AFRICAN POPULATION AND HEALTH RESEARCH CENTER

EDUCATION RESEARCH PROGRAMME: MATHEMATICS TEACHER ASSESSMENT TOOL

THIS TOOL SHOULD BE ADMINISTERED TO TEACHERS OF MATHEMATICS IN STD. 3 & 6 IN THE SCHOOL VISITED

GENERAL INSTRUCTIONS TO THE TEACHER

- Read these instructions carefully.
- It is important that you answer each question carefully and as accurately as possible.
- Respond to the questions by **simply circling the most suitable response** among the choices provided.
- Please return the completed questionnaire to the research assistant. All information in this questionnaire will be treated confidentially.
- Thank you very much for the time and effort you have put into responding to this questionnaire.

PART I: BACKGROUND INFORMATION

1.1   START TIME

1.2   DATE OF INTERVIEW   (DD/MM/YYYY)

1.3   FIELD INTERVIEWER'S (FI) CODE

1.4   FULL NAME OF THE TEACHER

1.4.1   GENDER OF THE TEACHER   01=FEMALE, 02=MALE

1.4.2   TEACHER'S DATE OF BIRTH   (DD/MM/YYYY)

1.4.3   TEACHER'S ID [**TO BE ASSIGNED AT DATA ENTRY**]

1.5   FULL NAME OF SCHOOL

1.5.1   GRADE(S) CURRENTLY TEACHING MATHS
01=1; 02=2; 03=3; 04=4; 05=5; 06=6; 07=7; 08=8; 09=CLASS 3 AND ANOTHER CLASS; 10=CLASS 6 AND ANOTHER CLASS 96=OTHER(SPECIFY)

1.6   CURRENT KENYA NATIONAL EXAMINATION INDEX FOR THE SCHOOL

| 1.7 | PREVIOUS KENYA NATIONAL EXAMINATION INDEX FOR THE SCHOOL | | | | | | |

1.8   FI: IN WHICH TOWN IS THE SCHOOL LOCATED?

1.9   FI: GIVE THE NAME OF THE DISTRICT WHERE THE SCHOOL IS LOCATED

1.10   START TIME FOR PART II & III

1.11   END TIME FOR PART II & III

PART II: MATHEMATICS ITEMS

1. As Mr. Makokha was assessing his learners' work from the day's lesson on multiplication, he noticed that Simuyu had invented an algorithm that was different from the one taught in class. Simiyu's work looked like this:

$$
\begin{array}{r}
983 \\
\times\ 6 \\
\hline
488 \\
+5410 \\
\hline
5898
\end{array}
$$

What is Simiyu doing here? (Mark ONE answers only)

A. Simiyu is regrouping ("carrying") tens and ones, but this work does not record the regrouping.
B. Simiyu is using the traditional multiplication algorithm but working from left to right.
C. Simiyu has developed a method for keeping track of place value in the answer that is different from the usual algorithm.
D. Simiyu is not doing anything systematic. He just got lucky – what he has done here will not work in most cases.

2. Mrs. Mwangi set her grade 6 Class the following problem:

Calculate the perimeter of the figure.

Sally answered the question this way:

I divided the figure into a rectangle and a square.
I then found the perimeter of each figure and added them.

2 cm

2 cm

2 cm   B   4 cm

2 cm   2 cm

8 cm

2 cm

$P = (2 + 8 + 2 + 8)$ cm   + $(2 + 2 + 2 + 2)$ cm

2 cm   A   2 cm

8 cm
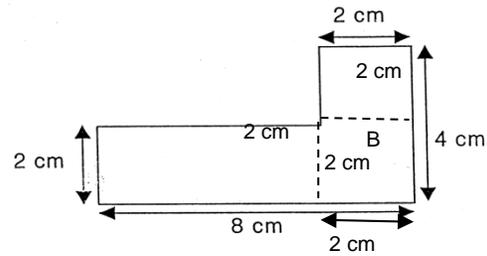
=   20 cm   +   8 cm

= 28 cm
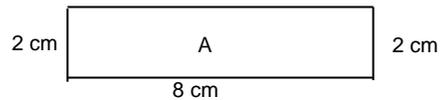
Makau **answered the question this way:**
I drew a line to make two rectangles, but did not separate them. I then calculated the perimeter like this:
$P = 2 + 6 + 2 + 2 + 4 + 2 + 8= 26$ cm

2 cm

6 cm   2 cm

2 cm   4 cm

8 cm   2 cm
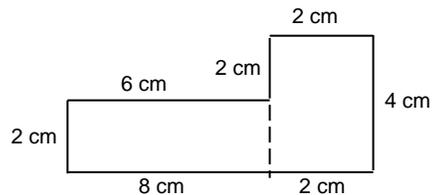
Which of the following is correct?-

   A. Sally is right.
   B. Makau is wrong because he did not use the middle line.
   C. Makau is wrong because he has put in an extra 2 cm.
   D. The correct answer is 20 cm

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3. Fatuma seems to have difficulty with some multiplication problems involving decimals, but solves other problems correctly. Look carefully at her solutions.

Which exercise is (are) incorrect? *Circle all that apply.*
   A.
   B.
   C.
   D.

Name: *Fatuma*

A. $6.45 \\ \times \ 3 \\ \overline{19.35}$

B. $32.7 \\ \times \ .5 \\ \overline{16.35}$

C. $21.8 \\ \times .4 \\ \overline{87.2}$

D. $4.35 \\ \times 2.3 \\ \overline{1305} \\ 870 \\ \overline{100.05}$

Look at Maitha's worksheet about fractions and use it to answer question 4, 5 and 6.

What Part is Shaded?   Name: *Maitha*

A.
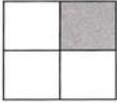
Write a fraction. $\frac{1}{3}$

B.
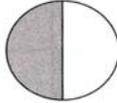
Write a fraction. $\frac{1}{2}$

C.
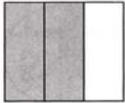
Write a fraction. $\frac{2}{1}$

D.
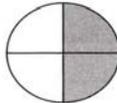
Write a fraction. $\frac{2}{2}$

4. Which answer(s) is/are correct? *Circle all that apply.*
   - A.
   - B.
   - C.
   - D.

5. How would <u>Maitha answer</u> the following two exercises using her incorrect procedure?
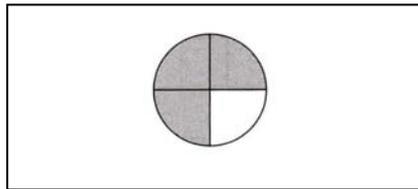
Write the fraction _____

6.
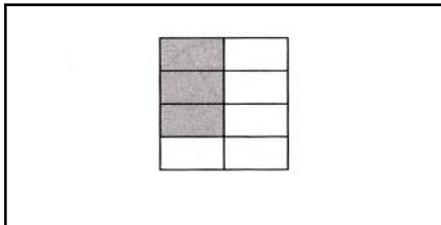
Write the fraction _____

7. In working out 42-17 using anl showed the work as follows:

$$
\begin{array}{cc}
4 & 2 \\
- \quad 1 & 7 \\
\hline
3 & 5 \\
\hline
\end{array}
$$

What is the cause of such an error?
   A. He subtracted 2 from 7 in the ones.

   B. He forgot to make change after borrowing.

   C. Inability to borrow

   D. There is no error.

8. A pupil worked out 45x37 and got 450. Which is the most likely reason why he got this answer?
   A. He added 3 to 7, got 10, and multiplied with 45.

   B. He multiplied 45 by 3 ones instead of 3 tens.

   C. He has no idea about multiplication.

   D. He simply multiplied 45 by the number ten.

9. A teacher wanted to introduce the number concept to her class. Name three pre-number activities the pupils can be involved in.
   A. Sorting, Classifying, Grouping

   B. Ordering, Sequencing, Classifying

   C. Pairing, Matching, Ordering

   D. Grouping, Sequencing, Matching

10. The sketch below shows a drawing of a building as seen from the front.
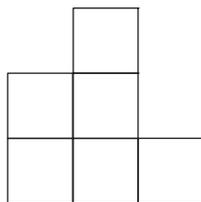
Which of the following sketches shows the **back view** of the building?

Circle the letter that shows the answer.
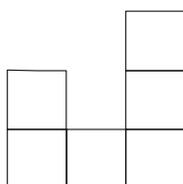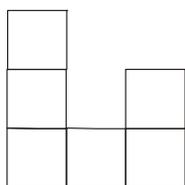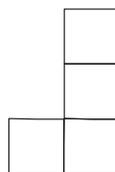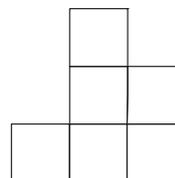
A   **B**   **C**   **D**

11.
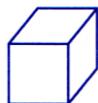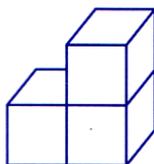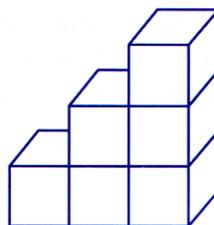
Step 1   **Step 2**   **Step 3**

Miss Musa is exploring number patterns with her class. She asks her class to find a pattern which will enable them to find the number of blocks in **any** Step. The class begins to explore the problem and come up with the following statements. Which of these is **not correct**?

A. Step 7 contains 26 blocks.

B. The number of blocks in Step n is calculated by: Number $= 1 + 2 + 3 + \ldots\ldots + n$

C. The number of blocks in Step n is given by: Number $= \frac{n(n+1)}{2}$

D. The number of blocks in Step 10 is given by: Number $= \frac{10^2 \times 10}{2}$

12. Mrs Karichu class conducted a survey of 100 learners to find who preferred playing video games and who preferred watching television. The class constructed the following table from the data:

	Prefer television	Prefer video game
Number of learners	40	60

Mrs Karichu asked the class to write statements based on this information. For each statement, indicate whether it accurately reports preferences of learners in the survey, by circling ACCURATE, INACCURATE, or NOT SURE.

	Accurate	Inaccurate	Not sure
A. The ratio of learners who prefer TV to all learners is 2:5	1	2	3
B. TV is 40% more popular than video games	1	2	3
C. Learners who prefer video games outnumber those who prefer TV by a ratio of 3 to 2	1	2	3
D. Learners prefer video games to TV by a ratio of 6 to 4	1	2	3
E. 4/6 of the learners prefer video games to TV	1	2	3
F. Video games are preferred by 20% more of the learners than TV is	1	2	3

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Steve is having difficulty solving percent problems. Take a look at his test paper and answer question 13 and 14.

13. Which exercise is (are) correct? Circle all that apply.

   A.

   B.

   C.

   D. All of the above

14. Which of the following problems is Steve likely to get correct using his procedure? Circle all that apply.

   A. All are correct

   B. Seventy is 14% of what number?

   C. What percent of 125 is 25?

   D. What number is 80% of 54?

PART III: Circle the MOST appropriate response

15. In preparing a test for your class you set the following stem of a multiple choice item. Kimonge takes 2 hours to walk from home to school at an average speed of 3km/h. His sister takes 20 minutes less to walk the same distance. What is her average speed? Determine the key for the item.
    A. 3 km/h
    B. $2\dfrac{4}{7}$ km/h
    C. 10 km/h
    D. 3.6 km/h

16. Describe a practical activity you would use to show the addition of 26+37
    A. Count 26 bottle tops, count 37 bottle tops, put them together and count how many they are in total, they will be 63. Conclude 26+37 is 63.
    B. Add 6 and 7 to get 13, write 3 in the ones column, carry 1 ten to the tens, add to 2 and 3 tens to get 6 tens. Conclude 26+37 is 63.
    C. Represent 26 and 37 in place value apparatus. Count the ones in the ones to get 13. Group 13 ones in 1 bundle of ten and 3 loose ones. Carry the one bundle of tens to the tens. Count the ones together, and then conclude 26+37 is 63.
    D. Represent 26 and 37 in place value apparatus. Count the ones in the ones to get 13. Carry one bundle of tens to the tens. Count the ones and tens together. Conclude 26+37 is 63.

17. Using an example like 12÷3, describe how you would introduce division of **whole numbers as grouping.**
    A. Using 12 bottle tops call out 3 pupils, give each a bottle top at a time until they are all finished. Ask how many each got.
    B. Using 12 bottle tops call out 3 pupils, give each 4 bottle tops.
    C. Using 12 bottle tops, give some pupils 3 bottle tops each, then ask how many pupils received 3 bottle tops.
    D. Using 12 bottle tops, call out 3 pupils, ask each to pick a bottle top until they are all finished.

18. You want to teach prime numbers to your class, using numbers 1 to 20. How would you do this?
    A. Tell pupils that all odd numbers are prime numbers.
    B. List all the numbers from 1 to 20 with their divisors, all the numbers with only 2 divisors, one and the number itself are prime numbers.
    C. Inform pupils that a prime number is a number with only 2 divisors, one and the number itself.
    D. List all the numbers from 1 to 20; let the pupils find all the prime numbers.

19. You intend to **introduce** to your class how to find the G.C.D of 12, 16 and 20. List down the steps you would use.
   A. List the multiples of each number, identify the common multiples, and select the greatest.
   B. List the numbers given, list their divisors.
   C. List the common divisors, identify the greatest.
   D. List the divisors of each number, identify the common divisors, and select the greatest common divisor.

20. Which of the following is the most appropriate when introducing a $\frac{1}{2}$ as part of a whole?
   A. Take an orange and cut it into two, each is a half.
   B. Take a strip of paper and cut it into two, each is a half.
   C. Take a circular cut out, fold through the middle and cut it along the fold, each is a half.
   D. Take a loaf of bread, cut it into two, each is a half.

21. Many children when asked to add 67+.35+2.4 will give the answer 1.26. Why is this? What must you emphasize in your teaching to help overcome this misunderstanding?
   A. No idea on addition of decimals, teach addition involving decimals.
   B. Ignored the decimal places initially, teach place value.
   C. Ignored the decimal places initially, align according to place values.
   D. No idea on place value, teach place value of numbers.

22. Explain how you would show your pupils to work out $2\frac{1}{3} \div 1\frac{1}{6}$
   A. Teach the concept of multiplication of a fraction by a fraction first.
   B. Teach the concept of changing mixed numbers to an improper fraction and reciprocals.
   C. Change the mixed numbers into improper fractions, get the reciprocal of the divisor, multiply the dividend by the reciprocal of the divisor, simplify.
   D. Change the mixed numbers into improper fractions, multiply the dividend by the divisor, simplify.

23. Describe the most appropriate practical activity you would involve your class to form an algebraic expression.
      A. Collect many items and count each type, assign letters to represent an item.
      B. Collect different items and count each type, assign letters to represent an item, form an algebraic expression to represent the total number of items.
      C. Collect different items, assign letters to represent an item, form an algebraic expression.
      D. Collect different items, ask learners to form algebraic expressions from these items.

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24. You have taught how to solve equations. Write down a question you would use to test mastery of this skill. Provide the solution.

    A. What is the value of X in X-3=5? :   **X-3-3=5-3, X=2**
    B. What is the value of Y in Y+6=9? :   **Y+6-6=9-9, Y=0**
    C. What is the value of M in $\frac{2}{3}$M=12?   **$\frac{2}{3}$ 1M=~~124~~, 2M=4, M=2**
    D. What is the value of K in 2(K-5) =10?   **2K-10=10, 2K=20, K=10**

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25. Describe the activities you would organize for your class in order to develop the concept of mass before introducing the Kg (Kilogram) as a unit of mass.
    A. Direct comparison, use an arbitrary unit and a beam balance to order objects from the lightest to the heaviest and vice versa.
    B. Estimating mass of objects, use a fixed unit to weigh objects.
    C. Direct comparison, use a kg mass and a beam balance to order objects from the lightest to the heaviest and vice versa.
    D. Estimating mass of objects, direct comparison.

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26. The following question appeared on a K.C.P.E paper. What is the approximate height of your teacher?

A	B	C	D
6 cm	170 mm	6 m	170 cm

What is the purpose of setting such questions?
    A. This topic is part of the syllabus.
    B. To test pupils' thinking.
    C. To test pupils' understanding of units of length.
    D. It is important to know their teacher's height.

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27. You have already taught your class how to tell and calculate time in a.m. /p.m. and 24 hour system. Write down a word problem that you would use to test the mastery in conversion of time from one system to the other.
    A. Koech worked in his shamba from 8 a.m. to 11 a.m. How long did he work in his shamba.
    B. A train left Mtito at 2200hrs and arrived in Mombasa at 4 a.m. How long did the journey take?
    C. Nekesa slept for 8 hours from 2000hrs. What time did she wake up?
    D. A matatu left Nakuru at 10 a.m. and took 7 hours to reach Busia. What time did it reach Busia?

28. Pupils in your class have learnt the idea of receiving/giving change in buying and selling. Write a word problem **based on a real life situation** that you would use to test the idea of giving/ receiving change.
    A. Said had a sh500 note. He changed this amount into sh50 notes. How many notes did he have?
    B. Mary went into a shop with a sh200 note. She bought a loaf of bread costing sh40. How much money was she given back?
    C. Okech had 2 sh1000 notes, 4 sh200 notes and 1 sh100 note. How much money did Okech have altogether?
    D. How many sh100 notes are there in a sh200 note?

29. Describe an activity that you would use to help your class to collect and record data.
    A. Ask pupils to say their ages.
    B. Ask pupils to measure their heights.
    C. Asking pupils to move to a point on a road and write the number and types of vehicles passing that point.
    D. Ask pupils to mention the number of siblings in their family.

30. The following were shoe sizes of 10 pupils in a standard 6 class.
    5, 4, 6, 7, 6, 5, 5, 4, 7, 5
    How would you help the pupils arrive at the modal shoe size, this being the first lesson on the mode?
    A. Arrange the shoe sizes in order starting from the least to the highest.
    B. Add up all the shoe sizes and divide by 10.
    C. Through inspection identify the shoe size that appears the most.
    D. Arrange the shoe sizes in order starting from the highest to the least.

31. Explain how you would lead your pupils to bisect a line AB 10 cm using a ruler and a pair of compasses only.
    A. Using a pair of compasses and point A as the center, choose any radius and make arcs above and below line AB, do the same with point B as the center. Join the intersecting arcs with a ruler.
    B. Using a radius of 5 cm and point A as the center, make arcs above and below line AB, do the same at point B; and join the intersecting arcs with a ruler.
    C. Using a radius of 4 cm with point A as the center, make arcs above and below line AB, do the same at point B; and join the intersecting arcs with a ruler.
    D. Using a radius of 6 cm with point A as the center, make arcs above and below line AB, do the same at point B; and join the intersecting arcs with a ruler.

32. Explain how you would lead your class to construct an angle of $22\frac{1}{2}^0$ using a ruler and a pair of compasses only.
    A. Construct an angle of 90^0, divide it into 4 equal angles, each angle will be $22\frac{1}{2}^0$
    B. Construct an angle of 90^0, bisect it to get 2 angles of 45° each, bisect one of them to get 2 angles of $22\frac{1}{2}^0$ each.
    C. Construct an angle of 45^0; bisect it to get 2 angles of $22\frac{1}{2}^0$ each.
    D. Construct an angle of 45^0, use a protractor and measure $22\frac{1}{2}^0$

33. There are two activities which pupils are involved in before introduction of the degree and the protractor in measuring angles. Which are they?
    A. Measure angles using arbitrary units, measure angles using fixed unit.
    B. Measure angles using a fixed unit, measure angles using a protractor.
    C. Measure angles by estimation, measure angles using arbitrary units.
    D. Measure angles using unit angles, measure angles using a protractor.

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34. Four boys are working on this problem together.

They want to arrange the decimal numbers from smallest to largest.

Which one of the following statements is true?

0.003	
	0.3
	0.35
0.035	

A. Andrew said: The smallest is 0.003 because it has the highest number of decimal places, and 3 is smaller than 35.

B. Moses said: 0.003 is smaller than 0.035 because $\frac{3}{1000}$ is smaller than $\frac{35}{1000}$

C. Michael said: The largest is 0.3 because it has the fewest decimal numbers.

D. Peter said: The largest is 0.3 because $\frac{3}{10}$ is bigger than $\frac{35}{100}$

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35. Mr Godana is teaching his grade 6 class about the relative sizes of fractions.

He tells them a story about a birthday party where Namwamba eats ½ of one cake, and Nyagaka eats 5/8 of another cake of the same size. Who ate the most?

Which of the following children is correct?

A. Salim says eighths are very small pieces because there are so many, but halves are bigger because there are only two. Therefore, Namwamba ate the most because halves are bigger than eighths.

B. Lawrence says Nyagaka ate the most because there are 5 eighths and only 1 half.

C. Mariam says ½ is the same as 4/8 which is smaller than 5/8. Therefore, Nyagaka ate the most.

D. Jane says that Namwamba and Nyagaka ate the same amount of cake.

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