on investigating and interpreting pictures of the instruments used in measurement clearly.

On the other hand, some pupils performed poorly (48.0%) on this question. Therefore, they failed in all five items or thay managed to respond correctly to only one item. These pupils had limited competence in the concept of measurement or they failed to interpret pictures and their uses. Extract 3.2 provides a sample of pupil's who incorrectly responded to all items in question number 5.


(a) Which device gives a non-standard measurement?
ruler

(b) Which device measures correct volume of water?
bacet

(c) Which device is used to measure the length of a desk?
preig balases

(d) Which device is used to measure the mass of a substance?
Rin guag

(e) Why the measurement given by a ruler is a standard measurement?
Wint

Extract 3.2 *A sample of pupil's incorrect response to question 5*

Extract 3.2 shows that the pupil failed to respond correctly to all 5 items in this question. The pupil lacked competence in the concept of measurement or they failed to interpret devices in the pictures and their uses. For example, item (c) asked "Which device is used to measure the length of a desk?", Instead of providing a correct response "ruler", the pupil wrote "preig balases" which is the incorrect spelling of "beam balance" and it is not used to measure lengths but mass of substance.

Analysis of pupils' responses in each item shows that in responding to item (a) which required the pupils to identify a device which gives a non-standard measurement. Pupils who managed to give the correct answer *bucket* understood the requirement of the question and had enough knowledge about the devices used in standard and non-standard measurements.

Furthermore, these pupils had competence on observing and recognizing non standard measurement devices that give

approximated results and they depend on concesus of the users of those devices, for example; steps, bucket, bottle, use of finger and cup, and standard measurement devices give out results which are uniform and they not change anywhere for example; ruler, beam balances, measuring cylinders, watch and thermometer. On the other hand, pupils who failed to write the correct response wrote *busket.* These had limited knowledge regarding the devices used in standard and non-standard measurement. They did not understand that a busket is not a measurement device rather than used to carry different items.

Item (b) required the pupils to identify a device which measures volume of water correctly. Most of the pupils failed to write the correct answer measuring cylinder, instead they wrote; *syringe, jug and whistle*. These pupils had limited knowledge concerning standard measurement devices. Those who wrote *jug* did not understand that a jug does not give exact measurement instead it makes approximation. The pupils who wrote whistle, syringe or jug, they misinterpreted the picture of measuring cylinder by resembling it with whistle, syringe or jug. These pupils showed that they had never heared, seen nor read measuring cylinder anywhere. Some pupils wrote litre, these were thinking of measuring unit of volume like litre and millilitre instead of the measuring devices. For example, measuring cylinder, beaker and bucket. On the other hand, pupils who responded correctly wrote, *measuring cylinder*. They had enough skills and knowledge of the devices used in standard and non-standard measurements and therefore they managed to interpret the pictures correctly.

Item (c) required the pupils to identify a device used to measure the length of a desk. Most of the pupils were able to identify the correct device*, ruler*. That shows these pupils were competent in understanding the appropriate device used in measuring length. Therefore, they managed to identify ruler as the device used in measuring length. That also indicates that pupils use ruler in different activities in their studies. On the other hand, some pupils responded incorrectly, as they wrote *rope or jug*. Such a response indicates that these pupils were incompetent in identifying devices used in measuring different quantities.

Item (d) required the pupils to identify the device used to measure the mass of a substance. This item assessed pupils' understanding in identifying the devices used to measure mass. Most of the pupils responded correctly by writing *beam balance*. That shows that the pupils had adequate competence in understanding different devices used to measure mass. Also, pupils were able to interpret the device on the picture. That is basically because they normally see the device in the shops measuring different items. However, some pupils who responded incorrectly wrote *bucket* or *bottle*. Pupils in this category were not competent in understanding measurements specifically the devices used in measurements and the quantities to be measured. The pupils did not understand that bucket or the bottle are non-standard devices used to measure volume.

Item (e) required the pupils to give a reason on why the measurement given by the ruler is a standard measurement. This item required the pupils to identify the characteristics of standard measurement devices. Pupils who failed this question gave a

responses such as *ruler is long, because it measures length and width*. These pupils were incompetent in identifying characteeristics of standard measurement devices. On the other hand, some pupils responded correctly by writing; *it gives similar answers that do not differ from one place to another.* That indicates that the pupils understood the question and they had enough competence on the characteristics of a standard measurement devices. Hence, they recognized that ruler is a device for standard measurement of length.

3.0 EVALUATION OF PUPILS' PERFOMANCE ON EACH COMPETENCE

This assessment paper of Science and Technology was divided into sections A and B with a total of five questions. Section A consisted of three questions and Section B constisted of two questions. *The competences assessed were Maintaining health and Environment, Applying Fundamental of Science and Technology and Performing Scientific Investigation and Technological Discovery*.

Statistical analysis showed that pupils had average performance on competence in Appying fundamentals of Science and Technology (61.15%) and Maintaining Health and Environment (59.30%). On the other hand, competence on Performing Scientific Investigation and Technological Discovery had poor performance (23.60%).

Comparatively the performance of the competence in Standard Four National Assesment for three years consecutively (2019-2021) showed that the competence in Applying Fundamentals of Science and Technology was good it stood at 70.80 and 71.65 per cent for 2019 and 2020 respectively.

However, in 2021 the performance decreased to the average of 61.15 per cent. The competence in Maintaining Health and Environment dropped by 29.35 and 15.50 for 2020 and 2021 respectively as compared to that of 2019. Likewise, the competence in Performing Scientific Investigation and Technological Discovery decreased in performance for three years consecutively. The average performance was 50.90 and 46.38 for the year 2019 and 2020 respectively. For 2021 this competence had a poor performance of 23.60 per cent. Decreasing of performance in this competence was due to pupils' inadequate competence in identifying the correct sequences of steps to be followed in conducting scientific investigation. This situation was due to lacking of practise in data collection, interpretation and report writing in scientific investigation. The summary of statistical performance in each competence has been shown in **appendix.**

4.0 CONLUSION

Generally, the overall performance of the pupils on each competence in the Science and Techonogy subject for the 2021 was average. A total of 48.02 per cent of the pupils were able to score 4 to 10 marks. Analysis of the pupils' response shows that, the pupils were more competent in specific competence in using information and communication technology whereby question number 1 that measured the respective competence had a good performance of 70.3 per ecent. However, the pupils' performance on the competence in Peforming Scientific Investigation and Technological Discovery for year 2021 had decreased by 22.78 per cent as compared to that of 2020. This competence was measured in question number 3 which based on scientific investigation steps. Most pupils (76.4 %) failed to identify the correct sequence of the

steps to be followed to perform scientific investigation. This shows that these pupils lacked knowledge in this particular competence during teaching and learning process.

The National Examination Councils of Tanzania expects that the recommendations given in this report will be taken care of so as to improve the performance of the pupils in the future assessment.

5.0 RECOMMENDATIONS

In order to improve the performance of the pupils on the competence in Peforming Scientific Investigation and Technological Discovery, it is recommended that:

(a) Teachers should guide pupils to perform various practical activities on Scientific Investigation and then write investigation reports. This will enable pupils to be able to identify the correct sequence of the steps to follow when performing a scientific investigation.

(b) Teachers should design various project work that must be done by pupils' in groups that will assist them in engaging into practical activities and make them to recall what they learnt, thereafter to build up the competence expected.

APPENDIX

A COMPARISON OF THE PUPILS' PERFORMANCE ON EACH COMPETENCE IN 2020 AND 2021 SFNA SCIENCE AND TECHNOLOGY SUBJECT

No.	Competence	SFNA 2020				SFNA 2021			
		Question Number	Peformance in each Question (%)	Average performance on each competence (%)	Remarks	Question Number	Performance in each Question (%)	Avearge performance in each competence (%)	Remarks
1.	Applying fundamentals of Science and Technology	5	71.65	71.65	Good	1	70.30	61.15	Average
						5	52.00		
2.	Perform Scientific Investigation and Technological Discovery	2	63.83	46.38	Average	3	23.60	23.60	Poor
		3	28.93						
3.	Maintaining Health and Environment	1	44.70	45.45	Average	2	50.30	59.30	Average
		4	46.19			4	68.20		