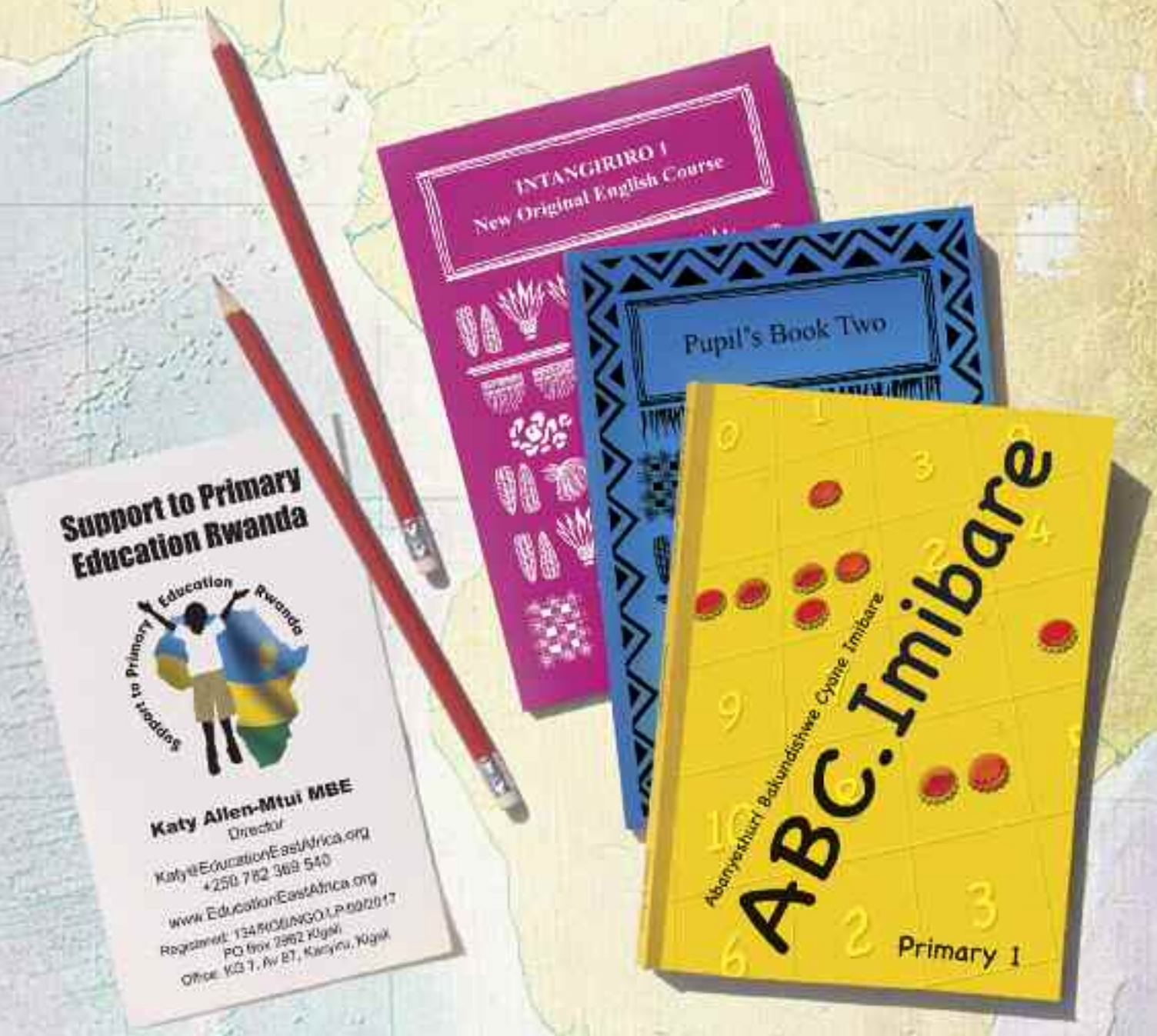
A Rationale for Change

Analysis of the Competence Based Curriculum
- for Lower Primary -
Mathematics, Kinyarwanda and English

As Requested by the Honourable Minister for Education, Dr Eugene Mutimura



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Rationale for Change

A consideration of the current Competence Based Curriculum
for primary schools

This document, in the pages which follow, analyses the new Competence Based Curriculum (CBC) documents for Mathematics, Kinyarwanda and English with a focus on those for Lower Primary. From the analyses it is apparent that the content of those curriculum documents is the very reason for the difficulty, or, frankly, lack of success in the CBC's introduction and use.

The content of the curriculum documents shows a lack of awareness of how children learn and of their cognitive development, and a lack of awareness of sound pedagogical practices in primary education. It seems fair to say that there is not a primary education specialist or expert on the team responsible for curriculum development. Young children learn in specific ways, and they are not smaller or younger versions of adults. Their learning takes time, and there are accepted strategies and techniques to be adopted for young learners.

What is currently in place is the equivalent of having put diesel in a petrol engine. While there are traces of petrol still in the tank, no additions or mixing will work; the only solution is to empty the tank and put in pure petrol. Only then will the car run. The curriculum documents need to be rewritten if successful learning for the majority of pupils in primary schools is to take place.

This is not what people in the Rwanda education system want to hear or to know, but only when the truth is faced can real solutions be adopted.

There follows a consideration of the function of a curriculum, some difficulties faced in this task of analyzing the curriculum documents, and then some recommendations. All of this has as its base the analysis in the further sections of this document.

Curriculum and its function

The Competence Based Curriculum (CBC) seems not to be understood by many.

Perhaps it is its name. A curriculum is, after all, a curriculum, and to give it any epithet is cause for confusion.

A curriculum, broadly, refers to the knowledge and skills pupils are expected to learn; a plan for learning. That might include the learning standards or learning objectives the pupils are expected to meet, the units and lessons that teachers teach, the assignments and projects given to pupils, the books and materials used in a course, and the tests, assessments and other methods used to evaluate pupil learning.

A curriculum will be meaningless unless and until it is implemented through an effective method of teaching. This seems to be part of the issue with the CBC, that the teachers do not have that effective method of teaching.

'Backward design' is useful in describing the person wanted at the end of the course of study, so that the course of study can be designed to meet that objective. That aim has been stated as 'developing the wholeness of the learner' (English syllabus for Primary Level P1 to P6 REB 2015), and 'to develop competencies which have a great impact on the society in general' (SET Syllabus for Upper Primary REB 2015), and, indeed, the Mission of the Ministry of Education is 'to transform the Rwandan citizen into skilled human capital for socio-economic development of the country by ensuring equitable access to quality education focusing on combating illiteracy, promotion of science and technology, critical thinking and positive values'.

What is not specifically stated in those descriptions is the fostering of creative capacities. Creativity is a process of having imaginative ideas that have value, and creativity comes through the interaction of different disciplinary ways of seeing things. 'Education takes you into the future we cannot grasp' (Ken Robinson 2006) and the unpredictability of the future means that education should tap into the gift of human imagination and seek to educate the whole being. After all, as much as scientists are needed, a country's culture is developed by artists, radio and television entertainers, fashion designers, dancers, musicians et al.

That academic ability dominates our view of intelligence, had its origins in education systems being invented to meet the needs of industrialism. What jobs will be available to pupils who are at school today and who will not be in the job market until at least 2030 cannot be predicted with certainty.

What is certain is that pupils need to be guided to develop skills of thinking so that they can adapt those skills to the needs of the changing world.

The curriculum that recognizes the need for the development of these skills is to be commended. However, it is the implementation of the curriculum that is crucial to its success. This is where the current confusion seems to come in with the new CBC.

The teacher-training college tutors, the teachers in the schools, the inspectors and others are not sufficiently, if at all, trained in 'pupil-centred learning/active learning' and so are struggling to teach the 'competencies' or the 'skills'. The curriculum should set out what is desired. How to reach the goal is predominantly upon the teachers. The methodology that is needed is not sufficiently established.

The CBC is to be commended for introducing skills-based learning, and recognizing the need to shift to pupil-centred learning/active learning.

Child learning and development:
A curriculum must take account of the cognitive ability of the children at their various ages, and take account of how children learn and child development. The CBC creates over-load for the learners, and many aspects are beyond the cognitive ability of the learners.

It is widely accepted that mother-tongue is the most natural mode of expression and thought, and emphasis on mother-tongue learning is not sufficiently given in the CBC.

Translation of the curriculum documents
In order to write this paper the Mathematics and Kinyarwanda subject curriculum had to be translated into English. There is no official English version in existence in REB or MINEDUC. The translation was done by staff members of SPER, who, in turn, referred to staff at REB, to staff at MINEDUC, to practising teachers, to academics and publishers. There were many words and phrases which no one was able to assist for an accurate translation, which indicates that the Kinyarwanda meaning is not itself sufficiently understood.

Of note is that many teachers have never seen the curriculum for their subjects. This means that they are relying on the various textbooks which have been issued to them, and the teachers may not be aware of the aims for each unit of study as set out in the source document.

Recommendations

The content of the curriculum documents must take account of how children learn and of their cognitive ability.

More emphasis on mother-tongue learning
In order for full educational development of the pupil to take place it is highly recommended that greater weight be given to Kinyarwanda as a time-table subject. Seven periods a week, especially in Lower Primary, is too few. Kinyarwanda is the subject or study through which pupils will develop their reading, their writing and, most importantly, their thinking. Their thinking is also developed through the study of mathematics, and that is the reason that primary education in other countries give such weight to mother-tongue learning and mathematics.

In Kinyarwanda, as a subject, the pupils need to be developing their thinking skills, and this is guided by the teacher in speaking, in drawing, in acting, in playing, in making things, in singing, and in reading and in writing. The subject of Kinyarwanda should be expanded to give time for these activities, and to ensure that skills are developed.

English impedes the learning of mother-tongue skills
It is very strongly contended that English, or indeed any foreign language, should not be introduced in the first years of primary school. The pupils need all their attention and focus on mother-tongue development. There is no evidence that younger children learn a foreign language better than older children. All younger children can gain is a near-fluent accent, but if their teachers are not modelling that fluent accent then even that advantage is not there.

It is recommended that, at a minimum, English as a language is not introduced until P2. Ideally, English should not be introduced until P3. The formal introduction of a foreign language in P3 would meet the cognitive ability of pupils to learn all the language skills in that foreign language. If pupils start to learn English in P3, then after two years of study they could be ready to learn all their subjects in English. This was the system adopted in Tanzania when it had an excellent education system in the 1960s.

However, a compromise would be to introduce the formal study of English in P2. This would give the devotion of the first year (P1) to the study of Kinyarwanda and mathematics, and the gaining of skills within those subjects. Of vital importance is the improvement in the reading and writing ability of the pupils. In P1 the pupils could benefit from a ‘language awareness’ course, which would complement their literacy skills and begin to motivate them to learn English. An example of such a course is available in the ‘Intangiriro’ books.

Text books
This is one of the most important issues. The curriculum is dependant on being implemented correctly. The new CBC relies on implementation through child-centred learning/active learning. The teachers, and their trainers, are not sufficiently au fait with the teaching techniques needed for this learning to take place.

In the Rwanda context, which is a huge number of teachers who need training, and trainers who also need training, the only viable solution is to have 'on-the-job' training. It is widely recognized, although seldom voiced, that the School-Based Mentor (SBM) programme or approach does not work. It does not work in other countries, and there is no reason why it will work in Rwanda. It is not the answer.

One answer, and perhaps the only feasible one in terms of readiness, cost, and being tried and tested, is to produce text books which give full and complete guidance to the teachers on the methodology to adopt within the delivery of the content of the curriculum. This will be a very full book, giving step-by-step, lesson-by-lesson guidance to the teachers, in their mother-tongue so that it can be fully understood, of what to teach and how to teach it. The activities will be set-out, answers to questions will be given or suggested, and methods of assessment can be set out too. In this way, the teachers will improve their own subject knowledge, their confidence in teaching, and will be able to deliver learning in such a way that the desired competencies and skills are gained by the pupils.

A survey of some teachers in our project schools revealed that all of the teachers would appreciate a single text book which helped them in this way.

SPER has been using such an approach for teaching English with great success.

Books for English and Mathematics adopting this approach are already available.

Learn from other countries
It is worth learning from the mistakes of other countries. In Tanzania, they tried to introduce English in P1, but gave up after several years, as they saw no improvements in the pupils' learning of English with those extra two years of tuition. The learning of English reverted to its introduction in P3.

Again in Tanzania, little to no attention was given to the inadequacy of its curriculum and text books for primary education. In 2017 the World Bank announced that, effectively, the education system in Tanzania had collapsed, in that its workforce is not skilled enough to drive the country's economy. Indeed, in that time, the Tanzanian Institute of Education had given itself the task of writing its own text books without having the expertise in primary education. The 'collapse' of its education system followed.

Beware of ICT

ICT is a thorny issue, and perhaps a highly political one, but it is worth noting that Silicon Valley bosses send their children to screen-free schools, and that an OECD report in 2015 found that the impact of computers on pupil performance was 'mixed, at best' and in most cases computers were 'hurting learning'. Whilst not wholly related to technological dependence, but not separate from it, are the social problems in so-called 'developed' countries. Children are glued to tablets, computer games, social media, and this affects their social interaction, their creativity, and very possibly their eyesight. East Africa is known for its oral traditions, its social interactions, and its sense of community. This should be cherished and maintained. ICT could be introduced at secondary school with no detriment to the learning in primary schools, and no detriment to the gaining of skills necessary for the technological age. Those skills are in logic, ordering, analysis etc. All of those skills can and should be learned and developed under a good primary curriculum with appropriate teaching methods.

Digitization of text books seems to be a distraction from the core issue that insufficient learning is taking place. Introducing a new 'tool' with which the teachers are inexperienced does not seem the most sensible way to address the core issue.

Learning equipment

The old **Dickensian desks**, all-in-one bench and desk, should be phased out. They are heavy and cumbersome to move around, but more importantly they impair pupils' writing and reading, as the distance of the bench from the desktop is often too far for shorter pupils, and too cramped for larger pupils. Tables and chairs are much easier to move (for group-work etc), and the chairs enable pupils to sit properly for writing and reading.

The **classroom layout** has a great effect on learning. Rows and columns of desks are not suitable for learning-centred learning; pupils cannot easily see the front of the class; the teacher cannot easily see every pupil; pupils cannot easily get out to go to the front etc. A horse-shoe layout is recommended for all lessons, and the horse-shoe can be two or three desks deep, and still provide ease of visibility and access

The **exercise books** available in most of the schools are not suitable for the pupils' learning. The cheapest, and therefore the most used, have graph-squares which are too small for young pupils to write numbers, and wholly unsuitable for writing.

The 'writing' exercise books are more expensive, and the ones widely available have lines which are not adequate for learning the height and length of letters.

This issue could be easily rectified. The types of paper are set out in an Appendix to the Kinyarwanda curriculum analysis.

Young pupils in P1 and P2 should use **pencils** for all lessons. The use of 'bic' biros is particularly unhelpful in the learning of writing, and leads to untidy work.

Many **teaching aids** can be made from locally found materials. However, that leaves many which cannot be so made, and need special material (soft cardboard, marker pens, scissors) or special equipment (dice and dominoes for elementary mathematics, real objects for English etc), and good storage of teaching aids needs many containers and bags. Many items could be donated within Rwanda and from outside. Supermarket customers could be asked to bring back used boxes (e.g. cereal packets), plastic containers etc., and the supermarkets could act as collection points from which education offices/officers could make collection and distribute to the schools. Tourists could be asked to donate marker pens, dominoes, dice and other good learning aids, through RDB and the tourist firms.

INTRODUCTION
TO THE ANALYSIS OF MATHEMATICS, KINYARWANDA AND ENGLISH AS SET OUT IN THE COMPETENCE BASED CURRICULUM FOR LOWER PRIMARY

The three sections below are devoted to an analysis of the lower primary curriculum document for the teaching of mathematics, Kinyarwanda and English. A separate document provides an annotated version of the curriculum for Upper Primary mathematics.

There are two main common themes and challenges which need consideration and ought to be addressed. These are now set out.

Recognising the cognitive ability of pupils

The most worrying recurrent theme is that much of the content of each curriculum does not take sufficient account of how young children learn and of their cognitive ability. This is fundamental. Without taking this sufficiently into account the topics are rushed, and not taught in a way which most children will learn from, and so the crucial foundation in each subject will not be embedded in the pupils. Without the foundation being embedded, then the consequences will be enduring and apparent for upper primary and beyond. It cannot be overstated enough that if the learning in lower primary works well, then results in upper primary and secondary will be enhanced. If lower primary does not work well, then the majority of pupils will not succeed in upper primary.

What is being taught in lower primary is not just the subject matter of mathematics, Kinyarwanda and English, but the development of skills. It is skills which enable people to be assets in the workforce. There are common skills which are developed in all subjects in lower primary such as the skills of ordering and sequencing, the skill of logical deduction and reasoning, skills of recognizing patterns and grouping, and the all-important skills of creativity and imagination. Without addressing how children learn, then these skills will not be developed.

Children from the age of 7, so most pupils in P1, are undergoing a special period of development in the way their brains work. They are in what is known as the ‘concrete’ stage, and will slowly move into the ‘abstract’ stage by the age of about 11 onwards. This means that learners in P1 to P3, and probably in P4 and P5 as well, need their learning to be based on the ‘concrete’. Not only that, but their level of cognitive ability means that they will need a lot of practice and a lot of repetition before they fully understand and can perform a task or skill independently. The aim in every subject and topic is that the pupils ‘see’ the meaning, and they will ‘see’ the meaning if they are actively involved in doing things and working things out for themselves.

What is apparent in the curriculum documents is that there is lack of sufficient time given to working with 'concrete' learning methods and the constant revision of what has been learned.

Mathematics is the easiest example, as it is tempting to teach in the 'abstract' as all numbers and signs are 'abstract'. In fact, pupils in P1 are not ready to work with the 'abstract' as in 4 + 2 = 6, until they have had a great deal of practice working with real objects (bottle tops or sticks) to find out that four things put with two things gives a total of six things. Pupils have to work with 'concrete' items for a long time to see the pattern that (written in the 'abstract' here for ease) 4+2=6 and 2+4=6. This principle of working first in the 'concrete' applies to all topics of mathematics. The curriculum is not focusing on the important issues of patterns which is the foundation of much in mathematics and can be discovered by working with the 'concrete'. The curriculum, in not taking sufficient account of all of this, is rushed, and progresses beyond the cognitive level of the pupils.

In Kinyarwanda insufficient time is given to the very basic skill of the correct formation of alphabet letters, and how to write (e.g. use of capital letters, spaces between words). This gives rise to bad handwriting. Lack of appreciation of the cognitive ability of the pupils gives rise to topics that are introduced at a level beyond that of the pupils (e.g. savings, leadership, development) and may well have no intrinsic interest to young pupils.

In English, the curriculum does not give sufficient attention to the structure of the language and the need to teach it in defined stages. It expects pupils to learn and understand far too many items, and at a vocabulary level sometimes beyond that of native English speakers of the same age.

The content and layout of the curriculum document

What is not clear enough is the actual setting-out of the curriculum documents itself.

Each unit of each curriculum is headed with a Topic Area, and then has a name or description for the Unit.
Each Unit then has a Key Unit Competency.
There is then a heading 'Learning Objectives' which is divided into five columns which are named:
1. Knowledge & understanding 2. Skills 3. Attitudes & values 4. Content
5. Learning activities.

This is where the confusion comes in. It is not clear what the pupils are meant to be doing and learning.
'Learning objectives' are not 'content' or 'learning activities'. This is, therefore, a problem with all units. Most units have learning outcomes in the 'learning activities' column. Learning activities are what pupils are going to 'do' to learn the content.

For instance, in Kinyarwanda P1 Unit 8 in the ‘learning activities’ column is ‘to identify consonant clusters learnt from the words and sentences’.
An example of a learning activity for this would be:
Teacher writes lots of different known words on cards, some containing the consonant cluster ‘ng’ and some not. In teams, pupils take turns to find the words with ‘ng’.

In mathematics P3 Unit 1 all the columns have the same thing but stated in different ways:
Knowledge & Understanding: Understand how to subtract with or without borrowing numbers not exceeding 2,000
Skills: subtraction with or without borrowing numbers not exceeding 2,000 and to use them in daily life
Content: addition and subtraction of numbers not exceeding 2,000
Learning Activities: Addition and subtraction…using number line exercises.

It would be much better to have just Learning Outcomes, and then have Learning Activities detailed in their own column.
E.g. Learning outcomes:
Solve simple subtraction problems using a range of written and mental strategies.

Another difficulty is the ‘Attitudes & Values’ column. The content is often confusing, and is also very vague.
There needs to be a clear understanding of what ‘attitude’ and ‘values’ mean:
Attitude: a well-established way of thinking about something
Value: one’s judgement of what is important in life – principles or standards of behaviour.

For instance, in Kinyarwanda, P1 Unit 9, in the Attitudes & Values column is ‘to positively respond to activities/practices relating to the culture of saving’. What is the attitude or value which is to be taught, and how and in what context are the pupils reacting?
In mathematics, P1 Unit 1 the Attitudes & Values column has, ‘proper counting, reading and writing of numbers of 1-5. To highlight the purpose of learning how to count, read and write’. It is not clear how that fits the definition of ‘attitude’ or ‘values’.

What is needed is a summary of the work to be done, and the expected learning outcomes with a list of ‘indicators of success’, and perhaps a guide to the assessment of the work of the unit.

MATHEMATICS – LOWER PRIMARY

The Competence Based Curriculum (CBC) for mathematics in Lower Primary covers the years of P1, P2 and P3, and each year comprises 14 units of study. Each unit of study comprises a stated number of 40-minute lessons or periods.

The topics or units in themselves are sound, and cover what is expected to be found in a mathematics curriculum. However, it is the time allocated to topics, the sequence of topics and the processes used within the topics which are not aligned with the cognitive ability of young learners. In addition, there are assumptions made which are unfounded.

The purpose of a lower primary mathematics course or curriculum is for young pupils to learn numbers and patterns, which form the basis of future mathematics work. The importance of this cannot be overstated. If the young learners fail to understand these basic concepts in mathematics then their future studies are needlessly jeopardized. How children learn is of paramount importance, and a lack of understanding of this is what leads to mathematics being badly taught by many teachers in many countries in the world.

The use of 'concrete' teaching methods is essential in mathematics This is so for young learners, but should continue for older learners too so that each new topic can be seen in a 'concrete' way.

'Concrete' refers to the use of real items, which can be seen, touched and manipulated. It is important to note that use of pictures is half way between 'concrete' and abstract, and can be very confusing particularly in relation to work in the four processes of + - x ÷.

Young learners are not cognitively ready to process abstract concepts **until** they have had sufficient practice with the 'concrete' first.
In mathematics nearly everything is abstract: the very writing of numbers (1,2,3 etc.) is abstract; the signs for mathematical processes (e.g. + - x) are abstract. It is the rushing to the use of the abstract, which is accountable for most shortcomings in the teaching and learning of mathematics.

In Appendix 1 on page 30 is a list of required knowledge before certain concepts can be learned.
In Appendix 2 on page 32 is a list of Mathematics Concepts.
In Appendix 3 on page 33 there is chart on the progression for teaching mathematics in primary school taken from the Australian system.
In Appendix 4 on page 36 is a guide to Working Mathematically
These are very useful reference documents.

Analysis of each year

Primary 1

Unit 1:
These first 36 lessons cover the counting and writing of numbers 1 to 5. There is no mention of 0 (zero). This is a serious omission at this stage, as 0 is a very important number. Zero is a place holder, and is very important for the development of the concept of place value.

There is insufficient learning of 'one to one correspondence', which is the learning that, for instance, two things are equivalent to the word 'two' and the number 2. Learning to count is not a rote learning of words and a learning of how to write the abstract numbers; what must precede that is a thorough understanding of the 'one to one correspondence'. One step on from that is 'subitizing' which is the ability to recognize 2 things without the need to count them, and to see or handle 4 things and recognize them as 4 without the need to count them one by one out loud.

Only once those skills have been thoroughly grasped should 'number-bonds' come into focus. 'Number-bonds' is the skill of seeing the patterns of the items. For instance, the 'number-bonds to 4' involve taking 4 items, and manipulating them to see that 0 and 4 is 4 (which we know as 0+4=4), that 1 and 3 is 4, that 2 and 2 is 4, that 3 and 1 is 4, and that 4 and 0 is 4. Once that is grasped then it can be done in reverse, so that 4 less 0 is 4, 4 less 1 is 3, 4 less 2 is 2, 4 less 3 is 1, and 4 less 4 is 0. This also brings in the skill of counting forwards and backwards which is another important element at this stage.

At this stage, the abstract signs of '+', '-' and '=' should not be introduced; it is too early.

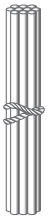
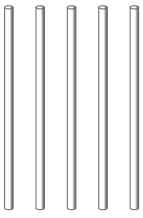
Specific comments on the written curriculum are that 'Learning Activities' includes number-bonds, whereas 'number-bonds' are the specific skill and not an activity. Using 3 digits for 'number-bonds' (e.g.5 = 2+1+2) is too advanced for most learners at this developmental stage. In the 'Skills' column mention is made of, 'to add or subtract mentally'. That is not feasible with young learners as they must be using the 'concrete' so that they can see the meaning. It is only with practice that knowledge of '4 and 1 making 5' is embedded to enable 'mental' arithmetic. In the 'Knowledge & Understanding' column it is suggested that pupils list 3 daily activities, 'beginning from the first one in the morning'. There must be great care that cardinal numbers are used, and not ordinal numbers. This suggested example would easily lead to ordinal numbers being used, and this is another concept altogether.

Unit 2:
The comments for Unit 1 apply here also. There must be a full understanding of 'one to one correspondence' before working with 'number bonds', and the use of the abstract signs '+, -, =' is too soon.
It is not clear whether there is revision of the work in Unit 1, but this is crucial. In mathematics at this introductory stage, constant revision is essential.

Unit 3:
In the curriculum '0' is introduced here, but it should be introduced in the teaching of 0-5 in order to make full sense.
Comparing bigger and smaller numbers should only be done using 'concrete' items, or 'concrete' items with the abstract written number alongside.
Comparing bigger and smaller numbers using only written numbers is too abstract at this stage.

What is not apparent from the written curriculum is the use of any 'number line' to help with the skills of 'counting on' and 'counting backwards'. These are important skills which help to build the foundations of addition and subtraction.

Unit 4:
This unit introduces the crucially important topic of 'place value' (tens and units), although very little is written in the curriculum as to how this will be taught. If this is not taught using 'concrete' methods then the learning for most pupils will be severely impaired. This is such an important topic and it should be taught with, for instance, individual sticks, and sticks tied in bundles of ten, for the concept to be seen and understood.

Tens	Units
	
10	6
	
	2
18	

However, from my experience in the primary schools, place value is not understood. Pupils come to the board to work out, e.g. 18 + 4, and they are encouraged to put 18 chalk marks (//// etc) on the blackboard followed by 4 chalk marks, and to count all the chalk marks. This is a worrying indication that place value is not being taught properly.

It is hoped that it is simple addition and subtraction which is used in this Unit, and that any 'carrying' is only introduced once the use of a table with sticks, as shown above, is fully understood and able to be used independently by individual pupils.

A common problem when teaching is that the tens column numbers are not named as tens. E.g.

```
      1   8
+     2   1
-------------
      3   9
```

Narration of this, so often, is: 8 plus 1 is 9, one plus 2 is 3. However, of great importance is that when working in the tens or hundreds etc. they should be referred to as such. 8 ones/units plus 1 one/unit is 9 ones/units. 1 ten plus 2 tens is 3 tens.

Unit 5:
This unit introduces multiplication and division, using 2.
It is hoped that 'arrays' are used, which is the use of rows and columns in order to help the pupils to see the concept of repeated addition (multiplication) and repeated subtraction (division).

The concept of 'sharing' has not been taught, and that is a prerequisite for understanding division. As this has not been taught, and therefore, not understood, then division cannot properly be introduced.
The concept of sharing needs to be embedded at this stage.
The pupils should also have a concept of 'skip counting' (e.g.in 2s: 2,4,6). The order in which to learn skip-counting is in 2s, 5s, 10s as the children can use their fingers and hands and it is easy to do.

It is not clear from the translation of the curriculum whether 'remainders' are involved in this unit. In any event remainders should not be introduced until about Year 4.

It is important that the content of this unit is conveyed using 'concrete' methods only. The pupils need to see the number patterns. This is the basis for so much future work. By using arrays, the pupils should see that 'two lots of three' (making 6), is the same as 'three lots of two' (making 6) etc. In the same way, acquiring the skills of number-bonds the pupils would see that '4

and 3' (making 7) is the same as '3 and 4' (making 7), and then start to manipulate the patterns to find that '7 less 3' makes 4, and '7 less 4' makes 3. It is not clear from the curriculum that these important correlations have been embedded.

Unit 6:
This unit seems to be further practice in place-value, and learning the numbers from 20 to 50.
The use of the symbols < and > is far too advanced for the learners of this age. The concepts of 'greater' than and 'less' than should be introduced informally, for instance by asking 'Who has more? Who has fewer?'. This is very important.

Unit 7:
This unit teaches numbers from 50 to 99.
At this age the numbers up to 50 are sufficient. What is important is to consolidate the mathematical concepts using numbers up to 20 (or perhaps 50) but not using higher numbers. Better use would be made of the teaching time by consolidating addition, subtraction, multiplication and division concepts.

Unit 8:
This unit gives six lessons for the introduction of fractions – to show halves and quarters.
The writing of the fractions is introduced, and that is abstract and not necessary or helpful at this stage. The understanding and learning will be influenced by the use of 'concrete' items, and the teaching methods used.

Unit 9:
This unit seems to include 'skip counting' which is a good skill to foster, but it is not introduced as a specific skill, e.g. in 2s: 2,4,6,8. It also seems to include revision of number-bonds, so that the pupils have to think of the number which is not shown, e.g. 7 = 4 + x. This then gives rise to the practice and skill of 'counting on', which in the previous example would be, 5,6,7- and then you have the answer 3 (4 + 3 = 7).
There also seems to be an element of analyzing place value, so that pupils can find the larger numbers, e.g. 32 is greater than 23. If that is the case then the exercise needs to use concrete items (such as the bundles of sticks shown above) in order for learners of this age to be able to understand fully, and to embed their understanding of place value.

Whilst this unit might serve as revision, it would be better, pedagogically, if the practice of the skills in this unit had been embedded when the pupils were learning the separate skills. In other words, there should have been more practice of number-bonds at the beginning, and more practice of skip-counting, counting-on and counting-back in learning addition and subtraction.

Unit 10:
This unit is on measurement, comparing lengths and using addition and subtraction with length measurements. This seems too advanced for the cognitive ability of children at this level.
At this stage the children need to develop their concept of length, weight and capacity, and to learn basic concepts of 'shorter/longer', 'heavier/lighter', 'holds more/holds less'. The children need to be introduced to why, where, when and how we measure things, with relevance to their lives. So, we weigh in the market, we measure in carpentry, we use capacity in water, milk or paint. Addition and subtraction of lengths is an unnecessary complication at this stage, and is beyond the stage of development of the children.

Unit 11:
This unit is a good unit on the days of the week, and periods within each day. This is the very beginning of teaching time.

Unit 12:
This unit introduces money, and deals with Rwandan francs from 1f to 100f. As noted above, numbers up to 50 are more than sufficient at this level of learning.
This unit lacks reality as there are very few things that can be bought using up to 100f. It is, therefore, not a useful introduction to money.

Unit 13:
This is headed as the location of objects using different lines.
It introduces concepts of location and transformation which is good, so long as they are simple concepts of up, down, in front of, behind etc.
However, the curriculum mentions, 'south and north' and this is very advanced for the development level of P1 children; many adults have difficulty with the points of N. S. E. W.
The different lines introduced are also too abstract to be introduced at this stage.

Unit 14:
This unit covers right angles, a square and triangle.
This unit should just cover basic shapes so that pupils learn to recognize a square, circle, triangle, diamond.
Anything beyond that is too advanced for this age-group. The introduction of right angles is for a higher level, and other angles should be delayed until P4

Primary 2

The first year, P1, went up to 100, but the analysis above suggests only going to 20 or to 50.
There has been no precise mention of skip-counting. The order in which to learn skip-counting is 2 (2,4,6 etc.), 5 (5,10,15 etc.), 10 (10,20,30 etc.). This makes the exercise easy as pupils can use their hands and feet (2), and their fingers and toes (5,10).

There has also been no mention of doubling numbers, and this is an important prerequisite for multiplication. So, doubling small numbers starts with 2, 4, 8. After that, 3, 6, 12. This reflects the order in which the multiplication tables (times tables) should be taught: 2, 5, 10, 4, 3, 6, 8, then 9 and 7.

The concept of 'sharing' has not been taught, and that is a prerequisite for understanding division.

The work with multiplication and division in this year is too hard and the process confusing for children of this age.

It is worth noting what knowledge and learning must be in place before **multiplication** can be learned and understood:

- An understanding of place value as applied to whole numbers
- An understanding of, and fluency with, skip-counting
- Familiarity with the use of arrays to model multiplication
- A fluency with doubling small numbers
- An understanding of, and fluency with, addition of two single-digit numbers
- An understanding that addition can be modelled by combining sets of objects, and can also be modelled on a number-line
- The use of the multiplication symbol (x) to mean 'groups of'

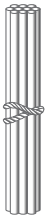
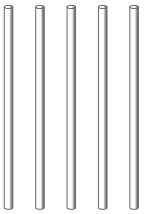
It is also worth noting what knowledge and learning must be in place before **division** can be learned and understood:

- An understanding of place value as applied to whole numbers
- An understanding of, and fluency with, forwards and backwards skip-counting
- Experience of division as sharing
- Knowledge of simple multiplication and division facts
- An understanding of, and fluency with, addition, subtraction and multiplication including the use of algorithms
- An appreciation of division as calculating the 'number of copies' of one whole number in another (e.g. 9 things: how many groups of 3 can we make, and do this with concrete objects).

It is of concern that the work in P1 will not have laid sufficient foundation for these processes of multiplication and division. From the curriculum itself it shows there has not been enough use of 'concrete' items for number bonds and the concept and practice of place value to have been fully mastered. There has been no direct mention of skip-counting. There has been very little, if any, work with arrays or the idea of sharing. Without a solid foundation the pupils' learning of mathematics will now very quickly go astray.

Unit 1:
Using numbers up to 200 for addition and subtraction is alright for this level of learning. It will serve as assessment of whether place value has been understood and can be properly used.
However, the use of addition with carrying, and subtraction with carrying will need a lot of practice. All the practice should be with 'concrete' items (e.g. see the diagram below with bundles of sticks), and wholly abstract processes should not be used at this stage.

The multiplication table of 2 is introduced, followed by the multiplication table of 3 (both only going up to 10 times). This has little pedagogical foundation, as the multiplication tables are not best taught in numerical sequence (2x/3x/4x/5x etc. tables) but by the ease of progression with reference to number patterns. As stated above, the first multiplication tables to be taught should be 2x, and 5x.

Tens	Units
	
10	6
	
	2
18	

All of this would be more than enough in the allocated 24 lessons. However, the curriculum moves on to multiplying numbers of two digits by 2, and then by 3. This is far too hard at this stage. Then there is an expectation of division without a remainder using numbers below 200. This is far too hard.
The operations of division and multiplication have to be consolidated using much smaller numbers.

At this stage working with place value, and using carrying with addition and subtraction, serves as revision of the work of the previous year, and builds on the important foundations of addition and subtraction, and the number bonds, which were introduced in P1.

The start of multiplication tables is too soon, as not enough has been covered with repeated addition, arrays, skip-counting, etc. The introduction of division is too soon without the required prior knowledge, as noted above.

This is where the beginnings of any weakness in the mathematics teaching and learning can be sourced. This is essential to recognize; how early this has happened, and how the rush to use the abstract and the lack of full understanding of the underlying basic principles for maths' work and of how children learn can so quickly affect the acquiring of competencies.

Whilst the curriculum for this unit does refer to the use of repeated addition to show what is meant by 'multiplied by' 2 and 3, the introduction of this first work on 'times tables' has come too soon. The work crammed in to these 24 lessons is far too much. Certainly to be learning 'times tables' alongside the inverse processes of multiplication and division is far too rushed. Many, many more lessons are needed for this essential basic work to be properly introduced and practised.

With these comments in mind, the analysis continues below.

Unit 2:
There is the first mention of counting backwards in the curriculum and of skip-counting (in 10s). This is good pedagogy and should have come sooner.

The 'times tables' continue, but in numerical order, and so this unit introduces the 4 and 5 'times tables'. As noted above, there is a better pedagogical order in which to teach the 'times tables'.

However, it is right at this stage that the pupils should be learning the 'times tables'.

Unit 3:
This is similar to units 1 and 2, but introduces the 6 'times table'.
There continues to be addition and subtraction with carrying, and it is hoped that 'concrete' items are being used whilst the abstract notation is very slowly introduced.

Unit 4:
This unit concerns fractions and follows on from the initial work on fractions encountered in Unit 8 in P1. The unit is for only 6 lessons.
It is revision of halves and quarters, and introduces eighths.

The introduction of eighths is alright, but the expectation would be for thirds to be introduced at this stage.

It is important at this stage that fractions are seen in visual representation, and that, therefore, 'concrete' items are used, or pictures (which are half way between 'concrete' and abstract). This must be used extensively until the concept of the different fractions is understood. The writing of fractions is abstract and is advanced for this level. Pupils will come unstuck if too much emphasis is placed on writing fractions at this stage, especially in comparing the size of fractions. Indeed, there is evidence that the abstract is being used, and not sufficient time has been given to the pupils being able to understand the concept by seeing the meaning with 'concrete' items.
Indeed, in a P2 classroom the following was seen on the blackboard: $\frac{1}{2}$ikibara$_{icyita}$
This is beyond the cognitive capacity of children at this stage.

Unit 5:
This unit is on measurement of length and is concerned with metres, decimetres, and centimetres.
Decimetres are not much used, and their introduction at this stage is unnecessary.
Comparing and converting measurement at this stage is too advanced. At this level the pupils need to learn how to measure and what measurement is.

Multiplying and dividing measurements is too hard at this stage.
This unit gives indications, again, that the cognitive ability and development of children of P2 age has not been understood.

Unit 6:
This unit is concerned with capacity, and introduces litres.
This is a good use of measurement and the use of 'concrete' items. The children will see the different containers and will, therefore, see the meaning of this measurement of capacity.
However, the introduction of multiplication and division of capacity in litres is not suitable, as the pupils are still learning what capacity is.

Unit 7:
This unit is concerned with mass, and introduces kilograms.
The comments for Unit 6 apply here, and particularly that multiplication and division is too advanced for this stage.

Unit 8:
This is a unit on money. It is much better to introduce the topic here than in P1 in Unit 12.
This is as much a mathematics topic, as general knowledge in understanding what 'buying' and 'selling' is, and the difference between 'goods' and 'services'. This will need to be acted out using 'concrete' items of money and goods for the pupils to understand the concept.

Whether real money is used or pretend money, it is a very easy way of showing repeated addition for the purposes of multiplication, and of 'sharing' for the purposes of division. This, regrettably, is not specifically mentioned in the curriculum document.

The concept of 'saving money' is probably too advanced for this age-group. How to 'keep' money by using a purse or wallet is age-appropriate.

There are 21 lessons allocated to this unit, and that should give good practice in the four processes (addition, subtraction, multiplication, division).

Unit 9:
This corresponds with Unit 11 of P1, developing the understanding of time. This unit explores telling the time. This is a difficult skill, and will need a lot of time devoted to it. Ideally the pupils should spend much time working with the clock-face and seeing the number patterns: they involve counting forwards and backwards in 5s (the minutes), and counting to 12 and to 60. It would be useful by using the 'backward design' practice, if the 12 numbers on the clock face were observed and practice was made of knowing which numbers are opposite each other; this will help in telling the time in English, where the Kinyarwanda 'three o' clock' translates to the English 'nine o' clock'.

Days of the months and calendar work is also covered in this unit, and that is useful work for this age-group. A calendar is an abstract tool, and some children may take time to understand this. There are rhymes and 'games' to help children learn how many days are in each month, and it is shame that there is no reference to these in the curriculum document.

Unit 10:
This unit is on geometry and lines and angles. It is far too advanced for children in P2, and the inclusion of this in a P2 curriculum indicates again the 'rushing' of the curriculum writers without regard for the stages of child development.

At this stage, pupils should be learning about 2D and 3D shapes and the differences between them; corners, faces, sides. The pupils should be classifying shapes etc.

Unit 11:
The unit is headed 'location and pictures' but it involves mapping.
The unit introduces rows and columns. However, this should have been emphasized in 'arrays'. This is why teaching arrays, when learning addition and the beginnings of multiplication is so important. These basic number patterns, and number facts, are essential and they relate to so many other areas of mathematics. The basic concepts cannot be stressed enough, and for sufficient time to be spent on them, and for use of 'concrete' items so that they are understood and mastered.

At this stage, learners should be learning about simple maps of familiar locations, but without grid lines, as grid lines would come in at the next level. More suitable here is following directional instructions.

Unit 12:
This unit is headed as 'geometry', and yet it includes calculating the perimeter of shapes. Perimeter is a *measurement* concept, and not geometry. Geometry covers points, lines, angles, surfaces, faces, shape and space.
This unit looks at the three shapes of square, rectangle and triangle.
This unit could replace Unit 10 above. This unit 12 makes no mention of angles or lines, and the introduction of the three shapes and consideration of their similarities and differences is just what is needed at this stage.

Unit 13:
This unit is headed 'algebra'.
At this stage pupils do not need to know the term or definition of 'algebra'.
What the unit is doing is getting pupils to find missing numbers in all four processes, e.g. 4+?=7, 6x?=12, 7-?=3, 12÷?=2.
In order to do this the pupils will need to have had lots of practice with inverse operations using 'concrete' materials. They have to have mastered + and – as inverse operations, and x and ÷ as inverse operations, and from the curriculum document there has not been sufficient practice devoted to this.

The example in the Learning Activities column of the curriculum document is too advanced and is 'wrong'. The example given is: 5?+36=89
It is 'wrong' because it does not represent place value clearly, and it needs to be set out vertically. At this stage a vertical setting is the only way to help with place value when using 2 digit numbers or more.

Finding missing numbers in equations of multiplication and division is too advanced for this stage.

The existence of this as a unit is of concern; the knowledge and practice of inverse operations should be work within the four processes, and much practice needs to be given to this, from the very beginning of work with number-bonds. Again, the element of 'rush' in the curriculum document is a worry.

To have a unit labelled 'algebra' at this level, and looking at inverse operations as if they are a separate entity, is pedagogically unwise.

Unit 14:
This final unit of P2 is really on graphing, or more accurately it should be described for the teachers as 'statistics and probability'.
Drawing pictograms is good.
The pupils should be collecting data about everyday events and learning how to represent and interpret the information.

Primary 3
It has been noted above that several elements of the curriculum have already been 'rushed', and have not taken full account of the cognitive development and ability of children in P1 and P2. It is highly probable that pupils are entering P3 without sufficient grasp or mastery of the basic number work, the four processes, an understanding of shapes or measurement, an understanding of fractions, to be able to cope with the work in P3. By this stage many children will have developed the notion that they are not good at maths, and that it is hard, and this is directly related to the fact that concepts have not been fully understood and consolidated.

Unit 1:
In the headings and columns there is lack of clarity of exactly what is to be taught. All the columns have similar information, and there is not a clear distinction between Skills, Knowledge & Understanding, Content and Learning Activities. This could be simplified to have just the expected Learning Outcomes, and then the details of the Learning Activities.

The unit contains development of addition and subtraction with carrying, and of place value.
The 7, 8 and 9 times tables are introduced. However, as noted before, the multiplication tables have been introduced in numerical order, and so the opportunity for children to see and learn number patterns has been lost. For instance, the 8 times table relates to the 2, and 4 times tables, and should have been introduced with those other tables in P2. The 9 times table relates to the 3 and 6 times table, but its introduction in P3 along with the 7 times table is alright.

The other multiplication and division set out in the curriculum is far too advanced. That is, 'multiply a number with 3 digits by another with 2 digits to a sum not exceeding 2000', and 'divide a number with 4 digits with a number with one digit, with numbers not exceeding 2000'.

At this level, children should be working to consolidate what multiplication and division are, learning the times tables, and only using numbers in the times tables.

Unit 2:
As with unit 1 there is lack of clarity of exactly what is to be taught and the expected outcomes.

Using numbers up to 5,000 is too advanced.

The learning activity of finding a missing number seems to lack pedagogical integrity. It is removed from real-life, and on top of that, the example given in the curriculum document is incorrect. It is printed there:

21*5 + 13 = 2167. The only way to verify the answer is to calculate 2167 – 13, and the answer is 2154. Therefore, the printed last digit of 5 is incorrect, and may well mislead teachers, many of whom are not confident in mathematics.

As with unit 1, the multiplication of 3 digit numbers by 2 digit numbers is too advanced. At this level the pupils should be recognizing and representing multiplication as repeated addition, groups and arrays.

The expectation to divide a number of 4 digits with a number of 1 digit is too great. Set out above on page 10 are the knowledge and skills which need to be in place before division sums such as these can be tackled. The necessary foundation is not there yet.

This unit, as with others, has no mention of using 'concrete' items in order to help the pupils to see the meaning. This is crucial, and at this level the pupils should only be moving slowly into the use of abstract on its own.

Unit 3:
The use of numbers up to 10,000 is far too advanced.
Without the firm foundation in place value knowledge, working with numbers this large is not possible. The curriculum has not demonstrated enough 'concrete' work with the concept of place value. Also, children of this age do not have the cognitive capacity to work wholly in the abstract.

Unit 4:
This unit seeks to further the work on fractions.
However, far too many fractions are introduced.

The pupils, at this stage, should only be working with ½, ¼ $^1/_8$, and $^1/_3$. This is then related to doubling and halving. The work must be in a logical order. 1 whole is divided into 2. The two parts halved again to make ¼ . Then each ¼ is halved again to make $^1/_8$. The fractions of $^1/_7$ and $^1/_9$ should not be used at this level. The next stage, at a different level, would be to introduce $^1/_6$. This is related to the order in which the 'times tables' should be taught.

As with multiplication and division, there are recognized skills and knowledge that must be in place before work on **fractions** develops.
The key skills and knowledge required are below (but also see Appendix 1 on page 30)

- Fluency in addition, subtraction, multiplication and division of whole numbers
- Understanding that subtraction is the inverse operation of addition
- Understanding that division is the inverse operation of multiplication
- The use of the commutative – pupils do not need to know the term but must know the concept that you can add and multiply in any order and the answer is the same.
- The role of 0 and 1
- Using arrays and areas as models for multiplication
- Using a number-line for whole numbers

Unit 5:
This unit and the next two units, respectively on measurement, mass and capacity, do not seem to have an easy 'fit' with the rest of the curriculum. They relate to ways of measuring distance, weights of things, and amounts of liquids, and it would be better for the pupils at this stage if those three ways of measuring were in one unit, using 'concrete' examples for the pupils to understand the relation between them, and the differences in names etc. The pupils need to become familiar with measuring, and what is measured in those particular units, and when they are used. For instance, an understanding of 'what is a metre?' 'When to do we use metres? What is a kg? What do we buy in kg? There should be lots of informal measuring, guessing measurements, and ordering objects according to their measurement etc.

This unit 5 is on measurement, and sets out for the pupils 'to understand the lengths of km, hm, dam, m, dm, cm and mm'. This is far too much, and most of these measurements are not used regularly, if at all. The only measurements which are used regularly are km, m, cm and mm.
Even if the unit is restricted to km, m, cm and mm it is too advanced for children at this stage. The development of the concept of a metre and centimeter is crucial at this level. These units are the basis for understanding measurement in length. There is the expectation of the pupils to multiply and divide different lengths. Until the pupils have a thorough understanding of multiplication and division using large numbers (1,000, 100, and the concept of the units of measurement) then this work with lengths will not be understood. If the pupils have that understanding working with multiplication and division of large numbers, then this unit would serve as a transference of those skills to working with lengths, but P3 is not the stage at which to be doing this.

What is needed at this stage is much use of 'concrete' items and then moving into the abstract slowly, so that the pupils build a proper understanding of the different lengths and how they relate to each other. It is also essential that children understand the use of these measurement units in everyday life. How do we use them? When do we use them? Why do we use the particular units for different things? E.g. mm are used in building when you would think cm would be used.

Addition of those lengths, and subtraction is good practice, but the numbers for multiplication and division are too large for pupils at this stage.
Multiplication of lengths (e.g.100 cm x 25cm) relies heavily on using 0 (zero) as a place-holder and it is not clear that this has been introduced or practised sufficiently.

Unit 6:
This is on mass.
The unit introduces the relationship between kg, hg, dag and g. The only weights in common use are kg and g, and it is suggested only those are used.
The addition and subtraction provides good practice, but multiplication and division is too advanced for the reasons set out in Unit 5 above.

Unit 7:
This is on capacity.
The unit introduces litres, deci litres, centi litres and millilitres. Pupils at this stage should only be learning what is in common use, and that is litres and millilitres. It is not common for centi litres and deci litres to be used.
As stated above, the use of multiplication and division is too advanced.

Unit 8:
This unit is on money, working with amounts up to 5,000Rwf.
The use of addition and subtraction is realistic, and good practice of those two processes.
However, P3 children are about 9 years old, and expectations of their understanding small businesses, savings and profitability are misguided.

Unit 9:
This unit is on time, and how to tell the time and to use calendars.
For this age group this work is good.

Unit 10:
This unit it on lines and angles.
The use of angles other than right angles,is too advanced at this stage. The use of lines is also too advanced with the exception of straight, vertical and horizontal.
This should be linked to shapes.
There is no mention of lines of symmetry, and that is a concept that could be introduced at this stage.

Unit 11:
This unit is on shapes, and should be more closely aligned with types of lines suggested in unit 10 above.
The unit looks at squares, rectangles, triangles and circles.
However, looking at the different types of triangles (scalene etc.) is far too advanced for children at this stage.
Also looking at radius and diameter of circles it also far too advanced for children at this stage.
Perimeter is again mentioned within the topic of 'shape' and yet perimeter is within the topic of measurement.

Unit 12:
This unit is on mapping. For the pupils to locate things using simple grid maps is good, but it is too advanced for the pupils to draw the grids. This is especially so knowing how cramped they are on their desks, and how the desks have sloping narrow tops.

Unit 13:
This is a unit on 'missing numbers', and seems to involve work and practice which should be incorporated with work on the four processes, and not in a separate unit.
This seems to practise inverse operations, but it is not clear that that is how it will be taught.
The exercise given of finding a missing number: **0 + 36 = 896, firstly should be set out vertically so that the place values can be identified, and, secondly, is not pedagogically sound as it not how the problem is usually encountered.
A question, 36 + ? = 896, would more readily give rise to the pupils recognizing the task as an inverse operation giving rise to the need to calculate 896 – 36 = ?. By giving one digit of the answer, and setting it out horizontally, it is likely to give rise to guesswork and not to develop number skills.

Unit 14:
The topic area given for this unit is 'algebra'. This is not algebra. It is a unit on graphing, and so the topic is statistics and probability.

The major omission here is the collection of the data, and why we do so and how we use it in real life. We collect the data, and then decide how to represent the data.

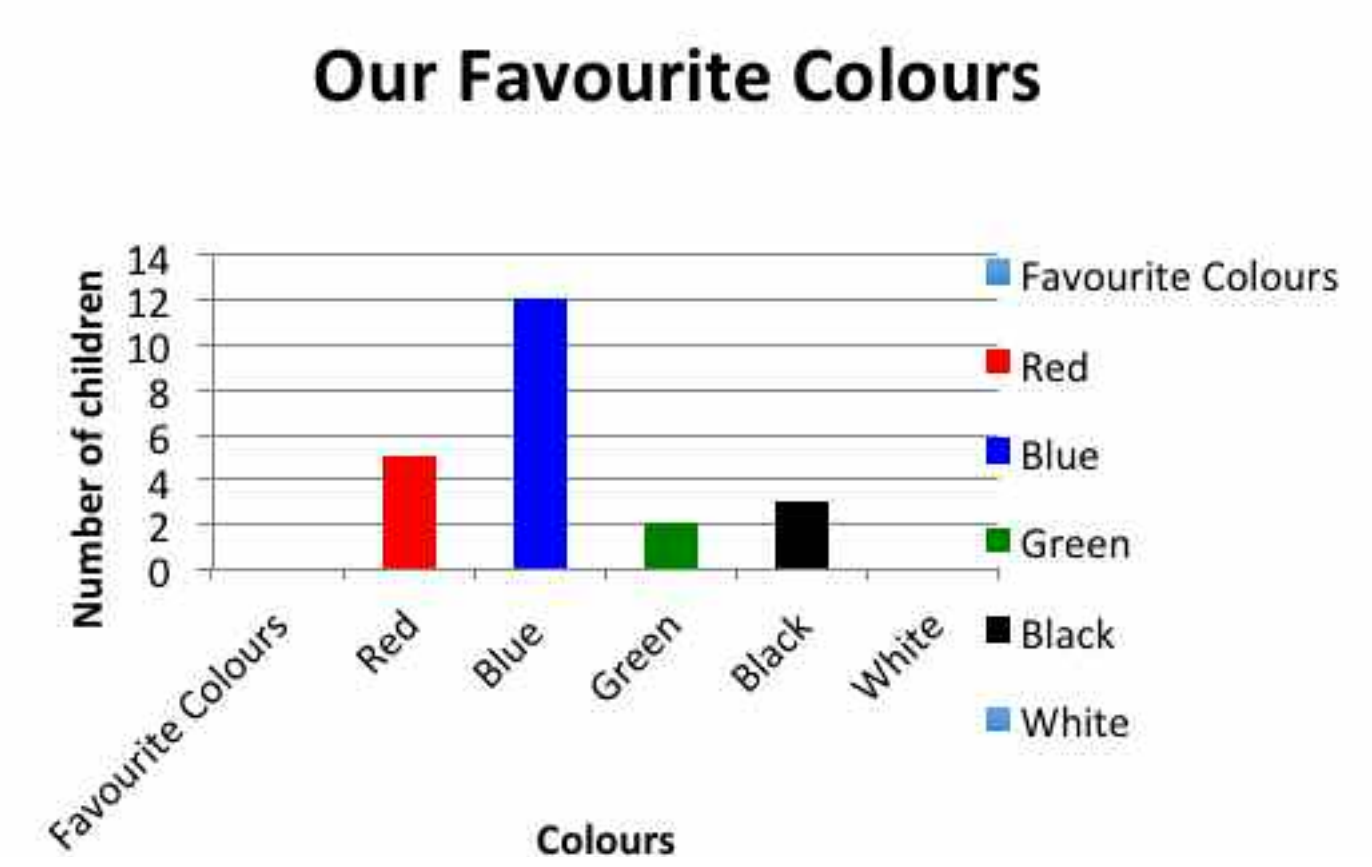
Also tally marks are missing, and that is a very important part of data collection: ////

Using tables to represent data is also important to introduce here.
Tables are for collecting data. For example, finding out favourite colours.
Children use the tally section when asking class mates their favourite colours.

Colours	Tally
Red	𝍸
Blue	𝍸 𝍸 ||
Green	||
Black	|||
White	

Children then use this to make simple graphs.

APPENDICES



APPENDIX 1

Required Knowledge for PLACE VALUE

- The ability to write numbers up to 100, and that number work up to 100 is done thoroughly
- The ability to add single-digit numbers with accuracy and fluency
- The ability to count up to 1,000

Required Knowledge for MULTIPLICATION

- An understanding of place value as applied to whole numbers
- An appreciation that addition can be modelled by combining set of objects, and can also be modelled on a number line
- An understanding of, and fluency with, addition of two single-digit numbers
- Familiarity with the use of arrays to model multiplication
- The use of the multiplication symbol 'x' to mean 'groups of'
- A fluency with doubling small numbers

Required Knowledge for DIVISION

- An understanding of place value as applied to whole numbers
- An understanding of, and fluency with, forwards and backwards skip-counting
- An understanding of, and fluency with, addition, subtraction and multiplication, including the use of algorithms
- Experience of division as sharing
- An appreciation of division as calculating the 'number of copies' of one whole number in another
- Knowledge of simple multiplication and division facts

Required Knowledge for FRACTIONS

- Fluency in addition, subtraction, multiplication and division of whole numbers
- Understanding that subtraction is the inverse operation of addition
- Understanding that division is the inverse operation of multiplication
- The use of commutative, associative and distributive laws when calculating
- The role of 0 and 1
- Division with remainder
- The highest common factor and the lowest common factor
- Using a number line for whole numbers including, order, addition and subtraction, multiplication as repeated addition, division without remainder
- Using arrays and areas as models for multiplication
- Some experience with shading simple fractions of areas

Required Knowledge for ALGEBRA

- Fluency with addition, subtraction, multiplication and division of whole numbers and fractions
- Ability to apply the 'any-order' principle for multiplication and addition (commutative law and associative law) for whole numbers and fractions
- Familiarity with the order of operation conventions for whole numbers

APPENDIX 2

Mathematics Concepts List – Doug Williams

My view of a list of major concept areas might be:

Counting - which includes all sorts of things from subitising (instantly recognizing the number of objects in a small group) and one to one correspondence through to the 'clever counting' of combination theory. Implied in this too is a growing concept of 'number'.

Measuring - which ranges from informal measurement units to measuring triangles in trigonometry and really involves counting with units.

Place value - which is the refinement of recording counting that allows us to develop efficient calculation practices.

Pattern - the seeking, analysis and application of which is core work for mathematicians, but is dependent in itself on sorting and classifying.

Decimals and fractions - which involves counting parts of a whole.

Chance and probability - which involves counting in random event situations and overlaps with concepts of fractions and decimals.

Relationships in two and three dimensional space.

Representing data - which most usually comes from counting, or measuring or chance events.

Algebra - which brings together counting, pattern and reasoning to create, describe and symbolise generalisations.

APPENDIX 3

Mathematics Scope and Sequence

The progressive development of Mathematic skills

Number and Algebra							
	Year 1	**Year 2**	**Year 3**	**Year 4**	**Year 5**	**Year 6**	**Year 7**
Number and place value	Establish understanding of the language and processes of counting by naming numbers in sequences, initially to and from 20, moving from any starting point	Develop confidence with number sequences to and from 100 by ones from any starting point. Skip count by twos, fives and tens starting from zero	Investigate number sequences, initially those increasing and decreasing by twos, threes, fives and ten from any starting point, then moving to other sequences	Investigate the conditions required for a number to be odd or even and identify odd and even numbers	Investigate and use the properties of odd and even numbers	Identify and describe factors and multiples of whole numbers and use them to solve problems	Identify and describe properties of prime, composite, square and triangular numbers
	Connect number names, numerals and quantities, including zero, initially up to 10 and then beyond	Recognise, model, read, write and order numbers to at least 100. Locate these numbers on a number line	Recognise, model, represent and order numbers to at least 1000	Recognise, model, represent and order numbers to at least 10 000	Recognise, represent and order numbers to at least tens of thousands	Use estimation and rounding to check the reasonableness of answers to calculations	Select and apply efficient mental and written strategies and appropriate digital technologies to solve problems involving all four operations with whole numbers and make estimates for these computations
	Subitise small collections of objects	Count collections to 100 by partitioning numbers using place value	Group, partition and rearrange collections up to 1000 in hundreds, tens and ones to facilitate more efficient counting	Apply place value to partition, rearrange and regroup numbers to at least 10 000 to assist calculations and solve problems	Apply place value to partition, rearrange and regroup numbers to at least tens of thousands to assist calculations and solve problems	Solve problems involving multiplication of large numbers by one- or two-digit numbers using efficient mental, written strategies and appropriate digital technologies	Investigate everyday situations that use integers. Locate and represent these numbers on a number line
	Compare, order and make correspondences between collections, initially to 20, and explain reasoning	Represent and solve simple addition and subtraction problems using a range of strategies including counting on, partitioning and rearranging parts	Explore the connection between addition and subtraction	Recognise and explain the connection between addition and subtraction	Investigate number sequences involving multiples of 3, 4, 6, 7, 8, and 9	Solve problems involving division by a one digit number, including those that result in a remainder	
	Represent practical situations to model addition and subtraction	Represent practical situations that model sharing	Solve simple addition and subtraction problems using a range of efficient mental and written strategies	Recall addition facts for single-digit numbers and related subtraction facts to develop increasingly efficient mental strategies for computation	Recall multiplication facts up to 10 × 10 and related division facts	Use efficient mental and written strategies and apply appropriate digital technologies to solve problems	
	Represent practical situations to model sharing		Recognise and represent multiplication as repeated addition, groups and arrays	Recall multiplication facts of two, three, five and ten and related division facts	Develop efficient mental and written strategies and use appropriate for multiplication and for	Recognise, represent and order numbers to at least hundreds of thousands	

					division where there is no remainder		
			Recognise and represent division as grouping into equal sets and solve simple problems using these representations	Represent and solve problems involving multiplication using efficient mental and written strategies and appropriate digital technologies			
	Year 1	**Year 2**	**Year 3**	**Year 4**	**Year 5**	**Year 6**	**Year 7**
Money and financial mathematics	Represent simple, everyday financial situations involving money, e.g. Acting out shopping	Recognise, describe and order coins according to their value	Count and order small collections of coins and notes according to their value	Represent money values in multiple ways and count the change required for simple transactions	Solve problems involving purchases and the calculation of change	Create simple financial plans	Investigate and calculate percentage discounts of 10%, 25% and 50%
Fractions and decimals		Recognise and describe one-half as one of two equal parts of a whole	Recognise and interpret common uses of halves, quarters and eighths of shapes and collections	Model and represent unit fractions including 1/2, 1/4, 1/3, 1/5 and their multiples to a complete whole	Investigate equivalent fractions used in contexts	Compare and order common unit fractions and locate and represent them on a number line	Compare fractions with related denominators and locate and represent them on a number line
					Count by quarters, halves and thirds, including with mixed numerals. Locate and represent these fractions on a number line	Investigate strategies to solve problems involving addition and subtraction of fractions with the same denominator	Solve problems involving addition and subtraction of fractions with the same or related denominators
					Recognise that the place value system can be extended to tenths and hundredths. Make connections between fractions and decimal notation	Recognise that the place value system can be extended beyond hundredths	Find a simple fraction of a quantity where the result is a whole number, with and without digital technologies
						Compare, order and represent decimals	Add and subtract decimals, with and without digital technologies, and use estimation and rounding to check the reasonableness of answers
							Multiply decimals by whole numbers and perform divisions by non-zero whole numbers where the results are terminating decimals,
							Multiply and divide

							decimals by powers of 10
							Make connections between equivalent fractions, decimals and percentages
	Year 1	**Year 2**	**Year 3**	**Year 4**	**Year 5**	**Year 6**	**Year 7**
Patterns and algebra	Sort and classify familiar objects and explain the basis for these classifications, and copy, continue and create patterns with objects and drawings	Investigate and describe number patterns formed by skip counting and patterns with objects	Describe patterns with numbers and identify missing elements	Describe, continue, and create number patterns resulting from performing addition or subtraction	Explore and describe number patterns resulting from performing multiplication	Describe, continue and create patterns with fractions, decimals and whole numbers resulting from addition and subtraction	Continue and create sequences involving whole numbers, fractions and decimals. Describe the rule used to create the sequence
	Follow a short sequence of instructions	Recognise the importance of repetition of a process in solving problems	Solve problems by using number sentences for addition or subtraction	Use a function machine and the inverse machine as a model to apply mathematical rules to numbers or shapes	Solve word problems by using number sentences involving multiplication or division where there is no remainder	Use equivalent number sentences involving multiplication and division to find unknown quantities	Explore the use of brackets and order of operations to write number sentences
			Apply repetition in arithmetic operations, including multiplication as repeated addition and division as repeated subtraction		Use equivalent number sentences involving addition and subtraction to find unknown quantities	Follow a mathematical algorithm involving branching and repetition (iteration)	Design algorithms involving branching and iteration to solve specific classes of mathematical problems
					Define a simple class of problems and use an effective algorithm that involves a short sequence of steps and decisions to solve them		

APPENDIX 4

Working Mathematically

The Process

"First give me an interesting problem."

In the past, mathematics has been solution-focused: children set out to find the correct answer, but 'real' mathematicians don't know all the answers - they start with a problem they find interesting, and work through a number of strategies to find a solution.

In Working Mathematically, we teach children to think like mathematicians, but first, we have to get them interested!

When mathematicians become interested in a problem they:

- Explore the problem to collect and organise data about it.
- Discuss and record notes and diagrams.
- Seek and find patterns or connections in the organised data.
- Make and test hypotheses based on the patterns or connections.
- Look in their strategy 'toolbox' for problem solving strategies which could help.
- Look in their skills toolbox for mathematical skills which could help.
- Check their answer and think about what else they can learn from it.
- Publish their results.

Questions which help mathematicians learn more are:

- Can I check this another way?
- What happens if..?
- How many solutions are there?
- How will I know when I have found them all?

When mathematicians have a problem they:

- Read and understand the problem- What is the problem asking me to do? What is the important information?
- Plan a strategy to start the problem. How am I going to work this out?
- Carry out their plan.
- Check the result.

A mathematician's strategy toolbox includes:

- Do I know a similar problem?
- Guess, check and improve.
- Try a simpler problem.
- Write an equation.
- Make a list or table.
- Work backwards.
- Act it out.
- Draw a picture or graph.
- Make a model.
- Look for a pattern.
- Try all possibilities.
- Seek an exception.
- Break the problem into smaller parts.

KINYARWANDA – LOWER PRIMARY

The analysis of this curriculum is not unit by unit, but rather by subject matter.

Teaching Writing

This is a topic which gives rise to one of the biggest problems I have seen in the primary schools from P1 to P3 – pupils' handwriting. Many pupils cannot form their letters correctly, cannot write on a line, form small letters of all different sizes, put capital letters in the middle of words, do not leave any space between words. As a consequence, their writing is not possible to read easily and is very messy. Many pupils copy from the blackboard with one letter at a time, and have little concept of letter/sound clusters.

The pupils are not helped by the all-in-one desk and bench, which means that many of them are not sitting in the correct position for writing. They are not helped by being cramped on the desk as they are easily jostled by another pupil's arm, and, indeed, hardly have room for their non-writing hand to be steadying the paper and bearing some body weight. Another set-back is the exercise books which are available, as either they do not have lines (most of them are graph paper) or do not have the lines which help with forming taller letters (see Appendix 1 for example on page 45).

In the first unit of P1 the pupils are to learn the alphabet. This is the essential foundation to be laid so that the letter sounds and shapes are mastered.

In the first unit of P1 there is mention that pupils need to be taught how to hold writing materials. In order for their writing to be developed, pupils in P1 should use only pencils. Pens, or what I see in schools, biros/bics, are not suitable for learning how to write as they flow too easily and lead to messy work. This is a serious problem as children at this age do not have the fine motor skills to control a pen.

There is then mention that pupils draw lines. Lines and curves are indeed a prerequisite to learning to write, and they also serve as methods by which young children learn to control their movements - motor skills. Young children will 'write' with a whole-arm movement which will soon develop to lower-arm movement, and then to the wrist-movement which is needed for handwriting. This takes time, but 7 year olds, who are the majority of P1 pupils should soon learn the fine motor skills necessary for learning to write. This practice with lines and curves will also establish each pupil's preference for their dominant hand to be used (e.g. right-handed or left-handed writers).

Not only are motor-skills needed to be developed, but it is important that pupils practise the correct patterns, and develop language to talk about the shapes and movement.

Pupils should be practising patterns of: continuous curvy lines looking like waves; rows of what look like continuous 'm's; continuous 'u's; rows of backward (anti-clockwise) loops with look like a row of continuous 'e's; straight lines going downwards, and straight lines going upwards, and then the same straight lines but coming back up or down along the same line.

There must be pattern-making which encourages left to right direction, and spaces between the patterns. This will help with spaces between words.

It is thought that practising these important patterns and, hence, preparing to write, will take longer than the 40 periods allocated to Unit 1, taking account of what else is in Unit 1. Also the curriculum document lacks the necessary details, such as have been set out above, and this does need to be set out for the teachers. This is of such paramount importance, as the foundation for all that follows, that specific guidance must be set out.

It might be noted that the new REB Pupil's Book for P1, 'Ikinyarwanda', produced as part of the USAID funded Soma Umenye project, on page 5 does not provide nearly enough in this regard.

The curriculum then introduces the letters to be taught to be written. There seems to be no apparent pedagogical reason for the order in which these letters are introduced. They are introduced as follows in Units 1 to 7 in the P1 curriculum:

i, u, o, a, e, r, k, b, n, m, g, y, t, z, h, s, v, w, c, d, f, j, p, l.

The letters are introduced with small and capital letters together. This is not pedagogically sound. Small letters should be taught first. Most written material is in lower case letters, and the formation of lower case letters teaches children to keep their pencil on the page. This lays the essential foundation for joined-up writing later on. One of the many arguments against teaching capital letters first is that there are many more 'pencil pick-ups' with upper case letters, and every time a pupil has to locate another point on the letter for formation, the pupil loses his or her place. To teach both lowercase and uppercase letters (two totally different forms multiplied by 24) is overwhelming. The first stage is to have a full understanding of the sounds and shapes of the lowercase alphabet. After that the ancillary concepts of capital letters can be learned.

Letters should be taught in groups in relation to the way they are formed. There are four main groups:

- Anticlockwise formation: a c e o d g s u y f
- Stick letters: l i t j
- Clockwise formation: b p h mn r k (if written with a curve) (s)
- Diagonal letters: k v w z

Teaching letters in this way improves the metacognitive awareness and makes it easier for pupils to learn.

As four of the vowels are in the first group of anticlockwise letters, it would make sense to teach them first. In fact, it is these letters which are most commonly formed incorrectly by the pupils. With such badly formed letters, those pupils are going to find joined-up writing very difficult. Again, paying attention to 'backward design', the curriculum writer must be aware of the future stages, and how to prepare for them.

There is no guidance for the teacher, or the pupil, on how to form the letters. This is the biggest oversight, as many teachers are not forming their own letters correctly, and are not teaching the correct formation to their pupils. The new REB Pupil's Book for P1, 'Ikinyarwanda' (referred to above) does provide helpful guidance on how to form the lower-case letters. However, on page 139 there is a misleading way of writing 'L' in the lower case. The book adopts the printers' 'l' which looks like a capital 'I'. The lower case 'L' must have a 'flip up' at the bottom.

In order to make learning handwriting a fully kinaesthetic method, the pupil should say the letter sound alongside the letter shape.

From Unit 8 in P1 until Unit 3 in P3, there is the introduction of letter-clusters, or rather consonant-clusters. It seems very odd that these are not introduced with vowels, so that pupils can become familiar with the reading and writing of syllables that appear in Kinyarwanda words. For instance, to learn the clusters, with their sounds,
'umu/aba/imi/iki/ibi/ama/uru/aga/aka/aku/inka/inko/imbe/inte/inya/abo/ore/aza/curu/obwa' etc. would help the pupils to write many words, and to read many words by breaking them down into syllables. Kinyarwanda is a language which lends itself to this.

The new REB Pupil's Book for P1, 'Ikinyarwanda' is certainly a helpful addition, and goes some way to addressing the points raised above. However, it should be noted that in the book the initial exercises in writing involve correcting the order of syllables in words, and the progress to putting words of a sentence in the correct order. This will probably lead to problems, as pupils should first be encouraged to read and copy correct words, and correct sentences. It is not until page 41 that the pupils read and copy a correct sentence. There are also mistakes in the book where capital letters should be used, and are not, and where small letters should be used and are not (e.g. page 150 exercise 10, and page 156 exercise 10). This is not helpful as putting capital letters in the middle of words or sentences is already a common problem.

As a pupil cannot sensibly learn to write what s/he cannot read, then it is important to look at what is set out for the teaching and learning of reading.

Teaching Reading

The order for teaching letter sounds (adapted for Kinyarwanda) is:

- Vowel sounds
- Consonants
- Two-letter blends (b+ a = ba, then be/bi/bo/bu)
- Two-consonant blends (nt, nk, mw, ry)
- Digraphs (sh, ye)
- Three and four consonant blends (mbw, shy, nshy, mvyw)

The curriculum follows this, and takes from P1 Unit 1 to P3 Unit 3 to cover all the sounds. However, some of the progression is questionable. For instance, in P2 unit 5 the consonant clusters 'shy' and 'nsh' are introduced, and yet 'nshy' is not introduced until P2 Unit 8, and 'shyw', 'nshw' and 'nshyw' not until P3 Unit 2. It is not clear why related sounds are not introduced nearer together. For fluid learning children need to build on what they know, and be able to make connections in order to improve understanding.

This introduction of all consonant clusters seems rather drawn-out, and would seem to limit the pupils' reading material if words containing those consonant clusters cannot be used until they are reached in the curriculum, which could be until P3 Unit 3.

It is not clear from the curriculum document what method or methods are being adopted to teach reading. There are several methods, which link together:

- Phonics
- Look and Say
- Language experience
- Context support

Kinyarwanda lends itself to the phonics approach, taking each syllable at a time.
The Look and Say method should also be encouraged, whereby pupils learn to recognize whole words or sentences rather than individual sounds. The curriculum should provide exercises to help pupils begin to learn word-recognition. For instance, exercises to:
'Count 'ifu' then count 'ifi' : ifi ifu ifu ifi ifi ifu ifu ifi if ifu ifi ifu ifi ifi.

Find the same word in A and B

A	B
1. amazi	1. amavi
2. amazu	2. amazi
3. amavi	3. amazu

Word recognition is an essential step in fluent reading, and is an important skill to encourage. Pupils should develop from sounding-out words to recognizing them instantly.

The Language Experience approach is very useful as it forms the beginnings of creativity in literacy. Encouraging creativity is one of the most important skills to develop; a creative mind is the foundation for success in STEM subjects, ICT, literature and, of course, the creative arts.
This approach encourages pupils to draw a picture (e.g. on the blackboard), and for the pupils to suggest a word or a sentence to describe the picture. To start with the teacher will write the word or sentence, and the picture helps the pupils to put meaning to the words. In time the pupils will write the words and sentences all alone.

The Context Support method relies on texts of intrinsic interest to the pupil(s). It is based on capturing the enthusiasm of the pupil, and uses short and long texts together. For instance, a picture of a lion will have a short text for the pupils to read, 'A lion', or 'This is a lion', while the teacher reads the long text, 'This lion is resting on the grass' (put into Kinyarwanda, of course).

All four of the above teaching methods should be integrated in the curriculum.

Reading aloud in the class is in most units from early in P2. This is an activity which will discourage many readers. Reading aloud is not an important skill to develop at this stage. Reading aloud is used to assess how pupils are reading, but it is not the best way. It would be better if during some group work the teacher called individual pupils to the front to hear them read. Assessing reading is always difficult with large classes, but it is very important.

From the curriculum for P1 and P2 the link between reading and writing is not clear. The pupils should be looking at a word, saying the word, then writing the word without looking at it, and then checking what they have written. It is not clear that there is such a strategy.

Punctuation
Any mention of punctuation does not appear until P3 Unit 4. The acknowledgement of full-stops and question marks should come a lot earlier. In P2 pupils should learn capital letters, and be aware of their use for proper names, and for words at the beginning of a sentence. Along with this would be the use of punctuation for a simple sentence or question.

Learning the rules of, and correctly using, punctuation can be daunting for some children. Perhaps the curriculum could incorporate the 'sound/action' approach. This is where the children come up with a sound and action for each punctuation mark. For instance, a full-stop could be a punch in the air and say 'Ha'. Every time when reading you come to a full stop, the pupils do the action and say the sound. This will reinforce the punctuation. Strategies such as this are much needed.

Listening and speaking
These two skills are not directly referred to very much at all, and yet they are important. In all the units of P1 the pupils are expected to 'retell stories in their own words'. The intended outcomes for this need to be clear. It could be to develop skills of sequencing, perhaps with different pupils taking over from where the previous pupil left off, or to use descriptions and so practise the use of adjectives, or to recognize a beginning, middle and end etc.

Reading Comprehension
This is, arguably, the most important skill to develop as it forms the basis for all future study. Whilst pupils will only be studying in Kinyarwanda until the end of P3 (after which English takes over as the medium of instruction), there are reading strategies that the pupils should be learning in Lower Primary which can help them beyond P3.

From P1 Unit 2 pupils are to work in groups and tell or predict the end of a story they have read before. This is repeated in Units 5, 6,7,8, and 9, and in P2 Unit 1; this seems very limited. From P2 Unit 3 there is an activity of pupils exploring another end of the story; this is repeated for Units 4, 5, and 6, and Units 1 and 2 of P3. Again, this is very limited on the part of the curriculum writer(s). There are units which suggest that pupils answer different questions on the story read. All of this, however, is not structured enough if skills development is to occur.

Skills that should be developed are: those of predicting what a story is about – either from its title or from a picture that accompanies it, and predicting what might happen next; those of clarification – talking about any words or sentences that are not understood and learning that 'not knowing' is alright; those of questioning – what questions arise from the reading such as 'Who?' 'What?' 'When?' 'Why?'; those of summarizing – briefly saying what the story is about. In Appendix 2 (pages 46 to 48) there are examples of questions which can be used at different levels.

Writing composition
This starts in Unit 1 of P3.
This could start in P2 with the use of very guided writing. For instance, using pictures and pupils writing a sentence about the picture.

In P3 pupils start with the compositions of short sentences, or short stories, with focus on punctuation, grammar and chronology, and then progress to writing an informal letter with the correct format.

This is a good start, but it is thought that more can be done. For future work pupils need to be guided to the stages of a story so that there is a beginning, a middle and an end. Pupils need to be guided in making the story more interesting by the use of adjectives. The most important skill is to develop the creativity and imagination of the pupils.

Group work
There is reference to group work, and in their groups the pupils are to 'debate', 'discuss', 'analyse'.
This needs very careful structuring which should be set out in the curriculum so that there is consistency and focus on what the actual learning is.

In Appendix 3 (page 49) there is a guide on 'Analysing' with sample verbs and a list of questions which give a further insight into how to make group work more specific and focused.

Topics for each Unit
The curriculum writer(s) have chosen a topic-based curriculum.
The topics are very wide, and are not sufficiently defined.

For instance, Hygiene (P1 Unit 2) is stated to relate to parts of the body, home utensils, food, drink and clothes. However, the hygiene to be focused on should be listed. E.g. washing hands before meals, cleaning teeth, not putting things in your ears, etc. etc.

In P1 Unit 1 – Culture and Values, might be better named Our Classroom. The basis is what is important to the pupils in the classroom. The children could list five things which are important to the class, perhaps, friendship/behaviour/conduct/sharing. This then has meaning and is at the pupils' level.

Hygiene (P1 Unit 2) might be better named, Staying Clean. The focus is then on cleanliness – washing hands, bodies, keeping the room clean, keeping the school clean.

Family (P1 Unit 3) the focus here should be: who is in your family. Who does what at home/jobs in the family. These are things the children know about.

Environment (P1 Unit 4). This should relate to the environment around the school, e.g. urban, rural, forests. For different environments the pupils can look at what lives there and how to look after it.

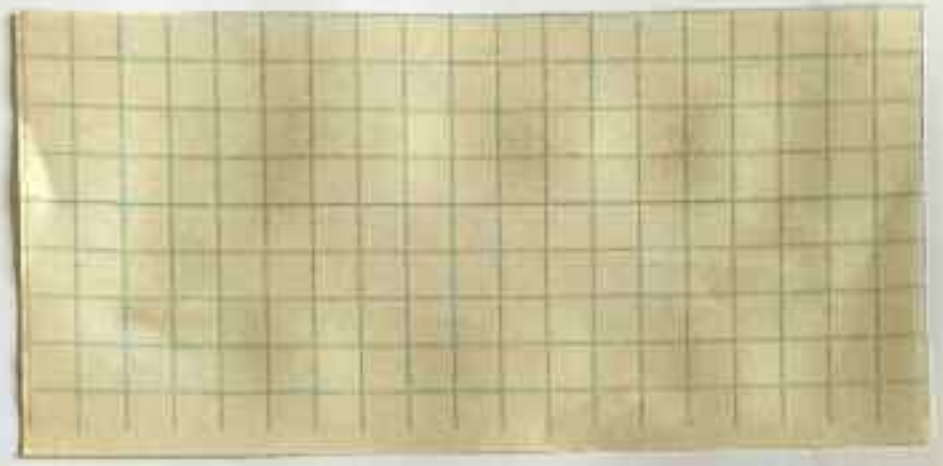
Children's Rights (P1 Unit 5). What rights are being looked at? This could be linked with Unit 1, and might be better named 'Looking after Ourselves'. Some rights that can be covered for children of this age are the right to feel safe, the right to an education, the right to take part in school and class activities.
Prevention of Violence (P1 Unit 6), perhaps could be better named, 'Getting Along'. This should cover things relating to how we get along and how we treat one another, and learning how to resolve conflict without resorting to violence. Given the history of Rwanda, it is understood why this topic is here, but it needs to be clearly stated what the pupils are expected to get out of it. Whilst there are political reasons for these topics, the age and cognitive ability of the pupils cannot be forgotten, and they will learn and remember if they are engaged and enjoy the studies.

Savings (P1 Unit 9). This does not seem very appropriate for pupils of this age. The expectation that pupils of this age will understand 'saving at home, the importance of bank savings, and home reserves and lack of extravagance' is not realistic.

The topics continue in the units in P2 and P3, but the above serves to demonstrate that the learning focus must be clear and in-line with the cognitive ability of the pupils, because pupils will not learn if they are not engaged and interested.

APPENDIX 1

This is the most commonly used exercise book paper for writing available to the primary school children for 50f a book



This is less commonly used but is available for 100f per exercise book

This is the paper which primary pupils should be using to help with their handwriting

APPENDIX 2

EXAMPLES OF QUESTIONS IN THE TAXONOMY

Remembering		
USEFUL VERBS	**SAMPLE QUESTIONS**	**POTENTIAL ACTIVITIES AND PRODUCTS**
• Tell • List • Describe • Relate • Locate • Write • Find • State • Name	• What happened after...? • How many...? • Who was it that...? • Can you name the...? • Describe what happened at...? • Who spoke to...? • Can you tell why...? • Find the meaning of...? • What is...? • Which is true or false...?	• Make a list of the main events.. • Make a timeline of events. • Make a facts chart. • Write a list of any pieces of information you can remember. • List all the .... in the story/article/reading piece. • Make a chart showing...

These two are Literal

Understanding		
USEFUL VERBS	**SAMPLE QUESTIONS**	**POTENTIAL ACTIVITIES AND PRODUCTS**
• Explain • Interpret • Outline • Discuss • Distinguish • Predict • Restate • Translate • Compare • Describe	• Can you write in your own words...? • Can you write a brief outline...? • What do you think could of happened next...? • Who do you think...? • What was the main idea...? • Who was the key character...? • Can you distinguish between...? • What differences exist between...? • Can you provide an example of what you mean...? • Can you provide a definition for...?	• Cut out or draw pictures to show a particular event. • Illustrate what you think the main idea was. • Make a cartoon strip showing the sequence of events. • Write and perform a play based on the story. • Retell the story in your words. Paint a picture of some aspect you like. • Write a summary report of an event. • Prepare a flow chart to illustrate the sequence of events. • Make a colouring book.

Application		
USEFUL VERBS	**SAMPLE QUESTIONS**	**POTENTIAL ACTIVITIES AND PRODUCTS**
• Solve • Show • Use • Illustrate • Construct • Complete • Examine • Classify	• Do you know another instance where…? • Could this have happened in…? • Can you group by characteristics such as…? What factors would you change if…? • Can you apply the method used to some experience of your own…? • What questions would you ask of…? • From the information given, can you develop a set of instructions about…? • Would this information be useful if you had a …?	• Construct a model to demonstrate how it will work. • Make a scrapbook about the areas of study. • Take a collection of photographs to demonstrate a particular point. • Make up a puzzle game suing the ideas from the study area. • Make a clay model of an item in the material. • Design a market strategy for your product using a known strategy as a model. • Paint a mural using the same materials. • Write a textbook about… for others.

These two are Inferential

Analysis		
USEFUL VERBS	**SAMPLE QUESTIONS**	**POTENTIAL ACTIVITIES AND PRODUCTS**
• Analyse • Distinguish • Examine • Compare • Contrast • Investigate • Categorise • Identify • Explain • Separate • Advertise	• Which events could have happened...? • I ... happened, what might the ending have been? • How was this similar to...? • What was the underlying theme of...? • What do you see as other possible outcomes? • Why did ... changes occur? • Can you compare your ... with that presented in...? • Can you explain what must have happened when...? • How is ... similar to ...? • What are some of the problems of...? • Can you distinguish between...? • What were some of the motives behind...? • What was the turning point in the game? • What was the problem with...?	• Design a questionnaire to gather information. • Write a commercial to sell a new product. • Conduct an investigation to produce information to support a view. • Make a flow chart to show the critical stages. • Construct a graph to illustrate selected information. • Make a family tree showing relationships. • Put on a play about the study area. • Write a biography of the study person. • Prepare a report about the area of study. • Arrange a party. Make all the arrangements and record the steps needed. • Review a work of art in terms of form, colour and texture. • Review a film

EVALUATION		
USEFUL VERBS	**SAMPLE QUESTIONS**	**POTENTIAL ACTIVITIES AND PRODUCTS**
• Judge • Select • Choose • Decide • Justify • Debate • Verify • Argue • Recommend • Assess • Discuss • Rate • Prioritise • Determine	• Is there a better solution to... • Judge the value of... • Can you defend your position about...? • Do you think ... is a good or a bad thing? • How would you have handled...? • What changes to ... would you recommend? • Do you believe? • Are you a ... person? • How would you feel if...? • How effective are...? • What do you think about...?	• Prepare a list of criteria to judge a ... show. Indicate priority and ratings. • Conduct a debate about an issue of special interest. • Make a booklet about 5 rules you see as important. Convince others. • Form a panel to discuss views, e.g. "Learning at School.". • Write a letter to ... advising on changes needed at... • Write a report. • Prepare a case to present your view about...

These two are Opinion / Debatable

Create		
USEFUL VERBS	**SAMPLE QUESTIONS**	**POTENTIAL ACTIVITIES AND PRODUCTS**
• Create • Invent • Compose • Predict • Plan • Construct • Design • Imagine • Propose • Devise • Formulate	• Can you design a ... to ...? • Why not compose a song about...? • Can you see a possible solution to...? • If you had access to all resources how would you deal with...? • Why don't you devise your own way • to deal with...? • What would happen if...? • How many ways can you...? • Can you create new and unusual uses for...? • Can you write a new recipe for a tasty dish? • Can you develop a proposal which would...	• Invent a machine to do a specific task. • Design a building to house your study. • Create a new product. Give it a name and plan a marketing campaign. • Write about your feelings in relation to... • Write a TV show, play, puppet show, role play, song or pantomime about...? • Design a record, book, or magazine cover for...? • Make up a new language code and write material suing it. • Sell an idea. • Devise a way to... • Compose a rhythm or put new words to a known melody.

APPENDIX 3

Blooms Analysis guidelines are:

Useful verbs *This is what you want the children to be able to do.*	Sample questions *To analyse something the children need a focus. What is it they are required to do? Having questions before reading is helpful as children then know what to focus on.*
· Analyse · Distinguish · Examine · Compare · Contrast · Investigate · Categorise · Identify · Explain · Separate · Advertise	· Which events could have happened...? What part of the story was real? · I ... happened, what might the ending have been? · How was this similar to...? · What was the underlying theme of...? What do you think the character was trying to tell us? What was the story trying to tell us? · What do you see as other possible outcomes? · Why did ... changes occur? · Can you compare your ... with that presented in...? · Can you explain what must have happened when...? Tell me what happened when…….? · How is ... similar to ...? Is this like anything you know? · What are some of the problems of...? · Can you distinguish between...? What is the difference between …….? · What were some of the motives behind...? · What was the turning point in the game? · What was the problem with...?

Appraisal of the English Syllabus for Primary Level P1 – P4
New Competency Based Curriculum

Below I consider each unit for each year from P1 to P4. Each unit comprises 28 lessons of 40 minutes each. That is 7 periods/lessons a week for 4 weeks. That amounts to nearly 19 hours of instruction.

My comments are based on the printed syllabus. I obtained this syllabus on the REB website in September 2015.

At the end of this appraisal of the units there are some overall comments and suggestions.

I write with 24 years of experience of helping in the teaching and learning of English in Tanzanian and Rwandan government primary schools, and of the many difficulties encountered by the teachers there. My comments are set down in the hope of helping to improve the teaching and learning.

The English curriculum, as with the other curriculum documents, is topic-based. This is not helpful. Indeed, the topic dictates the language items, rather than a systematic introduction of language items adopting suitable vocabulary. This is the 'tail wagging the dog', and this gives rise to many of the shortcomings in this curriculum.

P1- Unit 1

Unfortunately, in the first column 'Knowledge and understanding' there is an error in the grammatical terminology. 'Personal and possessive pronouns' should be 'personal and possessive adjectives' as it is '*my, your, his, her*' which are to be taught. This same mistake is found on page 18 of the syllabus document.

Possessive adjectives are very difficult to teach, and especially to children of a young age. The teacher needs help in activities that indisputably denote possession. This is best done with 'concrete' or actual objects. To introduce this difficult grammatical item with something 'abstract' as '*name*' makes the teacher's job more difficult. It would be better to use '*shirt*'. Every pupil will be wearing a shirt, and it is indisputably something belonging to that pupil. Other items such as '*bag, 'book' 'pencil*' also bring difficulty as they may not be the actual property of the pupil, but might be borrowed items or even items belonging to the school. For teaching methodology the teacher can stand behind the pupil, assist him/her with actions, and say on his/her behalf (or with him/her) '*this is **my** shirt'*. It is possible to do that with '*my name is Felix*' but there is nothing to 'hold' or to 'see'. Whereas a '*shirt*' is visible to all other pupils.

There is then the introduction of '*this*'. It is for the textbooks to expand on this, as the curriculum document is silent. '*This*' is to be used when touching an item. The question '*Who is this*?' requires an answer. The obvious answer, assuming all pupils in the class cannot touch Felix at the same time, is '*That is Felix*' –and yet '*that*' is not introduced in the unit.

Classroom instructions are introduced. The inclusion of '*speak'* is potentially problematic. '*Speak*' as a classroom instruction is not used. The teacher might say, '*speak up'* or '*speak loudly'* or '*speak to Ivan'*, but '*speak*' on its own is not used.

The problem with actions for the classroom instructions is that the use of the present continuous tense is being invited. If the teacher says '*clap*', then the pupils can do the action and so obey the instruction. However, if the pupils are to speak whilst they are doing the action (which I strongly suspect is what will happen in the classroom) then the pupils need to say, '*I am clapping'*. The present continuous tense is not mentioned in the curriculum document.

This first 19 hours of instruction has invited rote learning or learning by translation. There is no learning by 'seeing the meaning' or understanding of the meaning. Possessive adjectives are difficult to teach, and it is evident from working in the primary schools that the pupils are not able to use them properly which means that they are not being properly learnt.

P1- Unit 2

Here '*this*' and '*that*' are used, but the teacher will need to be supported and guided to know when each word is used. '*This*' is used if you touch an object and '*that*' is used if you point to an object (or you cannot touch an object).

Colours and plurals are introduced together. This is potentially confusing to young learners, and is overload for young learners. Work should be done using singular items and the sentence structures used in the singular. Only when those structures are embedded should learning of plurals be introduced.

Plurals of nouns in the English language fall into three distinct categories, and these are because of the different pronunciation of plural words.
There are those with the '*ss*' sound, those with the '*z*' sound and those with the '*iz*' sound. These three categories should be introduced separately. This will help the teacher as much as the pupil.
The '*ss*' sound comes after unvoiced sounds. For example, '*books' 'cats' 'cups'*
The '*z*' sound comes after voiced sounds. For example, '*dogs' 'pencils' 'pens' 'chairs'*
The '*iz*' sound comes after words ending in '*s*' '*z' 'x'* and '*ch*' sounds. For example, '*houses' 'dresses' 'faces' 'boxes' 'churches'.*

Along with plural nouns there is the plural verb form '*are*'. The form '*these are'* is in the curriculum, but there is no mention of '*those are',* and yet '*that is*' in the singular is used.

Adjectives of colour are then introduced. It is not evident from the Kinyarwanda curriculum that these are familiar to the pupils in their mother tongue as a specific language item. There is the difficulty of word-order, as English puts the adjective before the noun whereas in Kinyarwanda the adjective follows the noun. This is something that needs to be contrasted and learned accordingly. It is too soon in the English curriculum to be introducing this.

The use of the verb '*have got'* is far too difficult at this stage. It is quite an advanced language item. It is a multi-word or two-word verb, and it is one of those verbs where its components are split. So, for instance 'to stand up' is similarly a multi-word verb, but the '*stand*' and '*up*' are never split; as in '*Are you standing up*?', '*Did you stand up*?' The use of '*have got*' is fraught with difficulty.

Firstly, it is split in the question '*Have you got..*?' by the object coming between the verb-words. Not only that but it does not fit the pattern of the present simple verbs which are about to be introduced. That pattern is that the question form uses the auxiliary verb '*do*', as in '*Do you like bananas*?'. It seems unnecessary to introduce young pupils to the unique structure of '*have got'* when the use of '*to have*' would suffice at this stage. In fact, nowhere else in the syllabus for P1 to P4 is the '*have got*' structure used again.

Even if '*to have*' is adopted, then to introduce the interrogative form at this stage is ambitious.

The indefinite article is introduced. It is introduced as '*a*'. The introduction of '*an*' is not until P2 Unit 8. The teachers need to be guided to know the difference in use of '*a*' and '*an*', and to use '*an*' before a noun beginning with a vowel sound, as in '*an umbrella' 'an ant'*. Much guided is needed for the teachers in the use of '*a*' and '*the*', so that in this unit the teacher does not continue to use '*a*' when in fact s/he should be using '*the*'. This is a very difficult grammar item as the indefinite and definite articles are absent from Kinyarwanda.

Again, at this very early stage of learning a second language there are far too many grammar items introduced. Each item needs to be introduced carefully so that pupils 'see the meaning' and then practise using the sentence structure until they are familiar with it. Only then can a another language item be introduced. Without these 'building blocks' the language is not successfully learnt. Indeed, this unit seeks to introduce all the colours of the rainbow, classroom objects and their plural forms, and the structures 'that is/these are/I have got/ have you got?/Is that your bag?/Is it blue?/What colour is this?'. This is far too much for children of this age to learn. Native English speakers of the same age would have difficulty in knowing the colours of the rainbow.

It is not clear if writing is introduced as the curriculum states, 'Copy the names of classroom objects'. That could be in writing or orally. However, if any writing is expected then that is wholly misplaced. In their Kinyarwanda studies the pupils are only learning how to write some of the letters of the alphabet at this stage in P1.

P1- Unit 3

In this unit the use of '*to have*' is introduced. This is much more grammatically sound at this stage of learning than '*have got*' – see the comments in Unit 2.

Age is introduced, the short form '*I am 10'* is introduced rather than the full form of '*I am ten years old'*. The full form should always be introduced.

Unfortunately, the definite article '*the*' is introduced without acknowledging its introduction in '*the head teacher'*. This will cause confusion, and the teacher as well as the pupils, in all probability, will not know why it is used.

Numbers 1 to 20 are introduced. Knowing that telling the time is to be introduced in P2 it would be helpful if within this number work the pupils could start to count in fives, as in '5, 10, 15, 20'. However, of significance, is that the pupils have only just learned to count to 20 in the Mathematics curriculum. It seems too ambitious, and is misguided, to burden the pupils with the numbers in English at this stage.

P1- Unit 4

In this unit again the definite article is introduced without its use being specifically stated in the Language Structure.

Parts of the body are introduced and this leads to good revision of possessive adjectives where full meaning of possession can be gleaned.

The question '*what colour are…..?*' is a confusing structure. It is singular noun followed by a plural verb '*colour…are'.* This would need to be carefully introduced and it is possibly unnecessary at this stage to use this structure. It would be advisable to start with the singular as in '*What colour is this sock*? Or, if the plural form is to be used, then to ask '*Are the socks blue*?' However, in the classrooms the erroneous structure '*It is blue colour'* is heard. This is evidence of the lack of guidance given to the teachers on the sentence structures.

Clothing is introduced. '*Trousers'* are in the list of clothing. Again care needs to be taken, as this is a plural word. It is singular when used as '*a pair of trousers'*, but the common short form of '*trousers*' is a plural noun. This gives rise to structures '*My trousers are blue*.' '*Where are my trousers*?' Far more guidance for the teacher s is needed. The teachers very often mix the singular and the plural, such as '*This is socks/This is shorts'* because the guidance is lacking and sufficient attention is given to the all-important sentence structures.

The present continuous tense is introduced. In order for pupils to understand a tense the use or meaning of that tense must be clearly demonstrated. The present continuous is used for an action or arrangement in progress at the time of speaking but which will have an end at some time. The usual introduction of the present continuous tense is for actions which the teacher and pupil can do – and then they can see the meaning of the structure. For instance, '*I am drawing'* if the words are spoken at the same time as the individual is drawing on the blackboard. My concern here is that '*he is wearing…*' is not a clear enough use of the verb tense for the pupil to be able to understand the difference between that structure and the present simple structure to which, so far, she/he has been introduced.

Writing in English is certainly in this unit as the curriculum document states, '*Write the names of clothes and parts of the body'.* This will involve pupils using letters which they have only just learned how to form in their Kinyarwanda studies. In their Kinyarwanda studies they are not used to writing whole words. There has been no mention of reading in the curriculum. Reading English at this stage is, indeed, too early. However, you cannot write what you cannot read. That is, if the exercise is to have any meaning or educational worth. So, for the pupils to be writing English at this stage means it will be a purely mechanical exercise which will not help their learning. Indeed, mechanical copying leads to letters being missed out, and no learning takes place.

P1- Unit 5

This unit introduces many difficult items.
Firstly, it introduces countable and uncountable nouns, with no mention of this grammatical item in the Language Structure. However, the structure, '*this is rice'* is introduced alongside '*these are beans'*. The teacher should be guided, and should, at this stage, use only the countable items.
This is the first introduction of the present simple tense in its regular structure. So far the pupils

have been introduced to the present simple of the verb *'to be'* which is irregular, and the unique structure of '*have got'*. As such the teacher will need to be guided to alert the pupils to the third person singular addition of '*s*' to the main verb stem, as in '*she like**s** beans*'.

Then the interrogative and negative are introduced. These are difficult as the auxiliary verb '*do*' is used. It is then the auxiliary verb that takes the addition of '*s*' in the third person singular and the main verb (e.g. *like*) reverts to its infinitive form, as in '*Doe**s** she like beans?*' The teacher who is struggling with English would need to be carefully guided in this. Such guidance should be in the curriculum document, as part of the 'Language Structures'.

The negative is difficult and the syllabus even adopts the contracted form '*doesn't*' as opposed to the full form of '*does not'*, as in '*he doesn't like rice'.* It is hoped that the textbooks will use the full form and then explain the contracted form and its pronunciation. The contracted form should only be used in oral English, and not in written English of any formal nature.

I wonder if other verbs are going to be introduced in this unit so that the pupils can see the structure of the present simple tense with other main verbs?

The meaning or use of the present simple tense which is usually introduced for beginner learners is that for actions which happen habitually or every day. This gives pupils a clear understanding of the present simple tense. They can then distinguish it from the present continuous tense of actions in progress at the time of speaking of 'now'. The introduction of '*to like*' to demonstrate the use of the present simple is not so clear. Overall the present simple tense is used to denote fact; that is what the speaker believes is fact at the time she or he utters the present simple structure. That gives rise to the use of the present simple for future events '*Kigali team **plays** Nyagatare team next Saturday*'. There is then the use of the present simple tense for telling jokes or stories, '*This man **enters** the bar, he **gets** a drink, then he **falls** over*..' These uses, or meanings, of the present simple tense are introduced later in this P1 syllabus. However, they are too advanced uses for young learners to grasp.

One activity suggested is for the pupils to represent data in a bar graph. This has not been sufficiently covered in the Mathematics curriculum and it seems unnecessary to use it here. A graph is an 'abstract' item, and children of this age (P1) who are still in the 'concrete' stage of learning will find this difficult in a foreign language.

Again, this unit contains far too much for young learners. Firstly, there are too many new vocabulary items from the unit topic focusing on food, and the language structures introduced are far too many. The pupils have not had nearly enough time to practise all the language structures introduced so far, and by this early stage in their English learning many of them will be muddled beyond rectification.

P1- Unit 6

Prepositions of place are introduced. '*Behind*' and presumably '*in front of'* are included. These are difficult language items and much guidance needs to be given to support the teachers before they teach these items.
The position where the teacher stands is crucial, as she must see things the same way as the pupils so that '*the ball is behind the box'* has proper meaning if the box is the first object in the line of sight of the both teacher and pupils.
There is then difficulty with objects that have a '*back*' and a '*fron*t' such as *a car, a person, a chair.* The teacher would need to be guided in this so that confusion in the classroom did not arise.

The structure '*there are*' is introduced. This needs to be contrasted with '*they are'*, and the pronunciation of the two structures practised so that the difference is grasped. This will occur as in '*Where are the pencils? **They are** on the table. How many pencils are there? **There are** two pencils*.' These two structures should be specifically noted.

Again the curriculum uses contracted forms, '*Where**'s** the blue pen? 'I**t's** Mutesi's'*
The contracted form of '*it is'* to be '***it's***' placed so near to the apostrophe to denote possession '***Mutesi's***' is unfortunate, and will lead to confusion. The golden rule is to teach one thing at one time. This, therefore, should concentrate on possession, and so the full form of '*it is'* should be used.

The awareness of lower case and capital letters is something that the pupils, from experience in the classrooms, have not mastered in their mother-tongue learning. The curriculum document does note this as an item to be emphasised; that people's names start with capital letters, but it is not addressed in practice as the pupils are already using capital letters randomly in their writing.

P1- Unit 7

This unit continues with the present simple tense of main verbs other than 'to be'.
As the comments for Unit 5 state, it is unfortunate that the use/meaning of the present simple tense in this unit is that of 'fact' in the speaker's mind when s/he utters the words. It is not easy for the pupils to understand when and how they should use the present simple tense.
For example, if a pupil is staying with a relative while studying at school but goes home for the holidays, then the pupils has two structures s/he can use. For example, s/he is studying in Kigali and staying with an aunt, but goes home in the holidays to Rubavu. That pupil can say, '*I am living in Kigali'* (as it is an action in progress which will come to an end) and '*I live in Rubavu'* as that is pure fact of where his/her real home is. This, of course, is far too complicated for beginner learners in P1. However, it illustrates the point that the structures introduced at this stage need to be crystal clear so that the pupils really understand the meaning and use. The meaning and use which the pupils should be learning initially is that of everyday or habitual actions.

Again the syllabus uses contracted forms, '*There**'s** a table'* This should only be heard by the pupils and they should not read or write it. With the apostrophe of possession having been introduced, for the pupils to see another use of the apostrophe is confusing.

P1- Unit 8

This unit concentrates on the present simple tense. Again the use or meaning adopted is that of fact in the speaker's mind at the time of speaking, using '*to eat'*.
It would be much easier for the pupils at this beginner-level to see this tense used for 'Every day' occurrences. So, if the target language was '*Every day our dog eats meat'* that would be more helpful to the pupils' learning of when and how to use this tense.

There is another 'uncomfortable' structure in '*My favourite animal is goats'.* This is a singular verb followed by a plural noun. For learners at this stage it should be '*my favourite animals are goats'*. It could be '*my favourite animal is a goat'* but the plural structure is more fluent.

Also in the Learning activities column it is suggested that '*toads*' is an anagram of '*goats*'. It is not. There is no '*g*' in '*toads*' and conversely no '*d*' in '*goats*'. This error is not helpful.

P1- Unit 9

This unit adopts the 'Every day' use of the present simple tense. This is the use/meaning which will make the most sense to the pupils, and should have been the first use of the present simple tense when it was introduced in unit 5.

However, if any actions are to be adopted to accompany the 'every day' action then there should be no speaking by the actor at the time he/she is performing the action. This is how you separate the meaning of the present continuous tense from the present simple tense. This is of huge importance, so that the pupils realise the meaning of each tense. It would be easier for the teacher if the pupils already knew the present continuous tense, so that she could ask for activity 'now' using the present continuous tense, in contrast to the present simple tense for 'every day'. Without the use of 'time markers' the teaching of these tenses at beginner level is very difficult. The pupils should know the 'time markers' of '*every day'* and to be able to distinguish that from '*now*'.

Telling the time is introduced. This is not only difficult in terms of new vocabulary but very difficult because the telling of the time in English differs so much from Kinyarwanda time.
However, by this stage in P1 the pupils have not been taught how to tell the time in their mother tongue Mathematics. That is not introduced in the Mathematics curriculum until P2. This is, therefore, far too difficult for the pupils in their English lessons.

Before pupils begin to learn telling the time is it very helpful if they are used to seeing a circle with the numbers 5 to 60 written round the edge. They can count in 5s, and count in 10s. They should know the basic fractions of ½ and ¼ from their studies in Mathematics, and see the circle split into two halves vertically, and then split into quarters. They should then see a circle with the numbers 1 to 12 written around the edge. They should play a game both in English and in Kinyarwanda saying numbers which are opposite each other. For instance, if one pupil says '2' then another pupil should say '8' either replying in English to English, or replying in Kinyarwanda to English. A further exercise of walking 'to' and 'past' is practised.
Once the pupils are confident in these exercises then they are ready to be introduced to telling the time. (See *Intangiriro 1* and *2* written for primary pupils in Rwanda).

P1- Unit 10

Without stating so in the Language structures, this unit introduces the past simple tense. Perhaps there is a typing error in that '*present simple tense'* in the Language structures should be '*past simple tense'*.

The introduction of the past simple tense needs careful direction. Again, a 'time marker' of '*Yesterday*' is useful for beginners so that they understand the 'past-ness' of the tense.

Verbs following the regular form of the past simple tense should be used initially so that the pupils can see the pattern of how to form the tense. Irregular verbs can then be introduced once the regular pattern is grasped.

The stative verb '*was*' is not so easy with the state of people, as in '*he **was** still hungry'*. It is more easily learned with revision and extension of the prepositions of place. That is, put a ball on the table, '*the ball is on the table'*, then remove the ball and put it on the floor. '*Where is the ball?'* '*The ball is on the floor'. 'Where **was** the ball?' 'The ball **was** on the table'*. This gives a visual and clear understanding of the past-ness of this irregular verb.

The first year of learning English is too rushed with far too many language items being introduced, and each language item has not been given sufficient time for its meaning to be understood and practised until it is embedded. Therefore, the essential building-blocks of the language are not in place.

P2- Unit 1

At the beginning of the new school year the syllabus starts with revision.
However, new greetings are introduced.

The English greeting 'Hi' is slang and should not be in a syllabus and should not be taught. Whilst it is much used in the English speaking world, its use is controversial, and many times it is not used appropriately by native English speakers and, as such, can cause offence. It is strongly suggested that this item of slang language be removed from the syllabus.

The modal auxiliary *'can'* as a request is introduced.
Then '*may*' is introduced similarly as a request. It is suggested that '*may*' is falling out of use, and that the pupils need only learn '*can*'. If the pupils understand that these words are interchangeable in this use, then there should be no problem.

P2- Unit 2

One new structure introduced here is the use of the gerund after the verb '*like*'.
The pupils may well find this difficult. However, it is a shame if by this stage they have not been exposed to the present continuous tense such as '*I am running'* '*I am swimming'* so that they would have prior knowledge of the words and the spelling. This is where experience in English is needed, and the use of 'backward design' would lead to the teaching of the present continuous tense first, before this more advanced structure of '*like*' with the gerund.

The other new structure is the modal auxiliary '*can*' but this time expressing ability. Again, the different meanings or uses needs to be made clear.
The negative is also introduced, and the full form of '*cannot*' should be introduced before the contracted from '*can't*'. The pronunciation of '*can't*' would need to be made clear.

P2- Unit 3

The daily routines, or 'every day' activities using the present simple tense are revised. It is a shame that this was not introduced more in P1.

Telling the time is extended, and this has not been fully embedded in the pupils' Mathematics studies.

Ordinal numbers are introduced, and it is not clear whether the pupils are familiar with these in Kinyarwanda and Mathematics.

The years are introduced. For 2013 it is given as 'two thousand and thirteen', and I would suggest the alternative of '*twenty thirteen'* is also given as this is consistent with the other centuries where the year is always referred to in that way, such as '*nineteen eighty'*.

P2- Unit 4

The unit misses an opportunity to differentiate between countable and uncountable foods.
This grammar structure of countable and uncountable is not formally stated as introduced until P3 Unit 5, although '*how many'* is in P3 Unit 1, and was in P1 unit 6.
Before the pupils are fully introduced to countable and uncountable nouns and the different grammar structures in P3 it would be good if, nevertheless, the teacher was helped to show the different nouns in units such as this one.

The classification of '*fruit*' and '*cereals*' and '*vegetables*' would need careful guidance for the teacher. 'Fruit' does have a plural but in the context used here it is in the singular.

There is a difficult structure, '*my favourite food is bananas'* where a singular verb is followed by a plural noun. This may cause confusion, and has been noted before. The vocabulary in this unit is difficult because of the 'countable' and 'uncountable' items.

P2- Unit 5

Story-telling in the present simple tense is not common. Most stories are told in the past tense. The concern is that although there has been an emphasis on the present simple tense its uses and meanings will not have been understood by many of the pupils. The pupils have seen the present simple for facts, for daily routines, for facts again, for daily routines again, and for story-telling. Unless each of those uses/meanings is made very clear then I suspect the pupils will not know when and how to use the present simple tense as opposed to some other tense.
For instance the suggested use of the song '*this is the way we…..*' will presumably be performed with actions. Those actions, with the singing at the same time, should be used with the present continuous tense – as it is an action in progress at the time of speaking.

There is a problem of context too, in saying that the postman delivers the letter. There is no postal delivery service in Rwanda with postmen but rather delivery to post-office boxes.

Punctuation with direct speech is introduced, and as much as this is important, it is too difficult at this stage. The pupils are not ready to be writing short stories in English. The pupils, from classroom experience, are struggling to write in Kinyarwanda.

P2- Unit 6

This is a unit concerned mainly with vocabulary, and revision of structures.
However, the structure '*how long does it take to get to….?*' is a new structure, and uses the infinitive of purpose. That same purpose can be expressed by using *'in order to get to'* or '*so that you get to* ' or just '*to get to'*. These structures are advanced, and have no place in a P2 curriculum. It is expected that this structure will be learnt by rote or by translation and will have no thorough meaning attached to it.

P2- Unit 7

This unit uses the present continuous tense. However, again, as in P1 Unit 4, the use of the tense is not as clear as it could be to aid the understanding of the pupils.
This use of the present continuous '*it is raining' 'the sun is shining'* is background description. It would be better if the pupils had a thorough grounding in and grasp of the present continuous for actions in progress ('*now*') at the time of speaking, before this harder- to-understand use and meaning is used. In fact, they have been exposed to so much use of the present simple tense for fact, that they might be forgiven for thinking the present simple should be used here, '*the sun shines' 'it rains'.* Once pupils are muddled like this in the early stages of their learning then it is very difficult to rectify things.

The activity of interpreting a line graph is something which has not been mastered in their Mathematics studies. The suggested activity of constructing a line graph is beyond the ability of P2 pupils.

The activity of using anagrams to rearrange the letters of a word, is not pedagogically sound at this stage. The skills the pupils need to develop is of word recognition, which is achieved by seeing the correct word, and learning to identify it and distinguish it from other similar words.

P2- Unit 8

In this unit the curriculum uses '*an*' for the first time, '*an elephant'*. This should have been introduced much sooner.

The unit also uses the basic use of the present continuous tense for actions in progress, and it is a shame this was not introduced early on in P1. For example, '*the lion is sleeping' 'the elephants are eating grass'*. This is the use and meaning which makes learning easy, and the fact that it is only introduced at this stage, does call into question the design of this curriculum.

The unit also anticipates a knowledge of geography (*Asia, Antartica, Africa*) which may well not have been grasped by the pupils in their other subjects.

P2- Unit 9

This unit states in the 'Knowledge and understanding' column that there is to be identification and use of question tags. I see no question tags in the 'Content' column. As question tags are very much an oral item of speech, I would doubt the suitability of introducing them at this stage.

This unit is using mathematical knowledge gained in Kinyarwanda mathematics lessons to be used as a basis for English vocabulary. It is proven that pupils can perform mathematical equations quite easily in another language. However, the language for multiplication is too much, and the pupils are not ready for multiplication and division in English.
However, one big problem arises with multiplication – it certainly does when transferring from Kiswahili into English and vice versa.

In English *5 times 3*, is concentrating on the number 3, and is asking for 5 lots of it:
III III III III III
In Swahili, and I expect the same might be true of Kinyarwanda, '*5 mara 3'*, concentrates on the 5 and is asking for 3 lots of it.
IIIII IIIII IIIII

If this is the case, then extreme care needs to be taken.

It is hoped that the numbers 1 – 100, and 1,000 are fully understood in Kinyarwanda. The pronunciation of '*thousand*' is difficult and will need attention.

P2- Unit 10

This unit at the end of the school year has a lot in it. It is a shame that practice of the past simple tense did not appear in earlier units in the year. The past simple was last mentioned in the syllabus in P1 Unit 10.
This unit introduces the negative and interrogative. As for the present simple tense the auxiliary verb 'to do' is used. This needs attention and much practice (not least I expect by the teachers) as the past of the main verb reverts to its infinitive form and the auxiliary verb takes the past form: *I **liked** the man. Did you **like** the man? He did not **like** the man*.'

Then the '*going to + infinitive*' tense is introduced for future meaning.
It is a shame that the pupils have not had much use of the present continuous tense, as then they would be familiar with the formation of '*…am going'*

It would be prudent to point out to the teachers as a guide, the difference between '*I am going to the market*' in the present continuous tense, and '*I am going to buy bananas at the market*' as the structure of this new tense. This should not be brought to the attention of the pupils but the teachers do need to know the difference before they start to teach this new structure.

By the end of P2 the expectations in the curriculum are beyond the ability of the pupils. The attempt to link the English topics to the pupils' learning in other subjects is contrived and unhelpful. It gives rise to needless amounts of new vocabulary, and impedes a logical introduction of language structures, and practice and revision of those structures.

P3- Unit 1

By this stage I am concerned by the emphasis on the present simple tense.
This unit uses again '*can*' of ability, and introduces imperatives for giving directions.

The unit is concerned with giving directions and maps. Maps are abstract concepts, and care needs to be taken with their use. The pupils are expected to write directions. It is doubtful that this an exercise which they could do well in Kinyarwanda.

P3- Unit 2

This unit revises the apostrophe of possession, and the vocabulary for jobs and occupations.
The new structure is '*want to + infiniive'.*

Again, this unit gives rise to a lot of new vocabulary, and expectations in writing which are beyond the ability of most of the pupils in their mother tongue.

P3- Unit 3

This unit is revision of time-telling, dates and daily routines.
New items are '*minutes, hours, days'*, and the adverbs of frequency, '*usually, always, sometimes, never'.* Those adverbs of frequency might have been better introduced in previous units as they would help to give meaning and understanding to the use of the present simple tense.

P3- Unit 4

This unit revises the past simple tense, and the future with '*going to + infinitive'*.
Letter-writing is introduced and yet it is not introduced in Kinyarwanda studies until Unit 7 of P3.

P3- Unit 5

This is the first unit in which *Countable and uncountable nouns* are mentioned.
The unit uses countable nouns and introduces '*few*' and '*a lot of'* and revises '*many*'.
This could have been introduced in earlier units to good effect.

As the written task is about the use of animals then the teacher should be guided to use the structure already met of '*to get*…' The structure '*we use xx for..*' might come in, and this should be set out in order to guide the teacher.

P3- Unit 6

This unit acknowledges the structure of 'infinitives of purpose', even though this has been introduced before in P2 Unit 6. Here one example is, '*I use soap to wash my hands'* which is also '*I use soap in order to wash my hands'* and '*I use soap so that I wash my hands'* At this stage all those structure could be taught as they will help in future studies in P4.

Again, the topic seems to be dictating the language structure, and in so doing the introduction of structures has little logical order.

P3- Unit 7

This unit is a revision of clothes, with the introduction of some new adjectives. It revises the present continuous tense. At this stage, with all learning conducted in English in P4, the pupils in P3 need be learning more language structures.

P3- Unit 8

This unit does not introduce any new structures but is for vocabulary. It is assumed that the words are already well understood by the pupils in their geography studies. However, this is another example of the topic 'wagging the tail of the dog'.

P3- Unit 9

This unit revises the past simple tense, the present simple tense and '*few*' and '*many*'.
New items are '*most*' and '*some*'
Vocabulary of mathematical equations is revised.
New vocabulary of '*vertical axis'* and '*horizontal axis'* is introduced. In P3 these terms would be better introduced in the Mathematics lessons where they would have immediate context.

A new item is '*what comes after/before 765?*' This appears straightforward, but the teacher should have careful guidance.

The answer to '*what comes after 765*?' is '*After 765 comes 766'.* The alternative answer of '*766 comes after 765*' is confusing for pupils as the larger number is seen or heard before the smaller number.

So the answer to '*what comes before 765*?' is '*764 comes before 765'.* This is guidance in helping the pupils to 'see the meaning'.

P3- Unit 10

As for the last lesson for the year in P1 and P2, here an important grammatical structure is introduced right at the end of the year. It would seem more efficient to have the new important structure before the end of the year, so that the end of the year is for practice and revision, and consolidation.

This unit tackles some of the complexities of countable and uncountable nouns. The use of '*many' 'much' 'any'* are introduced in the specific context of uncountable and countable.

At this stage the pupils have learned the English from the syllabuses of P1 to P3, and will enter P4 with all subjects taught through the medium of English.

P4- Unit 1

This unit revises the present simple tense.
The new structure is '*would like to + infinitive'*
The activity of gathering data and constructing a bar graph is used again. It has now been used in 4 units including this one (P1 unit 5, P2 unit 4, P3 unit 9).

P4- Unit 2

This unit revises the present simple tense, and '*like + gerund'* as in '*I like running'*. The past simple tense is also revised as is the future with '*going to'*
New vocabulary of adjectives is introduced, '*tall, short, tall, thin, attractive, confident'.* Some of these are basic and should have been taught a long time previously. However, '*confident*' and '*attractive*' will be difficult to teach and I wonder what guidance will be given to the teacher as to how to teach their meaning?

Comparatives are introduced, and again this structure could have been introduced in a previous year.

P4- Unit 3

This unit revises the present simple tense, and giving directions, as well as comparatives.
There is little new material.

P4- Unit 4

This unit, with the topic 'Weather', is very similar to P2 Unit 7, except that the past simple is now included.
The modal auxiliary '*can*' used for probability is introduced but is not noted in the Language structure.
It would be advisable for the teacher to be aware of this use/meaning of the modal auxiliary so that other examples can be given in order to make the meaning clear.
'When – clauses' are introduced, and this could have been introduced in P3.

P4- Unit 5

This unit, in 'Jobs' is very similar to P3 Unit 2.
The future simple with '*will*' is introduced.
In the syllabus there is no mention of '*shall*' for the first person singular and plural. Whilst its use for ordinary statements is rare, it is a structure that needs be to known for '*Shall we…?* etc.
Expressing the future using 'will' needs to be compared to the ways of expressing the future using the 'gong to + verb' tense. There are similarities and differences, and the pupils need to know these. Only if the pupils fully understand the uses and meanings of tenses will they be able to use them properly. From experience in the classrooms, there is far too much emphasis on 'form' (syntax) and not nearly enough work done on the use/meaning. The latter is of overriding importance if the language is to be understood and used.

P4- Unit 6

This unit, on wild animals, revises the present simple tense, and the comparative.
It introduces the superlative.
It expands on the countable noun structure by introducing '*there aren't any'*. The unit does not use '*there isn't any'*. That is a shame as that is often a mis-used structure in East Africa with many speakers saying '*there is no any…*'.

The unit introduces the present perfect tense. However, in the example in the syllabus the introduction is made with an irregular past participle. It would be more helpful for the pupils to learn the formation and the meaning of this new tense with verbs having regular past participles. Instead of '*I have seen*' (the irregular past participle of '*to see'*, which has a past form of '*saw*'), it would be more helpful to use '*I have looked at'* or '*I have pointed to'* or '*I have played with*' so that the past forms are the same as the past participle, and, therefore, formation of the tense is not a big problem. Again the topic 'wags the tail of the dog' and is dictating sentences that do not best illustrate the language structure being introduced.

There are several uses/meanings of the present perfect tense, and this use/meaning is for general past experience where the time is not mentioned and is not necessary. The teacher needs to be guided in this. As such there are no 'time markers' apart from '*ever*' as in '*have you ever seen a monkey?*' to denote general past. Very often the next question is '*When did you see a monkey?'* which uses the past simple tense in order to get a specific time reference. It would help both teacher and pupil to have these two tenses used together in this way.

P4- Unit 7

This unit introduces the modal auxiliaries of '*must*' and '*must not'* as well as the first conditional. The context of rights and responsibilities might be better and more successfully left to be discussed in the pupils' mother tongue, as these are abstract concepts.

P4- Unit 8

This unit revises the past simple.
It also expands on countable and uncountable noun structures with the introduction of '*fewer*' and '*less*'. It might have been better for those items to have been introduced in P3 Unit 10, and revised here. There is the introduction of a lot of new vocabulary, with some difficult items such as 'export'.

P4- Unit 9

This unit is set in the context of world geography and general knowledge. It is assumed, but not known, that the items will be familiar to the pupils in their previous studies in other subjects.
The unit revises the comparative, superlative, and the present perfect tense.

The use of '*have been'* should have a note for the teachers. It is, in this context, the past participle of the verb '*to go'*, and that verb has another past participle '*have gone'*. The difference between the two should be pointed out to the teacher. The meaning of '*have been'* is that the person has come back, whereas the meaning of '*have gone'* is that the person is still there.

P4- Unit 10

This unit introduces *'let's'* and *'don't'*.
It also introduces '*too*' as in '*too much/many'* which is something which could have been introduced earlier on.

One of the activities for the pupils is to write about cause and effect of climate change. I wonder if the pupils could do this in Kinyarwanda. It is a difficult assignment.

The Appendix

On page 152 and page 154 there are some typing errors in the phonemic symbols.

On page 152 the sound for 'tourist' is given as /ʊə/. This is not so. The sound for 'tourist' is the same as 'door' which is the /ɔ:/ sound.

An example of the /ʊə/ sound is 'pure'

On page 154 the phonemic symbols for 'catch' are written as those for 'cat'. The phonemic symbols should be /kætʃ/

Wording in the Curriculum

In the 'Knowledge and understanding' column when specific target words or phrases are used they should be in inverted commas. Without some way of differentiating those words it makes the sentence very difficult to read for non-fluent readers.

For example, in P1 Unit 3 on page 15, the first paragraph in the 'Knowledge and understanding' column is, "Recognize the use of how old and this is my".

It would be much clearer if it was written, "Recognize the use of '*how old'* and '*this is my'*.

This occurs in P3 Unit 9 although word 'equals' is written in italic font. In P4 Unit 7 the words 'must/mustn't' could be in inverted commas and/or italic font.

Overall comments, observations and suggestions.

Overall approach

The curriculum adopts a 'topic' or 'subject' approach as a means of determining the language and structures to be introduced or used. The topics are repeated and the content might well not inspire the pupils, particularly those in P1 and P2.

Language structures

There is an over-emphasis on the present simple tense, and even with that emphasis it is doubtful that a full understanding of it uses and meanings will be grasped by the pupils. Also the present simple tense gives limited scope for any actions to be done with the production of the language. The limitation is that if actions are performed then it is very likely that the present continuous tense should be being used. It would take a very good teacher to use actions in silence and then to say the target language.

The introduction of the present continuous tense could be much earlier on in the syllabus. Its introduction should be solely on the use/meaning of actions in progress at the time of speaking. This use of the tense gives rise to actions which makes the learning for young children fun, and gives their learning full meaning. Also the present continuous tense uses the auxiliary verb '*to be'* in the present simple tense, and this reflects the first sentences the pupils have learned, '*I am Felix', 'He is Ivan'* etc. Not only that, but the use of the present continuous tense would enable the pupils to be ready to understand the gerunds used with, for example, '*I like running'*. Also the formation of the negative and interrogative is not so very difficult as the auxiliary verb is already used in the positive form of the tense. This compares with the present simple tense in which the auxiliary verb '*to do'* is only used in the interrogative and negative forms, and does not appear in the positive form of the verb (unless, of course, it is used for emphasis, which is an advanced use, as in '*I do like eggs'*).

The way the present continuous tense is introduced and used in the curriculum does not give rise to an immediate understanding of it use and meaning. It is introduced as '*He is wearing* a shirt', which for the pupils is perhaps indistinguishable from '*he wears* a shirt'. The next introduction is for background description, such as *'it is raining', 'the sun is shining'* and, again, for young pupils it is not clear why this tense is being used as opposed to the present simple tense. With young learners, and indeed with many teachers who are struggling with the English language, the meaning and use needs to be made as clear as possible on its first introduction.

In the curriculum there is insufficient recognition of separate language structures. The use of 'a/an' and 'the' is difficult and needs specific attention especially for the teachers. There is no mention of language structures such as, 'the xxx of the xxx/the door of the house', 'tell X to…/ask X to …..', and there are many, many more structures which should be introduced before the pupils move into P4.

Speaking

The curriculum puts an emphasis on the pronunciation including the stress and rhythm of the words and sentences. This is not easy, and without specific guidance there is no guarantee that this component of the curriculum can be taught correctly.

Writing

The writing of English by the pupils is of concern. Firstly, their ability to write in their mother-tongue is of a low standard. Before pupils can write well in Kinyarwanda they should not be attempting to write in English. The first two years of learning English (P1 and P2) should be mostly oral/aural. The fact that the testing and examination is conducted in writing is regrettable. At this level there should be an emphasis on oral work and demonstration of understanding. The testing and examination should not wag the tail of the learner. The tests and examinations should, therefore, not be too ambitious. The writing, if any, in the first year can only follow on from reading. This should then, if at all, be restricted to copying from the blackboard, or the book. This not only serves as a visual, written record but in itself is a kinaesthetic exercise which will appeal to some pupils' learning style. In the next year there should be some filling of blanks, and limited copying of substitution tables. Labelling of pictures is also a good written exercise for P2 level. Also there should be spelling exercises, and lots of visual work of looking at words and reading and saying them.

In P1 Unit 8 there is an expectation of pupils to '*describe animals in writing using simple supported sentences*', and in Unit 9 to '*describe daily routines in writing using simple supported sentences'*. This is far too ambitious. Firstly, it depends on the pupils' ability to copy from the blackboard and the speed at which they can write English words, as I imagine this activity would be largely for the pupils to fill in some blanks. This is a meaningless exercise unless the pupils have had enough practice and guidance in letter and word recognition. This is a skill which needs to be developed. Without this then pupils will be slowly copying individual letters from the blackboard. It cannot be over-estimated how much time and practice young learners need in the language before they write it, and especially with the difficulties of English being non-phonetic.

In P2 Unit 2 there is an expectation of pupils to '*write a short text about sport'* and in P2 Unit 4 to '*write a short text about food and diet*' and in P2 Unit 5 to '*write a short text showing time sequence by using connectors'* and in P2 Unit 10 to '*write a short text about past and future activities.*'. I wonder how well they would do this in Kinyarwanda unguided. Even if guided by the teacher or the textbook, continuous prose at this stage in English is too ambitious.

From P3 I think expectations can rightly be a bit higher, as the pupils will have developed writing skills in Kinyarwanda, and in English their vocabulary is expanding and they will be used to a limited number of structures. As the comments above state, the structures to which they are introduced may be too limited.

Summary and suggestions

My overriding concern is that the introduction of English in P1 is very much to the detriment of the pupils' studies in Kinyarwanda. With that in mind, and a serious suggestion that English as a formal language of study starts in P3, I set out other suggestions.

The curriculum is over-ambitious in what it expects the pupils to produce, but under-ambitious in what it gives to the pupils. The pupils could be stretched more in language structures in the first three years. This would help to prepare them more for their future studies in English, but should be within their capabilities.

I set out below some suggestions as to what structures and sentence-patterns might be included and in what order of introduction in each of the first three years of study. The list assumes the cognitive ability of P3 pupils in Year One. If English remains to be introduced sooner than P3 then the list for each year would need to be adapted.

Year One

This/that, vocabulary of objects/nouns, and present simple of 'to be. What is that/this? Is this/that? Yes/No
a/an
the – of the (the floor, the floor of the classroom)
Present continuous tense for actions in progress at the time of speaking, I/you/she/he
Imperatives
Prepositions of place
Adjectives of possession
Plurals – 'z' sound, 'ss' sound, then 'iz' sound
Counting. How many? There are/they are
Them/they
Parts of the body
Have/has, who has?
No, it is not
Adjectives – long/short, thick/thin, big/little/small, old/new, and colours
Was – past simple tense of verb 'to be'
Introduction to the past simple tense, + what did?

Year Two

Revision – plus 'it isn't' 'I am not'
Don't
Can – of ability
Present continuous we/you/they
Past simple – and negative
Where/Who/What/How many?
Too (as well)
Future with 'going to + infinitive
Present simple everyday activities, and time-markers
Days of the week
It
But
Family members
Possessive apostrophe
Top of the..
Must
Our/their/belongs to
Show me/show us your/his + noun
Give me/her his/my + noun
Past simple questions
Let's
Like ('it sounds like…')
Ordinal numbers
At the end of
One (the blue one/the one on the table)

Something/sometimes/always/never
I want you to + infinitive
Different –from
Some
Countable and uncountable are/is any/some isn't any/ aren't any
For ('what are they for?')
Into/through/round/out of
More body parts
One…….the other
Very
Another
When (not a question) eg 'he wanted to….when he…..'
Only
Cannot – permission
Tell…that
Tell…..to
Beginnings of reported speech
Measurements for countable and uncountable – kilo of/packet of/loaf of/ etc.
Ask —— to
Future with Will
Reflexive pronoun (myself/yourself etc)
Comparatives
The longer one etc.
As ….. as
With – you write with a pen etc
Why ….because
Past continuous, brief introduction
Present perfect, brief introduction

Year Three
For + time eg. He waited for 2 hours/a long time
When + past simple + past simple eg When I knocked on the door he opened it.
Past continuous + past simple eg When I was cooking the girl shouted.
To whom
Once/twice
Which/what
Superlatives + as…..as, twice as …..as
First conditional
Who/whose
Adverbs
Difference/same as/different from
All/some/others/none +singular
Can…..if
More reported speech
Present perfect + just/already/yet
To whom/with whom/for whom
Time telling