

# **MATHEMATICS**

**TEACHER'S GUIDE**

**YEAR**

**2**

**PRIMARY**

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*Version edited and translated from Kinyarwanda in March 2020*

## FOREWORD

Dear teacher,

Rwanda Education Board is honoured to present P2 Mathematics teacher's guide. This book serves as a guide to competence-based teaching and learning to ensure consistency and coherence in the learning of Mathematics content for primary two. The Rwanda educational philosophy is to ensure that learners achieve full potential at every level of education which will prepare them to be well integrated in society and exploit employment opportunities.

In line with efforts to improve the quality of education, the government of Rwanda emphasizes the importance of aligning teaching and learning materials with the syllabus to facilitate their learning process. Many factors influence what they learn, how well they learn and the competences they acquire. Those factors include the relevance of the specific content, the quality of teachers' pedagogical approaches, the assessment strategies and the instructional materials available.

The special attention was paid to the activities that facilitate the learning process in which learners can develop ideas and make new discoveries during concrete activities carried out individually or with peers. With the help of the teacher, learners will gain appropriate skills and be able to apply what they have learnt in real life situations. Hence, they will be able to develop certain values and attitudes allowing them to make a difference not only to their own life but also to the nation.

This is in contrast to traditional learning theories which view learning mainly as a process of acquiring knowledge from the more knowledgeable who is mostly the teacher. In the regard of competence-based curriculum, learning is considered as a process of active building and development of knowledge and skills by the learner where concepts are mainly introduced by an activity, situation or scenario that helps the learner to construct knowledge, develop skills and acquire positive attitudes and values.

The book provides active teaching and learning techniques that engage pupils to develop competences. In view of this, your role as a teacher is to:

- Plan your lessons and prepare appropriate teaching materials;
- Organize group discussions for pupils considering the importance of social constructivism suggesting that learning occurs more effectively when pupils work collaboratively with more knowledgeable and experienced people;

- Engage pupils through active learning methods such as inquiry methods, group discussions, research, investigative activities and group and individual work activities;
- Provide supervised opportunities for pupils to develop different competences by giving tasks which enhance critical thinking, problem solving, research, creativity and innovation, communication and cooperation;
- Support and facilitate the learning process by valuing pupils' contributions in the class activities;
- Guide pupils towards the harmonization of their findings;
- Encourage individual, peer and group evaluation of the work done in the classroom and use appropriate competence-based assessment approaches and methods.

To facilitate you in your teaching activities, the content of this book is self explanatory so that you can easily use it. It is divided in 3 parts:

The part I explains the structure of this book and gives you the methodological guidance;

The part II gives a sample lesson plan;

The part III details the teaching guidance for each concept given in the pupil's book.

Even though this teacher's guide contains the guidance on solutions for some activities given in the pupil's book, you are requested to work through each question before judging pupils' findings.

I wish to sincerely extend my appreciation to the people who contributed towards the development and the translation of this book, particularly REB staff who organized the whole process from its inception. Special appreciation goes also to teachers who supported the exercise throughout.

Any comment or contribution would be welcome for the improvement of this textbook for next versions.

**Dr. NDAYAMBAJE Irénée**

**Director General of REB**

## **ACKNOWLEDGEMENT**

I wish to sincerely express my special appreciation to the people who played a major role in the editing and the translation of this teacher's guide for P2 Mathematics.

It would not have been successful without the participation of different education stakeholders to whom I would like to express my deep gratitude.

My thanks first go to the Rwanda Education Board staff and teachers who were involved in the editing and the translation of this book from Kinyarwanda to English.

I owe gratitude to different organizations and schools in Rwanda that have allowed us to work with their professionals in the editing and translation of this book.

**Joan MURUNGI,**

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## **PART I: GENERAL INTRODUCTION**

Mathematics is a very important subject as it provides concepts that help learners to be equipped with skills, attitudes and values applicable when solving real life problems.

Mathematics helps learners to think critically. It guides them to have the culture of saving, economic development, and it provides values that allow people to promote social cohesion.

On a basic level, Mathematics helps people to be able to count, add, subtract, multiply, and divide. At the psychological level, exposure to mathematics helps people in developing an analytic mind and assists them in better organization of ideas and accurate expression of thoughts.

At a more general level, far away from dealing with the higher mathematical concepts, the importance of mathematics for a common man is related to its application in science and technology and in the day-to-day activities of life.

### **1.1. The structure of the teacher's guide**

This book is a teacher's guide for P2 Mathematics. It is designed to accompany P2 Mathematics Pupil's book and intends to help teachers to plan quality mathematics lessons during the implementation of competence-based curriculum.

As the name says, it is a guide that teachers can refer to when preparing their lessons. Teachers may prefer to adopt the guidance provided but they are also expected to be more creative and consider their specific classes' contexts and prepare accordingly.

In this regard, learning is considered as a process of active building and developing of knowledge and skills by the learner where concepts are mainly introduced by an activity, situation or scenario that helps the learner to construct knowledge develop skills and acquire positive attitudes and values.

The book provides active teaching and learning techniques that engage pupils to develop competences and achieve the expected objectives.

In addition, this book provides more guidance on the content, teaching resources, techniques and methods of teaching, learning activities and application activities.

This section presents the overall structure, the unit and sub-heading structure of Mathematics content. It will help teachers to understand the different sections of this guide and what they will find in each section.

## **Overall structure of this book:**

This teacher's guide of P2 Mathematics is composed of three parts:

### **The Part I concerns general introduction**

It discusses methodological guidance on how best to teach and learn Mathematics by developing competences in teaching and learning, address cross-cutting issues when teaching and learning and it provides a guidance on assessment.

### **Part II presents a sample lesson plan.**

This lesson plan serves to guide the teacher while planning his/her lessons depending on the nature of the topic to be taught, school environment, teaching aids and level of pupils.

### **The Part III is about the structure of a unit and the structure of a lesson.**

This includes information related to the different components of the unit and these components are the same for all units.

#### **Structure of a unit**

Each unit is made of the following sections:

- **Unit title from the syllabus.**
- **Key unit competence: It highlights what the learner will be able to do at the end of the unit.**
- **Prerequisites:** This section indicates knowledge, skills and attitudes learnt in previous lessons or levels that are required for the success of the unit.

The competence-based approach calls for connections between units/ topics within a subject and interconnections between different subjects. The teacher will find an indication of those prerequisites and guidance on how to establish connections.

- **Cross-cutting issues to be addressed:** This section suggests cross cutting issues that can be integrated depending on the unit content. It provides guidance on how to come up with the integration of the issue. Note that the issue indicated is a suggestion; teachers are free to take another cross-cutting issue taking into consideration the learning environment.
- **New vocabularies:** Where necessary, some key terms were explained to indicate names of new concepts to be developed in the unit.
- **Guidance on the preliminary activity:** The content of pupil's book and some units start with preliminary activities. This section of the teacher's guide provides guidance on how to conduct these

activities which have the objective of verifying whether pupils have the prerequisites required to learn effectively the coming unit and to arouse their curiosity for the content of this unit.

- **Guidance on how to help learners with special education needs in classroom:** Even though this guidance is given in general introduction, where necessary, this book has provided in each unit the guidance on how the teacher can help learners with special education needs in classroom.
- **List of lessons/sub-headings in each unit:** Each unit has a table showing a suggestion on the list of lessons, lesson objectives copied or adapted from the syllabus and the proposal on the number of periods for each lesson. Each lesson /subheading is then developed.
- **Teaching techniques for every lesson:** This section shows the lesson objectives, Prerequisites/Revision/Introduction, Teaching resources, Learning activities and suggestion on answers for activities and application activities provided in the learner's book. However, instead of developing every lesson, some units have the general guidance on teaching and learning activities.
- **End of each unit:** At the end of each unit the teacher's guide provides the following sections:
  - **End unit assessment:** which provides the answers to questions of end unit assessment given in the pupil's book.
  - **Structure of each lesson or sub heading:** Each lesson/sub-heading is made of the following sections:
    - **Lesson /Sub headingtitle**
    - **Prerequisites/Revision/Introduction:** This section gives a clear instruction to teacher on the required skills necessary to effectively learn the lesson. It can also show the teacher how to start the lesson.
    - **Teaching and learning resources:** This section suggests the teaching aids or other resources needed in line with the activities to achieve the learning objectives. Teachers are encouraged to replace the suggested teaching aids by the available ones in their respective schools and based on learning environment.
    - **Teaching and learning activities or teaching steps:** This section provides a short description of the methodology and any important aspect to consider. It provides also answers to learning activities with cross reference to text book.

In a word, this part provides information and guidelines on how to facilitate pupils while working on learning activities.

More other, it provides answers for some activities given in the pupil's book.

## 1.2 Methodological guidance

### 1.2.1 Developing competences

Since the year 2015 Rwanda shifted from knowledge based to a competency-based curriculum for pre-primary, primary and general secondary education. This called for changing the way of learning by shifting from teacher centered to a learner centered approach.

Teachers are not only responsible for knowledge transfer but also for fostering pupils' learning achievement and creating safe and supportive learning environment. It implies also that pupils have to demonstrate what they are able to transfer the acquired knowledge, skills, values and attitude to new situations.

Teaching Mathematics requires pupils to perform different tasks and activities. The competence-based curriculum employs an approach of teaching and learning based on discrete skills rather than dwelling on only knowledge or the cognitive domain of learning. It focuses on what learner can do rather than what learner can memorize. Pupils develop competences through discussions in group work activities and the teacher facilitates them to discover new ideas and concepts by providing support where needed. After group discussions, pupils are given time to present their findings and then with the help of the teacher they harmonize their presentations and finally make a lesson summary.

In addition to the competences related to Mathematics, pupils also develop generic competences which should promote the development of the higher order thinking skills. Generic competences are developed throughout all units of Mathematics as follows:

<b>Generic competences</b>	<b>Ways of developing generic competences</b>
Critical thinking	All activities that require pupils to calculate, convert, interpret, analyse, compare and contrast, etc have a common factor of developing critical thinking into pupils.
Creativity and innovation	All activities that require pupils to apply skills in solving real life problems or to plot a pictograph of a given algebraic data have a common character of developing creativity into pupils.

Research and problem solving	All activities that require pupils to make a simple research in the library or on internet to find answers for given problems have a character of developing research and problem solving into pupils.
Communication	During Mathematics class, all activities that require pupils to discuss either in groups or in the whole class, present findings, debate etc, have a common character of developing communication skills.
Co-operation, interpersonal relations and life skills	All activities that require pupils to work in pairs or in groups have a character of developing cooperation and life skills among pupils.
Lifelong learning	All activities that instil in the learner the need for more learning have a common character of developing into learners a curiosity of applying the knowledge learnt in a range of situations. The purpose of such kind of activities is for life-long learning enabling pupils to be able to adapt to the fast-changing world and the uncertain future by taking initiative to update knowledge and skills with minimum external support.

The generic competences help pupils deepen their understanding of Mathematics and apply their knowledge in solving problems met in a range of situations.

### 1.2.2 Addressing cross cutting issues

Among the changes brought by the competence-based curriculum is the integration of cross cutting issues as an integral part of the teaching and learning process as they relate to and must be considered within all subjects to be appropriately addressed. The eight cross cutting issues identified in the national curriculum framework are: *Comprehensive Sexuality Education, Environment and Sustainability, Financial Education, Genocide studies, Gender, Inclusive Education, Peace and Values Education, and Standardization Culture.*

Some cross-cutting issues may seem specific to particular learning areas/subjects but the teacher needs to address all of them whenever an opportunity arises. In addition, pupils should always be given an opportunity during the learning process to address these cross-cutting issues both within and out of the classroom.

Below are examples of how crosscutting issues can be addressed:

Cross-Cutting Issue	Ways of addressing cross-cutting issues
<p><b>Environment and Sustainability:</b> Integration of Environment, Climate Change and Sustainability in the curriculum focuses on and advocates for the need to balance economic growth, society well-being and ecological systems. Student-teachers need basic knowledge from the natural sciences, social sciences, and humanities to understand to interpret principles of sustainability</p>	<p>Using word problems from real life experience, Mathematics teacher should lead learners to make calculations and find the correct solution. Among them, teacher may include problems which help learners to understand and to interpret principles of sustainability.</p>
<p><b>Financial Education:</b> The integration of Financial Education into the curriculum is aimed at a comprehensive Financial Education program as a precondition for achieving financial inclusion targets and improving the financial capability of Rwandans so that they can make appropriate financial decisions that best fit the circumstances of one's life.</p>	<p>Through different examples and calculations on word problems from real life experience of pupils, Mathematics teacher can lead pupils to discuss how to make appropriate financial decisions.</p>
<p><b>Gender:</b> At school, gender will be understood as family complementarities, gender roles and responsibilities, the need for gender equality and equity, gender stereotypes, gender sensitivity, etc.</p>	<p>Mathematics teacher should address gender as cross-cutting issue through assigning leading roles in the management of groups to both girls and boys and providing equal opportunity in the lesson participation and avoid any gender stereotype in the whole teaching and learning process.</p>

<p><b>Inclusive Education:</b> Inclusion is based on the right of all learners to a quality and equitable education that meets their basic learning needs and understands the diversity of backgrounds and abilities as a learning opportunity.</p>	<p>Firstly, Mathematics teacher needs to identify/recognize pupils with special needs. Then by using adapted teaching and learning resources while conducting a lesson and setting appropriate tasks to the level of pupils, they can cater for pupils with special education needs.</p>
<p><b>Peace and Values Education:</b> Peace and Values Education (PVE) is defined as education that promotes social cohesion, positive values, including pluralism and personal responsibility, empathy, critical thinking and action in order to build a more peaceful society.</p>	<p>Through a given lesson, a teacher should:</p> <ul style="list-style-type: none"> <li>Set a learning objective which is addressing positive attitudes and values,</li> <li>Encourage pupils to develop the culture of tolerance during discussion and to be able to instil it in colleagues and cohabitants;</li> <li>Encourage pupils to respect ideas for others.</li> </ul>
<p><b>Standardization Culture:</b> Standardization Culture in Rwanda will be promoted through formal education and plays a vital role in terms of health improvement, economic growth, industrialization, trade and general welfare of the people through the effective implementation of Standardization, Quality Assurance, Metrology and Testing.</p>	<p>With different word problems or charts related to the effective implementation of Standardization, Quality Assurance, Metrology and Testing, pupils can be motivated to be aware of health improvement, economic growth, industrialization, trade and general welfare of the people.</p>

### 1.2.3 Guidance on how to help learners with special education needs

In the classroom, pupils learn in different ways depending on their learning pace, needs or any other special problem they might have. However, the teacher has the responsibility to know how to adopt his/her methodologies and approaches in order to meet the learning needs of each pupil in the classroom. Also teachers need to understand that pupils with special needs have to be taught differently or need some accommodations

to enhance the learning environment. This will be done depending on the subject and the nature of the lesson.

In order to create a well-rounded learning atmosphere, teachers need to:

- Remember that pupils learn in different ways, so they need a variety of activities (e.g. role-play, music and singing, word games and quizzes, and outdoor activities);
- Maintain an organized classroom and limiting the distraction. This will help pupils with special needs to stay on track during lesson and follow instruction easily;
- Vary the pace of teaching to meet the needs of each child because some pupils process information and learn more slowly than others;
- Break down instructions into smaller, manageable tasks. Pupils with special needs often have difficulty in understanding long-winded or several instructions at once. It is better to use simple, concrete sentences in order to facilitate them understand what you are asking.
- Use clear and consistent language to explain the meaning (and demonstrate or show pictures) if you introduce new words or concepts;
- Make full use of facial expressions, gestures and body language;
- Pair a pupil who has a disability with a friend. Let them do things together and learn from each other. Make sure the friend is not over-protective and does not do everything for the one with disability. Both pupils will benefit from this strategy;
- Use multi-sensory strategies. As all pupils learn in different ways, it is important to make every lesson as multi-sensory as possible. Pupils with learning disabilities might have difficulty in one area, while they might excel in another. For example, use both visual and auditory cues.

Below are general strategies related to each main category of disabilities and how to deal with every situation that may arise in the classroom.

However, the list is not exhaustive because each child is unique with different needs and that should be handled differently.

#### **Strategy to help pupils with intellectual impairment:**

- Use simple words and sentences when giving instructions;
- Use real objects that pupils can feel and handle. Rather than just working abstractly with pen and paper;
- Break a task down into small steps or learning objectives. The pupil should start with an activity that she/he can do already before moving on to something that is more difficult;
- Gradually give the pupil less help;

- Let the pupil with disability work in the same group with those without disability.

### **Strategy to help pupils with visual impairment:**

- Help pupils to use other senses (hearing, touch, smell and taste) and carry out activities that will promote their learning and development;
- Use simple, clear and consistent language;
- Use tactile objects to help explain a concept;
- If the pupil has some sight, ask him/her what he/she can see;
- Make sure the pupil has a group of friends who are helpful and who allow him/her to be as independent as possible;
- Plan activities so that pupils work in pairs or groups whenever possible.

### **Strategy to help pupils with hearing disabilities or communication difficulties**

- Always get the pupils 'attention before you begin to speak;
- Encourage the pupil to look at your face;
- Use gestures, body language and facial expressions;
- Use pictures and objects as much as possible.
- Keep background noise to a minimum.

### **Strategies to help pupils with physical disabilities or mobility difficulties:**

- Adapt activities so that pupils, who use wheelchairs or other mobility aids, can participate.
- Ask parents/caregivers to assist with adapting furniture e.g. the height of a table may need to be changed to make it easier for a pupil to reach it or fit their legs or wheelchair under;
- Encourage peer support when needed;
- Get advice from parents or a health professional about assistive devices if the pupil has one.

### **Adaptation of assessment strategies:**

At the end of each unit, the teacher is advised to provide additional activities to help pupils achieve the key unit competence. These assessment activities are for remedial, consolidation and extension designed to cater for the needs of all categories of students; slow, average and gifted pupils respectively. Therefore, the teacher is expected to do assessment that fits individual pupil.

Remedial activities	After evaluation, slow learners are provided with lower order thinking activities related to the concepts learnt to facilitate them in their learning. These activities can also be given to assist deepening knowledge acquired through the learning activities for slow pupils.
Consolidation activities	After introduction of any concept, a ranged number of activities can be provided to all pupils to enhance/ reinforce learning.
Extended activities	After evaluation, gifted and talented learners can be provided with high order thinking activities related to the concepts learnt to make them think deeply and critically. These activities can be assigned to gifted and talented learners to keep them working while other pupils are getting up to required level of knowledge through the learning activity.

#### 1.2.4. Guidance on assessment

Assessment is an integral part of teaching and learning process. The main purpose of assessment is for improvement of learning outcomes. Assessment for learning/ Continuous/ formative assessment intends to improve pupils' learning and teacher's teaching whereas assessment of learning/summative assessment intends to improve the entire school's performance and education system in general.

##### **Continuous/ formative assessment**

It is an on-going process that arises during the teaching and learning process. It includes lesson evaluation and end of sub unit assessment. This formative assessment should play a big role in teaching and learning process. The teacher should encourage individual, peer and group evaluation of the work done in the classroom and uses appropriate competence-based assessment approaches and methods.

##### **Formative assessment is used to:**

- Determine the extent to which learning objectives are being achieved and competences are being acquired and to identify which pupils need remedial interventions, reinforcement as well as extended

activities. The application activities are done in the pupil book and they are designed to be given as remedial, reinforcement, end lesson assessment, homework or assignment.

- Motivate pupils to learn and succeed by encouraging them to read, or learn more, revise, etc.
- Check effectiveness of teaching methods in terms of variety, appropriateness, relevance, or need for new approaches and strategies. Mathematics teachers need to consider various aspects of the instructional process including appropriate language levels, meaningful examples, suitable methods and teaching aids/ materials, etc.
- Help pupils to take control of their own learning.

In teaching Mathematics, formative or continuous assessment should compare performance against instructional objectives. Formative assessment should measure the pupil's ability with respect to a criterion or standard. For this reason, it is used to determine what pupils can do, rather than how much they know.

### **Summative assessment**

The assessment can serve as summative and informative depending to its purpose. The end unit assessment will be considered summative when it is done at end of unit and want to start a new one.

It will be formative assessment, when it is done in order to give information on the progress of pupils and from there decide what adjustments need to be done.

The assessment done at the end of the term, end of year, is considered as summative assessment so that the teacher, school and parents are informed of the achievement of educational objective and think of improvement strategies. There is also end of level/ cycle assessment in form of national examinations.

### **When carrying out assessment?**

Assessment should be clearly visible in lesson, unit, term and yearly plans.

- Before learning (diagnostic): At the beginning of a new unit or a section of work; assessment can be organized to find out what pupils already know / can do, and to check whether the pupils are at the same level.
- During learning (formative/continuous): When pupils appear to be having difficulty with some of the work, by using on-going assessment (continuous). The assessment aims at giving pupils support and feedback.

- **After learning (summative):** At the end of a section of work or a learning unit, the Mathematics teacher has to assess after the learning. This is also known as Assessment of Learning to establish and record overall progress of pupils towards full achievement. Summative assessment in Rwandan schools mainly takes the form of written tests at the end of a learning unit or end of the month, and examinations at the end of a term, school year or cycle.

### **Instruments used in assessment.**

- **Observation:** This is where the Mathematics teacher gathers information by watching pupils interacting, conversing, working, playing, etc. A teacher can use observations to collect data on behaviours that are difficult to assess by other methods such as attitudes, values, and generic competences and intellectual skills. It is very important because it is used before the lesson begins and throughout the lesson since the teacher has to continue observing each and every activity.
- **Questioning**
  - a) Oral questioning: a process which requires a pupil to respond verbally to questions;
  - b) Class activities/ exercises: tasks that are given during the learning/ teaching process;
  - c) Short and informal questions usually asked during a lesson;
  - d) Homework and assignments: tasks assigned to pupils by their tutors to be completed outside of class.

Homework assignments, portfolio, project work, interview, debate, science fair, Mathematics projects and Mathematics competitions are also the different forms/instruments of assessment.

### **1.2.5. Teaching methods and techniques that promote active learning in mathematics**

The different learning styles for pupils can be catered for when the teacher uses active learning whereby pupils are really engaged in the learning process.

#### **a) The main teaching methods used in mathematics are the following:**

**Dogmatic method:** the teacher tells the pupils what to do and how to attempt. It is sometimes used when pupils need an example before applying what they learn. For example when introducing the conversion of units of measurements.

**Inductive-deductive method:** Inductive method is to move from specific examples to generalization and deductive method is to move from generalization to specific examples. In lower primary, inductive is more appropriate as pupils start by observing concrete objects before generalizing what they see.

**Skills Laboratory method:** Laboratory method is based on the maxim “learning by doing.” It is a procedure for stimulating the activities of the pupils and to encourage them to make discoveries through practical activities. For example, pupils can measure the total length of square’s sides before concluding on how to find its perimeter.

### **Problem solving method**

The following are some active techniques to be used in Mathematics:

- Group work
- Research
- Probing questions
- Practical activities (drawing, plotting, tabulation, interpreting pictographs)
- Modelling
- Brainstorming
- Quiz Techniques
- Discussion technique
- Scenario building technique.

### **b) What is Active learning?**

Active learning is a pedagogical approach that engages pupils in doing things and thinking about the things they are doing. Pupils play the key role in the active learning process. They are not empty vessels to fill but people with ideas, capacity and skills to build on for effective learning. Thus, in active learning, pupils are encouraged to bring their own experience and knowledge into the learning process.

<b>The role of the teacher in active learning</b>	<b>The role of pupils in active learning</b>
<p>The teacher engages pupils through active learning methods such as inquiry methods, group discussions, research, investigative activities, group and individual work activities.</p> <p>He/she encourages individual, peer and group evaluation of the work done in the classroom and uses appropriate competence-based assessment approaches and methods.</p> <p>He provides supervised opportunities for pupils to develop different competences by giving tasks which enhance critical thinking, problem solving, research, creativity and innovation, communication and cooperation.</p> <p>The teacher supports and facilitates the learning process by valuing pupils' contributions in the class activities.</p>	<p>A pupil engaged in active learning:</p> <p>Communicates and shares relevant information with peers through presentations, discussions, group work and other learner-centred activities (role play, case studies, project work, research and investigation);</p> <p>Actively participates and takes responsibility for his/her own learning;</p> <p>Develops knowledge and skills in active ways;</p> <p>Carries out simple research/investigation by consulting print/online documents and resourceful people, and presents their findings;</p> <p>Ensures the effective contribution of each group member in assigned tasks through clear explanation and arguments, critical thinking, responsibility and confidence in public speaking</p> <p>Draws conclusions based on the findings from the learning activities.</p>

### **c) Main steps for a lesson in active learning approach**

All the principles and characteristics of the active learning process highlighted above are reflected in steps of a lesson as displayed below. Generally, the lesson is divided into three main parts whereby each one is divided into smaller steps to make sure that pupils are involved in the learning process. Below are those main parts and their small steps:

#### **1) Introduction**

Introduction is a part where the teacher makes connection between the current and previous lesson through appropriate technique.

The teacher opens short discussions to encourage pupils to think about the previous learning experience and connect it with the current instructional objective. The teacher reviews the prior knowledge, skills and attitudes which have a link with the new concepts to create good foundation and logical sequencings.

## **2) Development of the new lesson**

The development of a lesson that introduces a new concept will go through the following small steps: discovery activities, presentation of pupils' findings, exploitation, synthesis/summary and exercises/application activities.

- **Discovery activity**

### **Step 1**

- The teacher discusses convincingly with pupils to take responsibility of their learning;
- He/she distributes the task/activity and gives instructions related to the tasks (working in groups, pairs, or individual to instigate collaborative learning, to discover knowledge to be learned).

### **Step 2**

- The teacher lets pupils work collaboratively on the task;
- He/she then monitors how pupils are progressing towards the knowledge to be learned and boosts those who are still behind (but without communicating to them the knowledge).
- **Presentation of student-teachers' findings/productions**
  - In this episode, the teacher invites representatives of groups to present their productions/findings.
  - After three/four or an acceptable number of presentations, the teacher decides to engage the class into exploitation of pupils' productions.
- **Exploitation of pupils' findings/ productions**
  - The teacher asks pupils to evaluate the productions: which ones are correct, incomplete or false;
  - Then the teacher judges the logic of the pupils' products, corrects those which are false, completes those which are incomplete, and confirms those which are correct.
- **Institutionalization or harmonization (summary/conclusion/ and examples)**

The teacher summarizes the learned knowledge and gives examples which illustrate the learned content.

- **Application activities**

- Exercises of applying processes and products/objects related to learned unit/sub-unit
- Exercises in real life contexts;
- The teacher guides pupils to make the connection of what they learnt to real life situations. At this level, the role of teacher is to monitor the fixation of process and product/object being learned.

### 3) Assessment

In this step the teacher asks some questions to assess achievement of instructional objective. During assessment activity, pupils work individually on the task/activity. The teacher avoids intervening directly. In fact, results from this assessment inform the teacher on next steps for the whole class and individuals. In some cases, the teacher can end with a homework/ assignment. Doing this will allow pupils to relay their understanding on the concepts covered that day. Teacher leads them not to wait until the last minute for doing the homework as this often results in an incomplete homework set and/or an incomplete understanding of the concept.

#### 1.2.6 Stages of concept development in lower primary

There are 3 main stages for concept development in mathematics for lower primary: Concrete stage, semi concrete and abstract stage.

- **Concrete stage:** In this stage, the teacher begins the lesson by modelling each mathematical concept with concrete materials. In other words, this stage is the “doing” stage, using concrete objects to model problems. Those materials are real objects that learners manipulate and discuss how to use them for better learning.
- **Semi- concrete stage, visualization or representation:** In this stage, the teacher transforms the concrete model into a representational (semi-concrete) level, which may involve drawings or pictures; using circles, dots, and tallies; or using pictures for counting. In other words, this is the “seeing” stage that uses representations of the objects to model problems.
- **Abstract stage:** In this stage, the teacher models the mathematics concept at a symbolic level, using only numbers, notation, and mathematical symbols to represent the number of circles or groups of circles. The teacher uses operation symbols (+, −, x, :) to indicate addition, multiplication, or division. This is the “symbolic” stage, where students are able to use abstract symbols to model problems.

### 1.2.7 Teaching and learning in the second language

A Rwandan child enters school with the accumulated experience of his/her pre-school years (ECD Centers and Nursery school) in the Kinyarwanda language which is also used at home. The child has already absorbed and processed few amounts of information about the Kinyarwanda language and customs of his/her society and the variety of objects and experiences that his/her environment offers: objects, houses, animals, trees, etc. Other experiences can be gotten “from outside” through the radios or TV and they are equally part of his everyday life.

As the child enters the Primary one (P1), the Kinyarwanda teacher will have to guide the child to deepen this information because the medium of instruction for other subjects is the English, a second language for the child.

The Mathematics teacher is well instructed to use a Mathematics syllabus, He/she will need to reflect to the Rwandan context and use examples and illustrations from real life experience of the child to help this child reflect to his/her environment and motivate him/her to enjoy school at first and to discover new experiences.

This means that the pupil will need to learn the content and the language at the same time where both the subject matter and the foreign language (L2) are developed simultaneously and gradually, depending on the age of pupil and other variables.

The method related to this way of teaching is called Content and Language Integrated Learning (CLIL) ( O'Malley and Chamot, 1990).

As a teacher, the following elements are emphasized during CLIL,

- **Presentation:**

Introduce to the classroom a tangential theme related to the concept you want to discuss. Use graphics, images and multimedia materials and write keywords on the chalk board.

Ne words and expressions are to be written in colours, circled or underlined on the chalkboard to watch out for.

- **Communication:**

Boost your pupils' ability to communicate while also allowing them to focus on learning the Mathematics concept. Along the way, you'll build their positive vibes for the target concept and its application in the real life. So, the best strategy is to aim for communicating rather than accuracy when your pupils exchange ideas during the discussion.

- **Feedback and conclusion:**

It is sometimes necessary not to interrupt students during activities, even

when their language may not be completely accurate. This may break the flow of the activity and may even cause pupils to lose their confidence. Rather, take notes and try to recap each activity by giving pupils language- and content-related feedback. To let them benefit all the pupils, try to give feedback to the entire class rather than to pupils individually.

Later, ask for feedback from pupils, monitor results and adjust accordingly.

### **Mathematics learning strategies in CLIL**

The teacher has to carefully organize good environment where all learning strategies will be catered. For Oxford (1990, p. 8), learning strategies are specific actions taken by the learner to make learning easier, faster, more enjoyable, more self directed, more effective and more transferable to new situations.

Basic classification of learning strategies was provided by O'Malley and Chamot (1990): Cognitive strategies, Meta-cognitive strategies, Social strategies and Affective strategies.

When leaning is done in the second language, the teacher will facilitate the above mentioned learning strategies in the following ways:

#### **1) Cognitive strategies**

- **Contextualization:** Placing the task into a meaningful mathematical or real life experiences for the child. For example, the teacher can use word problems involving objects or animals frequently seen by the child in the family.
- **Resourcing:** Using local teaching and learning materials and text books with simplified and adapted activities to the level of understanding for pupils.
- **Elaboration and transfer:** Relating new information to prior knowledge where the new concept must be built basing on the prerequisites, relating new information to the previous ones, making meaningful personal association to information presented where pupils are asked to provide their own examples and point of views.

Therefore, guide the learner to use previously acquired knowledge to facilitate a new task.

- **Substitution:** Where necessary, one can select alternative approaches and revise the plan to accomplish a task; For example the use of induction and recombination.

#### **2) Meta-cognitive strategies**

- **Problem identification:** for example in a word problem, help the learner to explicitly identify the central points which need resolution in a task, you can use pictures or highlight key words in the problem.

- ***Self-management:*** Understanding and arranging for the conditions that help accomplish the task successfully. This requires that after identifying the requested, one organizes data, and thinks of the way of solving towards the solution.
- ***Self-monitoring:*** Checking, verifying or correcting one's comprehension or performance in the course of problem solving. This requires to verify if the answer you find can justify the mathematics sentence given.

### 3) Social strategies

- ***Cooperation:*** Working with others to facilitate problem solving. Learners are facilitated to work in groups where they can feel free to discuss and explain to each other in the simple language.
- ***Mediation:*** Asking questions for clarification. Learners are given opportunity to feel free to ask questions any time for they need more clarification.

## PART II: SAMPLE LESSON

School Name: ..... Primary School

Teacher's name: ...

Term	Date	Subject	Class	Unit 1	Lesson N°	Duration	Class size
1	23 /01/ 2017	Mathematics	P2: B	Counting objects in groups from 1 up to 200.	1 out of 24	40 minutes	48 learners
<b>Type of Special Educational Needs to be catered for in this lesson and number of learners in each category</b>							
<b>Unit title</b> Numbers from 0 up to 200							
<b>Key Unit Competence:</b> To be able to count, read, write, order, compare, add, multiply and divide whole numbers from 0 up to 200.							
<b>Title of the lesson</b> Counting groups of objects from 1 up to 200.							
<b>Instructional Objective</b> By the end of this lesson, using sticks learners will be able to count object up to 200 in order without mistakes.							
<b>Plan for this Class (location: in / outside)</b> Outside and inside class.							

<b>Learning Materials (for all learners)</b>	Different objects to be counted. (stones, bottle tops, beads, beans, etc)
<b>References</b>	Mathematics P2 Pupil's book (page 7) and Mathematics syllabus for Lower primary.

<b>Steps and Timing</b>	<i>Description of teaching and learning activity</i>		Competences and Cross-Cutting Issues to be addressed
	<b>Teacher's activities</b>	<b>Learner's activities</b>	
<b>Introduction or Review (5 minutes)</b>	Puts different objects in groups not greater than 200 on a table, in a basin, in a cup, in a bucket, on a plate, in a box and calls learners to observe and tell their names.	<p>Puts counters together in groups.</p> <p>Observes and gives ideas on the names of objects in every group.</p> <p>Go into their respective groups.</p>	<p><b>Generic Competences</b> Critical thinking and being cautious. Following and doing as the given instructions.</p> <p><b>Cross cutting issues addressed.</b></p> <p><b>Gender:</b> Addressed when both boys and girls follow and do as instructed.</p> <p><b>Environment and Sustainability:</b> Addressed when learners don't destroy the environment while looking for counters.</p> <p><b>Peace and values education:</b> Addressed when all learners share ideas in a peaceful way with respect of each other's views.</p>

	<p>Puts learners in groups.</p> <p>Makes sure that learners with special education needs (slow learners, learners with physical impairment and very talented learners.) don't go into one group and are catered for.</p> <p><b>Activity 1:</b> Gives each group counters and asks learners to count and tell their number.</p> <p>Monitors groups to check if they are following the given instructions. For example: 50,75,100.</p>	<p><b>Activity 1:</b> Counting the objects in groups.</p> <p>Every group of learners presents to the teacher a group of 200 counters.</p> <p>Each learner counts the counters of a different group to check if all groups grouped the counters according to the number that the teacher gave them.</p>	<p><b>Generic Competences</b> Critical and logical thinking. Being cautious while doing exercises.</p> <p>Problem-solving skills in relation to counting.</p> <p>Appropriate communication while counting loudly.</p> <p>Lifelong learning skills as learners show curiosity to learn more in Mathematics.</p>
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	<p><b>Activity 2:</b> Asks learners to group the given counters according to the numbers given. Each group must have a different number. Monitors groups to check if they are doing the activities as instructed.</p>	<p><b>Activity 2:</b> Learners form groups of counters equivalent to the numbers given to them by the teacher. For example: 50, 75, 100. Listen attentively to instructions and ask questions where they don't understand before starting the activity.</p>	<p><b>Gender</b> addressed when both girls and boys working together in groups or when each accepts the role of presenting the findings of a group.</p> <p><b>Inclusive</b> education addressed in classroom by encouraging all learners to be engaged on the work and discussion.</p>
	<p><b>Activity 3:</b> Gives the learners 200 counters and asks them to make a group of 100 counters and keep adding 10 counters as they tell the new number of counters loudly.</p>	<p><b>Activity 3:</b> Counting in tens Holding a bundle of 100 counters, keep adding 10 counters as they tell the new number of counters.</p>	<p><b>Peace and values education:</b> Addressed when all learners share ideas in a peaceful way with respect of each other's views during group discussion</p>

<p><b>Conclusion</b> 5 minutes</p>	<p>Provides learners with exercises to group counters not more than 200 according to the given instructions of each group.</p> <p>An exercise to count the number of plates learners have at their respective homes. The next day each learner is to be given a chance to share to the class the number he/she counted.</p> <p>Asks learners to continue counting different things at their homes.</p>	<p>Every pick 40 counters put them together then count and make a group of 179 counters.</p> <p><b>Homework:</b> Each of you should count the number of plates you have at your home and be ready to share their number tomorrow.</p>	
<p><b>Teacher's self-evaluation.</b></p>	<p>Basing on how learners performed their activities and the assessment exercise, I confirm that my objectives were achieved and I plan to give more exercises on counting in the next lesson of reading and writing numbers and words.</p>		

## PART III: UNIT DEVELOPMENT

### III.0 Guidance on the preliminary activities

#### 0.1 Objectives:

- To help pupils recall the concepts and skills learnt in P1 that will serve as prerequisites of all concepts to be learnt in P2.
- To arouse the curiosity of pupils on the concepts to be learnt in P2 as the continuation of P1 content.

#### 0.2 Teaching and learning activities:

- Form groups of pupils, give them learning materials and provide instructions on how activities will be done;
- Invite groups to do activities assigned to them;
- Move around in the classroom to get aware of different suggestions and ask some probing questions where necessary;
- Invite group representative to present their findings in a whole class discussion and basing on pupils 'experience, prior knowledge and abilities shown in answering questions for these activities, open a discussion with probing questions to facilitate them to give their predictions and ensure that you arouse their curiosity on what is going to be learnt in P2.

#### 0.3 Additional information for the teachers

- **Sum:** the answer obtained when you add numbers.

These numbers are called **addends**.

Addition:

$$8 + 3 = 11$$

Diagram illustrating addition:  $8 + 3 = 11$ . The number 8 is labeled 'Addend', 3 is labeled 'Addend', and 11 is labeled 'Sum or Total'.

- **Difference:** The answer obtained when you subtract a number (**subtrahend**) from another (**minuend**).

Subtraction:

$$8 - 3 = 5$$

Diagram illustrating subtraction:  $8 - 3 = 5$ . The number 8 is labeled 'Minuend', 3 is labeled 'Subtrahend', and 5 is labeled 'Difference'.

- **Product:** The answer you obtain when you multiply numbers;
- **Multiplicand:** It is the number to be multiplied to find a product of two numbers.
- **Multiplier:** it is a number that multiplies the multiplicand to find a product of two numbers

Multiplication:

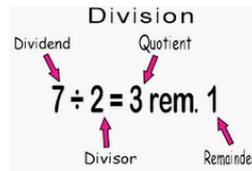
$$6 \times 3 = 18$$

Diagram illustrating multiplication:  $6 \times 3 = 18$ . The number 6 is labeled 'Factor (or Multiplier)', 3 is labeled 'Factor (or Multiplicand)', and 18 is labeled 'Product'.

**Quotient:** it is the answer obtained when dividing a number by another number

**Dividend:** it is a number to be divided by another to find the quotient.

**Divisor:** It is a number used to divide the dividend to find the quotient.



# UNIT 1

# WHOLE NUMBERS FROM 0 UP TO 200

## 1.1 Key unit competence

Counting, reading, writing, arranging, comparing, adding and subtracting, multiplying and dividing whole numbers from 0 up to 200.

## 1.2 Prerequisite knowledge and skills

Pupils will perform well in this unit if they have knowledge and mastery of the following: Counting, reading, writing, arranging, comparing, adding and subtracting, multiplying and dividing whole numbers from 0 up to 100.

## 1.3 Cross-cutting issues to be addressed

Through different tasks and activities, the following cross-cutting issues have to be addressed in this unit:

- **Inclusive education:** ensure that the selected teaching and learning techniques, teaching aids promote education for all.
- **Peace and value Education:** encourage learners to respect others' views and thoughts during group works and class discussions.
- **Gender:** ensure the equal opportunity of boys and girls in the lesson participation.
- **Environment and Sustainability:** ensure that pupils are encouraged to discuss effects of environment and sustainability through solving word problems involving addition, subtraction...
- **Financial education:** lead pupils to make appropriate financial decisions through word problems that involve four basic operations.

## 1.4. List of lessons

No	Name of the lesson	Number of periods
1	Counting groups of objects from 1 to 200.	3
	Reading and writing numbers from 0 to 200 in figures.	
	Reading and writing numbers from 0 to 200 in words.	
2	Grouping numbers from 1 to 200 into ones, tens and hundreds.	1

3	Comparing numbers that do not exceed 200.	1
4	Arranging numbers that do not exceed 200 in ascending and descending order.	1
5	Mental Addition of numbers whose sum does not exceed 200.	2
	Addition of Numbers whose sum does not exceed 200 without carrying.	
6	Addition of Numbers whose sum does not exceed 200 with carrying.	1
7	Word problems involving addition of numbers whose sum does not exceed 200.	1
8	Subtraction of numbers that do not exceed 200 mentally.	2
	Subtraction of numbers that do not exceed 200 without borrowing.	
9	Subtraction of numbers that do not exceed 200 with borrowing.	1
10	Word problems involving subtraction of numbers whose difference does not exceed 200.	1
11	Multiplication of whole numbers by 2 and multiples of 2 that do not exceed 20	1
12	Multiplication of 2digit numbers or 3digit numbers by 2 without carrying.	1
13	Word problems involving multiplication of 2digit numbers or 3digit numbers by 2 without carrying.	1
14	Division of 2digit numbers or 3digit numbers by 2 without remainder.	1
15	Word problems involving division of 2digit numbers or 3digit numbers by 2 without remainder.	1
16	Multiplication of whole numbers by 3 and multiples of 3 that do not exceed 30	1
17	Multiplication of 2digit numbers or 3digit numbers by 3 without carrying.	1
18	Word problems involving multiplication of 2digit numbers or 3digit numbers by 3 without carrying.	1

19	Division of 2digit numbers or 3digit numbers by 3 without remainder.	1
20	Word problems involving division of 2digit numbers or 3digit numbers by 3 without remainder.	
21	End unit assessment	1
	Total number of periods	24

## 1.5 Guidance on different lessons

### 1.5.1 Lesson 1: Count, read and write whole numbers from 0 up to 200

#### a) Learning objectives:

##### Knowledge:

Showing and explaining the place value of each digit in three-digit numbers.

##### Skills:

- Counting without mistakes numbers from 1 up to 200.
- Reading and writing accurately numbers from 1 up to 200 in figures and in words.

##### Attitudes and values:

- Show the culture of orderliness in daily life.

#### b) Teaching/learning aids:

- A variety of counters: stones, bottle tops, beans, beads, balloons, maize seeds, tomatoes, books, chalk, and number cards.
- The table of place values
- Number cards with different numbers between 100 and 200 in different colors.

#### c) Prerequisites/Revision/Introduction

To perform well in this lesson, do the following:

- Plan how to help pupils with different impairments;
- Guide pupils to:
  - Work out different activities for counting objects, reading and writing numbers less than 100 given from the pupil's book for P2;
  - Draw the table of place value and complete in it numbers less than 100 that they read from the number cards.

#### d) Generic competences that a learner develops from the lessons:

- Critical Thinking and being cautious while doing exercises.

- Cooperation and interpersonal skills as he or she works with others in different activities.
- Problem-solving skills in relation to counting as the learner looks for learning aids to help him or her to count without making mistakes.
- Appropriate communication skills when reading or counting out loudly.
- Lifelong learning skills as learners show curiosity to learn more in Mathematics.

**e) Crosscutting issues to be addressed in the lesson:**

**Inclusive education:** Catering for learners with special education needs.

Give to fast-learners extra activities found in this book.

Give slow learners suitable activities for their level.

Pay special attention to learners with physical impairment, making those with hearing and visual impairment sit in front where possible the teacher uses the special teaching/learning aids.

**Gender:** Addressed when both boys and girls work together in groups and do activities peacefully without discrimination.

**Environment and Sustainability:** Addressed when learners don't destroy objects from their environment while looking for counters and cleaning where they worked from.

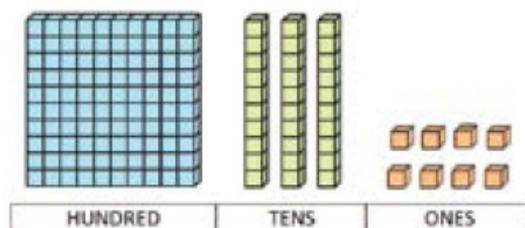
**Peace and values education:**

Encourage learners to live and work in harmony and share ideas in a peaceful way with respect of each other's views during group discussion.

**f) Teaching and learning activities**

- Ask every learner to get the counters that he or she brought and put similar ones together and ask them to make a collection of 100 similar counters.
- Ask pupils to count them in tens and in hundreds. Let them make 2 groups of hundreds.

They can also use blocks or rods.



- Using different prompting questions, teacher helps pupils to understand and discover how to count objects from 101 to 200.

- The teacher leads pupils how to read and write a 3-digit number from 101 to 200 (use from **activity 1.1.1** to **activity 1.1.10**).
- Teacher asks pupils to individually imitate how to write the 3-digit numbers from 101 to 200 written on the chalkboard or on a number card and then write them many times in their notebook using a pen or a pencil (Use from **activity 1.1.11** to **activity 1.1.13**).
- Teacher helps pupils with difficulties to write well the 3-digit numbers by giving them more time on writing activity. He/ she must use all possible ways to make all pupils successful in reading and writing the given 3-digit numbers.

### **Assessment activities**

The teacher provides activities to be done by pupils individually at school and others to be done at home.

All set activities should provide to every pupil the opportunities to demonstrate and apply the new concept learnt in a range of situations.

#### **g) More notes the teacher should consider:**

- Monitoring all activities closely and catering for all learners without leaving any one behind.
- Thoroughly explaining to learners how to count, read, and write numbers from 0 to 200 in both figures and words.
- Appropriate use of teaching and learning aids.

#### **h) Extra exercises and their answers:**

- 1) Make groups of the following objects: a) 124 books      b) 175 stones
- 2) Read and write the following numbers in words or figures.
  - a) One hundred and fifty-nine: 159.
  - b) 187: One hundred and eighty- seven.
  - c) One hundred ninety-nine: 199.
  - d) 178: One hundred and seventy-eight
  - e) One hundred and thirty-five: 135.
  - f) 169. One hundred and sixty-nine.

#### **Rule to follow when writing number in words:**

When you write a whole number, you write out the number in words as well as in digits. To write a number in words, start with the digit at the left, which has the largest place value. The commas separate the periods, so wherever there is a comma in the number, write a comma between the words. The ones period, which has the smallest place value, is not named.

**Example:** 172: One hundred seventy two, 169: One hundred sixty nine.

### **i) Home work:**

Where possible ask every learner to count the number of objects such as houses on his/her way home and be ready to share when he/she comes back.

## **1.5.2 Lesson 2: Grouping a number less than 200 into hundreds, tens and ones**

### **a) Objectives**

#### ***Knowledge:***

Understand and identify the place value of digits for numbers formed by three digits.

#### ***Skills:***

Grouping a three digit number not greater than 200 into Hundreds (H), Tens (T) and Ones (O).

#### ***Values***

Develop the capacity of quick critical thinking.

### **b) Prerequisites /Introduction**

To perform well in this lesson, do the following:

- Plan how to help pupils with different impairments;
- Guide pupils to:
  - Work out different activities for partitioning number between 0 and 99 into ones and tens given from the pupil's book for P1;
  - Draw the table of place value and complete in it numbers less than 100 read from the number cards.

### **c) Teaching resources and learning resources**

- The table of place values;
- Number cards with different numbers between 100 and 200 in different colors;
- Different types of counters.

### **d) Teaching and learning activities:**

- Ask pupils to draw a table of place value in their notebooks;
- Ask them to compare their table and the table which is in the pupil's book on **activity 1.2.1**;
- Provide to pupils the numbers cards with different numbers between 100 and 200 and ask each one to try to complete each number in his table referring to the example found in **activity 1.2.1**;

- Form groups of pupils and assign them to do **activity 1.2.1** and **activity 1.2.2**;
- Move around in the class for facilitating pupils and where necessary;
- Invite some groups to present their findings and then help them to harmonize.
- Assign each pupil to write down the number that was partitioned into hundreds (H), tens (T) and ones (O) (**see activity 1.2.3**).

### **Synthesis/summarization**

Guide pupils to summarize how to draw a table of place value, how to complete a number in such a table and how to group the numbers into hundreds (H), tens (T) and ones (O).

### **Assessment**

- Provide application activities to be done by pupils and check their answers;
- Assign all pupils activity to be done as a homework.

## **1.5.3 Lesson 3: Comparing and arranging numbers less or equal to 200**

### **a) Learning objectives:**

#### **Knowledge:**

Comparing and arranging numbers from 0 up to 200.

#### **Skills:**

- Compare numbers from 0 up to 200 using comparison symbols:  $<$ ,  $>$  or  $=$ .
- Arranging numbers from 0 to 200 in both ascending order and descending order.

#### **Attitudes and values:**

Appreciate the importance of comparing and arranging things according to their numbers in daily life.

### **b) Generic competences that a learner develops from the lessons:**

- Critical Thinking and being cautious while doing exercises.
- Cooperation and interpersonal skills as he or she works with others in different activities.
- Problem-solving skills in relation to counting as the learner looks for learning aids to help him or her to count without making mistakes.
- Appropriate communication skills when reading or counting out loudly.
- Lifelong learning skills as learners show curiosity to learn more in Mathematics.

**c) Crosscutting issues to be addressed in the lessons:**

- **Inclusive education:** Catering for learners with special education needs.  
Giving to fast-learners extra activities contained in this book.  
Giving slow learners suitable activities for their level.  
Giving special treatment to learners with physical impairment, making those with hearing and visual impairment sit in front where possible the teacher uses the special teaching/learning aids.
- **Gender:** Addressed when both boys and girls work together in groups and other activities peacefully without discrimination.
- **Environment and Sustainability:** Addressed when learners don't destroy the environment while looking for counters and cleaning where they worked from.
- **Peace and values education:**
  - Encourage learners to live and work in harmony and share ideas in a peaceful way with respect of each other's views and rights during group discussion.

**d) Teaching/learning aids:**

A variety of counters: stones, bottle tops, beans, beads, balloons, maize seeds, tomatoes, books, chalk, and number cards.

**e) Teaching and learning activity:**

- Guide pupils to recall how to compare the number of objects which are in two groups: say objects which are many, which are few, etc.
- Guide pupils to draw a table of place value on the chalk board and in their notebooks, then use numbers given in **activity 1.3.1** and guide pupils to complete them in a table of place values and help them to discover how to compare two numbers considering as if they represent number of objects;
- Lead pupils to find how to use comparison symbols to compare those numbers;
- Form groups of pupils and assign them to do from **activity 1.3.2** to **activity 1.3.4**;
- Move around in the class for facilitating pupils where necessary; assign other activities to those who finish first;
- Invite some groups to present their findings and then help them to harmonize;

## Synthesis/summarization

Guide pupils to summarize how to compare numbers using a table of place values: Insist on the comparison of hundreds (H), tens (T) and ones (O).

### Assessment

- Provide application activities to be done by pupils and check their answers;
- Assign all pupils a homework to be done.

### Note:

After this lesson, refer to activities from **Activity 1.4.1** to **Activity 1.4.5** and organize other sessions to guide pupils how to arrange numbers in ascending and descending order.

### f) More notes the teacher should consider:

- Monitoring all activities closely and catering for all learners without leaving any one behind.
- Thoroughly explaining to learners how to use counters to decompose, arrange and compare numbers less or equal to 200.
- Appropriate use of teaching and learning aids.

### g) Extra activities and their answers:

1) Group the following numbers into ones, tens and hundreds.

- a) 195= 1hundreds 9tens 5ones
- b) 142= 1hundreds 4tens 2ones
- c) 135= 1hundreds 3tens 5ones
- d) 194= 1hundreds 9tens 4ones

2) Arrange these numbers in ascending order.

- a) 105,104,140,150.

**Answer:** 104, 105, 140, 150.

- b) 112,131,121,113

**Answer:** 112,113,121,131.

3) Arrange these numbers in descending order.

- a) 108,180,107,189.

**Answer:** 189,180,108,107.

- b) 151,116,156,115.

**Answer:** 156,151,116,115.

4) Use the symbols  $<$ ,  $>$ ,  $=$  to compare the following pairs of numbers:

- a) 145  $<$  154

- b) 142  $>$  124

c)  $125 = 125$

d)  $154 > 142$

#### 1.5.4 Lesson 4: Addition of two or three numbers whose sum does not exceed 200

##### a) Learning objectives:

**Knowledge:** Addition of two or three numbers whose sum does not exceed 200.

##### Skills:

Giving examples and reading two numbers one by one that don't exceed 200.

##### Attitudes and values:

Appreciating the importance of addition in daily life.

##### b) Teaching/learning aids:

A variety of counters: stones, bottle tops, beans, beads, balloons, maize seeds, tomatoes, books, chalk, and number cards.

##### c) Generic competences that a learner develops from the lessons:

- Critical Thinking and being cautious while doing exercises.
- Cooperation and interpersonal skills as he or she work with others in different activities.
- Problem-solving skills in relation to counting as the learner looks for learning aids to help him or her to count without making mistakes.
- Appropriate communication skills when reading or counting out loudly.
- Lifelong learning skills as learners show curiosity to learn more in Mathematics.

##### d) Crosscutting issues to be addressed in the lessons:

**Inclusive education:** Catering for learners with special education needs. Giving to fast-learners extra activities contained in this book. Giving slow learners suitable activities for their level. Giving special treatment to learners with physical impairment, making those with hearing and visual impairment sit in front where possible the teacher uses the special teaching/learning aids.

**Gender:** Addressed when both boys and girls work together in groups and other activities peacefully without discrimination.

**Environment and Sustainability:** Addressed when learners don't destroy the environment while looking for counters and cleaning where they worked from.

**Peace and values education:** addressed when all learners share ideas in a peaceful way with respect of each other's views.

**Peace and values education:**

Encourage learners to live and work in harmony and share ideas in a peaceful way with respect of each other's views and rights during group discussion.

**e) Teaching and learning activity:**

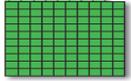
**Note:**

**This lesson can be taught in 3 different steps:** Addition without carrying, addition with carrying and word problem involving addition of numbers. In each case, try to emphasize the addition using mental arithmetic, pictorial representation of real objects and the use of standard written method.

In general, the lesson can be taught as follows:

- Use real objects and ask pupils to make 2 groups of objects and then ask pupils to put together those objects and ask them to explain how they can find their total number (**Activity 1.5.2, activity 1.5.3 and activity 1.5.4**)
- Using pictures of groups of objects from the pupil's book, ask pupils to use representations of 2 groups of similar objects and asks pupils to put together all objects in 2 groups by circling and then count them in order to get the sum. You can also use the table of values:

$123 + 32 = 155$

H	T	O
		
1	2	3
		
	3	2
1	5	5

$123$   
 $+ 32$   

---

 $155$

H	T	O
1	2	3
	3	2
1	5	5

$123$   
 $+ 32$   

---

 $155$

- Form groups of pupils and assign them to do the **activity 1.5.7** where they have to: draw a table of place values, complete numbers in the table, refer to the example and add the given numbers.
- Move around in the class for facilitating pupils where necessary;
- Invite some groups to present their findings and then help them to harmonize by explaining how to add numbers using a table of place values. Guide them to discover that this method is the same as *adding vertically or the standard written method*.

- Ask some groups to present answers and then guide the whole class to harmonize by explaining how to add numbers *without carrying*.
- Assign the same groups to do **activity 1.5.8** and move around to each group to verify their performance;
- Ask some groups to present answers and then guide the whole class to harmonize by explaining how to add numbers *with carrying*.

### **Synthesis/summarization**

- Guide pupils to summarize how to add numbers without or with carrying. Insist on the use of the standard written method which looks like the use of the table of values.

### **Assessment**

- Assign pupils to work in pairs, work out **activity 1.6** and mark their answers
- Provide application activities to be done by pupils and check their answers;
- Assign homework to all pupils.

### **f) More notes the teacher should consider:**

- Monitoring all activities closely and catering for all learners without leaving any one behind.
- Thoroughly explaining to learners how to use counters to add two or three numbers whose sum does not exceed 200.
- Appropriate use of teaching and learning aids.

### **g) Extra activities and their answers:**

Use the table of place values; ones, tens, and hundreds to add the following numbers.

- a)  $105 + 83 = 188$
- b)  $57 + 103 = 160$
- c)  $149 + 45 = 194$
- d)  $106 + 67 = 173$
- e)  $98 + 101 = 199$
- f)  $84 + 108 = 192$

## **1.5.5 Lesson 5: Subtraction of two or three numbers whose difference does not exceed 200**

### **a) Learning objectives:**

#### **Knowledge:**

Explain the subtraction of two or three numbers whose difference does not exceed 200.

**Skills:**

Subtraction of two or three numbers whose difference does not exceed 200.

**Attitudes and values:**

Appreciating the importance of subtraction in daily life.

**b) Teaching/learning aids:**

A variety of counters: stones, bottle tops, beans, beads, balloons, maize seeds, tomatoes, books, pens, pencils, chalk, and number cards.

**c) Generic competences that a learner develops from the lessons:**

- Critical Thinking and being cautious while doing activities.
- Cooperation and interpersonal skills as he or she work with others in different activities.
- Problem-solving skills in relation to counting as the learner looks for learning aids to help him or her to count without making mistakes.
- Appropriate communication skills when reading or counting out loudly.
- Lifelong learning skills as learners show curiosity to learn more in Mathematics.

**d) Crosscutting issues to be addressed in the lessons:**

**Inclusive education:** Catering for learners with special education needs. Giving to fast-learners extra activities contained in this book. Giving slow learners suitable activities for their level. Giving special treatment to learners with physical impairment, making those with hearing and visual impairment sit in front where possible the teacher uses the special teaching/learning aids.

**Gender:** Addressed when both boys and girls work together in groups and other activities peacefully without discrimination.

**Environment and Sustainability:** Addressed when learners don't destroy the environment while looking for counters and cleaning where they worked from.

**Peace and values education:**

Encourage learners to live and work in harmony and share ideas in a peaceful way with respect of each other's views and rights during group discussion.

**e) Teaching and learning activities:**

- Using counters, teacher asks pupils to make a group counters and then take away some of them and asks pupils to count, tell and write the number of the remaining counters (activity 1.7.1 and activity 1.7.2).

- Using pictures of groups of objects in the pupil's book, teacher asks pupils to draw a group of counters. And asks pupils to take away some of them by crossing them and then count, tell and write number of the remaining counters.
- Teacher helps pupils to write and read aloud a mathematical sentence on subtraction of 2 numbers less than 500 (activity 1.7.4).
- Form groups of pupils and assign them to do the **activity 1.7.5** where they have to: draw a table of place values, complete numbers in the table, refer to the example and perform the subtraction;
- Move around in the class for facilitating pupils where necessary;
- Invite some groups to present their findings and then help them to harmonize by explaining how to subtract numbers *without borrowing* by the use of a table of place values. Guide them to discover that this method is the same as *subtracting vertically or the standard written method*.
- Assign the same groups to do **activity 1.7.6** and **activity 1.7.7** and move around to each group to verify their performance;
- - Ask some groups to present answers and then guide the whole class to harmonize by explaining how to subtract a number from another *with borrowing*.

### **Synthesis/summarization**

- Guide pupils to summarize how to subtract numbers without borrowing and the subtraction with borrowing. Insist on the use of the standard written method (vertical addition) which looks like the use of the table of values.

### **Assessment**

- Assign pupils to work in pair, work out activity 1.8 and verify their answers.
- Provide application activities to be done by pupils and check their answers.

### **f) More notes the teacher should consider:**

- Monitoring all activities closely and catering for all learners without leaving any one behind.
- Thoroughly explaining to learners how to use counters to subtract two or three numbers whose difference does not exceed 200.
- Appropriate use of teaching and learning aids.

### **g) Extra exercises and their answers:**

a)  $145 - 123 = 22$

- b)  $157 - 113 = 44$
- c)  $149 - 115 = 34$
- d)  $156 - 127 = 29$
- e)  $178 - 121 = 57$
- f)  $134 - 108 = 26$ .

### 1.5.6 Lesson 6: Word problems involving addition and subtraction of numbers

#### a) Learning objectives:

##### Knowledge:

Solving word problems involving addition and subtraction related to daily life.

##### Skills:

Solve word problems involving addition and subtraction, explain to pupils how to solve word problems.

##### Attitudes and values:

Appreciating the importance of forming word problems of addition and subtraction of objects they use in daily life.

#### b) Teaching/learning aids:

A variety of counters: stones, bottle tops, beans, beads, balloons, maize seeds, tomatoes, books, pens, pencils, chalk, and number cards.

#### c) Generic competences that a learner develops from the lessons:

- Critical Thinking and being cautious while doing exercises.
- Cooperation and interpersonal skills as he or she work with others in different activities.
- Problem-solving skills in relation to counting as the learner looks for learning aids to help him or her to count without making mistakes.
- Appropriate communication skills when reading or counting out loudly.
- Lifelong learning skills as learners show curiosity to learn more in Mathematics.

#### d) Crosscutting issues to be addressed in the lessons:

**Inclusive education:** Catering for learners with special education needs. Giving to fast-learners extra activities contained in this book. Giving slow learners suitable activities for their level. Giving special treatment to learners with physical impairment, making those with hearing and visual impairment sit in front where possible the teacher uses the special teaching/learning aids.

**Gender:** Addressed when both boys and girls work together in groups and other activities peacefully without discrimination.

**Environment and Sustainability:** Addressed when learners don't destroy the environment while looking for counters and cleaning where they worked from.

Peace and values education:

Encourage learners to live and work in harmony and share ideas in a peaceful way with respect of each other's views and rights during group discussion.

### **e) Teaching and learning activities**

Form groups of counters with numbers equal to those given in the given word problem, put them together and tell the new number of counters.

**Note:**

Concerning **the lesson on word problems involving addition**, the teacher will help pupils to solve a one –step problem:

Guide them to *understand the problem, identify facts (givens and requests), draw visual representations related to equal shares and solve the problem using the division.*

Start by guiding pupils to solve some problems in a whole class discussion, provide problems to be solved into groups or in pairs and then give problems to be solved individually. Refer to activity 1.8.

#### **Teacher's activities:**

- Organizes word problems involving addition and subtraction related to daily life.
- Preparing enough teaching/learning aids to help a learner know how to solve word problems involving addition and subtraction of numbers whose sum and difference respectively don't exceed 200.
- Guiding learners when solving word problems involving addition and subtraction of numbers whose sum and difference respectively don't exceed 200.
- Gives an opportunity to each learner to solve word problems involving addition and subtraction of numbers whose sum and difference respectively don't exceed 200.
- Supports learners with learning difficulties giving them activities that suit their ability.
- Observes gender in all teaching and learning activities.
- Supplements learners' ideas as they explain to each other how to count without making mistakes.

### **Guide learners to accomplish the following:**

- Following instructions given by the teacher.
- Ask questions where he or she has not understood.
- Actively participating when solving word problems involving addition and subtraction of numbers whose sum or difference is less than 200.
- Helping fellow group members during group discussions in case he or she understood it better than they did.

### **f) More notes the teacher should consider:**

- Monitoring all activities closely and catering for all learners without leaving any one behind.
- Thoroughly explaining to learners how to use counters when forming word problems of addition with or without carrying and subtraction with or without borrowing.
- Appropriate use of different teaching and learning aids.

### **g) Extra exercises and their answers:**

Use the table of ones, tens and hundreds and counters to solve the following word problems.

1) Mugabo has 156 cows and 2 bulls. Find the sum of Mugabo's cattle.

**Answer:** The sum of Mugabo's cattle =  $156 + 12 = 168$  Cattle.

2) A school has 200 students. There are 121 girls. Find the number of boys in that school.

**Answer:** The number of boys in the school =  $200 - 121 = 79$  boys.

## **1.5.7 Lesson 7: Multiplication tables of 2 and 3 and their multiples.**

### **A) Multiplication table of 2**

#### **a) Objectives**

#### **Knowledge:**

Understanding the multiplication by 2

#### **Skills:**

Multiplying numbers by 2 and establishing a multiplication table of 2.

#### **Values**

Having self confidence when calculating the product of numbers.

#### **b) Prerequisites /Introduction**

To perform well in this lesson, do the following:

- Plan how to help pupils with different impairments;

- Guide pupils to work out different activities for finding the multiples of 2 not greater than 20.

**c) Teaching resources and learning resources**

- At least 20 Counters per group;
- Exercise books

**d) Generic competences that a learner develops from the lessons:**

- Critical Thinking and being cautious while doing exercises.
- Cooperation and interpersonal skills as he or she work with others in different activities.
- Problem-solving skills in relation to counting as the learner looks for learning aids to help him or her to count without making mistakes.
- Appropriate communication skills when reading or counting out loudly.
- Lifelong learning skills as learners show curiosity to learn more in Mathematics.

**e) Crosscutting issues to be addressed in the lessons:**

**Inclusive education:**

Caterfor learners with special educational needs.

Give to fast-learners extra activities contained in this book.

Give slow learners suitable activities for their level.

Give special treatment to learners with physical impairment, making those with hearing and visual impairment sit in front where possible the teacher uses the special teaching/learning aids.

**Gender:** Addressed when both boys and girls work together in groups and other activities peacefully without discrimination.

**Environment and Sustainability:** Addressed when learners don't destroy the environment while looking for counters and cleaning where they worked from.

**Peace and values education:**

Encourage learners to live and work in harmony and share ideas in a peaceful way with respect of each other's views and rights during group discussion.

**f) Teaching and learning activities:**

- Form groups of pupils and assign them to do the **activity 1.9.1** and activity **1.10.1** where they have to: form at least 10 groups of 2 counters, draw a multiplication table of 2;
- Ask each group to combine 2 groups, 3 groups, 4 groups, ... 9 groups and 10 groups of 2 counters so that at each case they count the number

of counters for new combination of groups formed and complete the number in the multiplication table;

- Move around in the class for facilitating pupils where necessary;
- Invite some groups to present their findings and then help them to harmonize by explaining how to find the multiplication table of 2 and the meaning of multiples of 2.
- Assign the same groups to do application **activity activity1.9.2** and move around to each group to verify their performance;
- Ask some groups to present answers and then guide the whole class to harmonize by explaining how to multiply by 2.

### **Synthesis/summarization**

- Guide pupils to find multiples of 2.

### **Assessment**

- Provide application activities to be done by pupils and check their answers;

Note: Multiplication table of 3 and multiples of 3 not greater than 30

The lesson related to: Multiplication by 3 and multiples of 3 not exceeding 30 (**activity 1.14.1**) is taught in the same way as this previous lesson.

### **g) More notes the teacher should consider:**

- Monitoring all learners' activities closely and catering for all learners without leaving any one behind.
- Thoroughly explaining to learners how to use counters to form groups equivalent to multiples of 2 and 3.
- Appropriate use of different teaching and learning aids.

### **h) Extra exercises and their answers:**

Fill in the missing numbers:

$3 \times \dots = 15.$	<b>Answer: 5</b>	$\dots \times 3 = 12$	<b>Answer: 4</b>
$\dots \times 2 = 16$	<b>Answer: 8</b>	$2 \times \dots = 20$	<b>Answer: 10</b>
$30 = \dots \times 3$	<b>Answer: 10</b>	$14 = \dots \times 2$	<b>Answer: 7</b>
$18 = 3 \times \dots$	<b>Answer: 6</b>	$\dots = 4 \times 2$	<b>Answer: 8</b>
$\dots \times 3 = 27$	<b>Answer: 9</b>	$21 = 3 \times \dots$	<b>Answer: 7</b>
$8 \times 3 = \dots$	<b>Answer: 24</b>	$9 = \dots \times 3$	<b>Answer: 3</b>

### **1.5.7 Lesson 8: Multiplying a two-digit numbers by 2 or 3 without carrying**

This lesson can be taught in two main steps:

#### **Step 1: Multiplication of a two digit number by 2**

##### **a) Objectives**

##### **Knowledge:**

Correctly multiply two-digit numbers by 2 or 3 without carrying.

##### **Skills:**

- Explain to peers the rules of multiplying two-digit numbers with a one-digit number.
- Multiplying two-digit numbers by 2 or 3 with the product not exceeding 200.

##### **Attitudes and values:**

- Appreciating the importance of multiplying two-digit numbers with a one-digit number.

##### **b) Prerequisites /Introduction**

To perform well in this lesson, do the following:

- Plan how to help pupils with different impairments;
- Guide pupils to:
  - Work out different activities for multiplying a 2 digit number by 2 where the product does not exceed 20.

##### **c) Teaching resources and learning resources**

- The table of place values;
- Different types of counters.

##### **d) Generic competences that a learner develops from the lessons:**

- Critical thinking and being cautious while doing exercises.
- Cooperation and interpersonal skills as he or she work with others in different activities.
- Problem-solving skills in relation to counting as the learner looks for learning aids to help him or her to count without making mistakes.
- Appropriate communication skills when reading or counting out loudly.
- Lifelong learning skills as learners show curiosity to learn more in Mathematics.

##### **e) Crosscutting issues to be addressed in the lessons:**

**Inclusive education:** Catering for learners with special education needs. Giving to fast-learners extra activities contained in this book.

Giving slow learners suitable activities for their level. Giving special treatment to learners with physical impairment, making those with hearing and visual impairment sit in front where possible the teacher uses the special teaching/learning aids.

**Gender:** Addressed when both boys and girls work together in groups and other activities peacefully without discrimination.

**Environment and Sustainability:** Addressed when learners don't destroy the environment while looking for counters and cleaning where they worked from.

**Peace and values education:**

Encourage learners to live and work in harmony and share ideas in a peaceful way with respect of each other's views and rights during group discussion.

**f) Teaching and learning activities:**

- Form groups of pupils and assign them to do the **activity 1.10.1** where they have to: draw a table of place values, complete numbers in the table, follow to the example and multiply by 2 to get the product.
- Move around in the class for facilitating pupils where necessary; ask probing questions guiding them to know that they multiply starting by the right.
- Invite some groups to present their findings and then help them to harmonize by explaining how to multiply a 2-digit number by 2. Guide them to discover another similar method of *multiplying vertically or the standard written method*.
- Assign the same groups to do the activity 1.11 and move around to each group to verify their performance;
- Ask some groups to present answers and then guide the whole class to harmonize by explaining how to do it.

**Synthesis/summarization**

- Guide pupils to summarize how to multiply a 2digit number by 2. Insist on the use of the standards written method which looks like the use of the table of values.

**Assessment**

- Provide application activities to be done by pupils and check their answers;
- Assign homework to all pupils.

**Step2: Multiplication of a two digit number by 3**

The lesson related to: Multiplication by 3 and multiples of 3 not exceeding

30 (activity 1.14.1) is taught in the same way as this previous lesson.

**g) More notes the teacher should consider:**

- Monitoring all learners' activities closely and catering for all learners without leaving any one behind.
- Thoroughly explaining to learners how to use counters to multiply two-digit numbers with 2 and 3 without carrying.
- Appropriate use of different teaching and learning aids.

**h) Extra exercises and their answers:**

Use the table of place values, number cards, counters and vertically multiply the following numbers;

- a)  $32 \times 3 =$  Answer: 96
- b)  $44 \times 2 =$  Answer: 88
- c)  $33 \times 3 =$  Answer: 99
- d)  $24 \times 2 =$  Answer: 48
- e)  $23 \times 3 =$  Answer: 69
- f)  $41 \times 2 =$  Answer: 82.

**1.5.9 Lesson 9: Division of a two or three-digit number by 2 or by 3 without a Remainder**

**a) Learning objectives:**

**Knowledge:**

Dividing numbers less than 200 by 2 or 3 without remainder.

**Skills:**

- Explain to pupils the rules of dividing two-digit numbers by a one-digit number.
- Dividing two-digit numbers by 2 or 3 without remainder with the dividend not exceeding 200.

**Attitudes and values:**

- Appreciating the importance of division in daily life.
- Appreciating the importance of dividing two-digit numbers by a one-digit number.

**b) Teaching/learning aids:**

- A variety of counters: stones, bottle tops, beans, beads, balloons, maize seeds, tomatoes, books, pens, pencils, chalk, and number cards.

**c) Generic competences that a learner develops from the lessons:**

- Critical thinking and being cautious while doing exercises.

- Cooperation and interpersonal skills as he or she work with others in different activities.
- Problem-solving skills in relation to counting as the learner looks for learning aids to help him or her to count without making mistakes.
- Appropriate communication skills when reading or counting out loudly.
- Lifelong learning skills as learners show curiosity to learn more in Mathematics.

**d) Crosscutting issues to be addressed in the lessons:**

**Inclusive education:** Catering for learners with special education needs. Giving to fast-learners extra activities contained in this book. Giving slow learners suitable activities for their level. Giving special treatment to learners with physical impairment, making those with hearing and visual impairment sit in front where possible the teacher uses the special teaching/learning aids.

**Gender:** Addressed when both boys and girls work together in groups and other activities peacefully without discrimination.

**Environment and Sustainability:** Addressed when learners don't destroy the environment while looking for counters and cleaning where they worked from.

**Peace and values education:**

Addressed when all learners share ideas in a peaceful way with respect of each other's views.

**Peace and values education:**

Encourage learners to live and work in harmony and share ideas in a peaceful way with respect of each other's views and rights during group discussion.

**Note:** This lesson can be taught in two steps.

**e) Teaching and learning activities**

**Step 1: Dividing by 2**

- Form groups of pupils and assign them to do the **activity 1.12.1** and **activity 1.12.2** where they have to: complete the division table, refer to the example and divide a 2 or 3 digit number by 2.
- Move around in the class for facilitating pupils where necessary; ask probing questions guiding them to know that they divide starting by the left side and that they can take 2 digits when necessary.
- Invite some groups to present their findings and then help them to harmonize by explaining how to divide. Guide them to discover when

they consider 2 digits of a dividend and that this method is the same as the one called *vertical division or the standard written method*.

- Assign the same groups to do **activity 1.12.4** and move around to each group to verify their performance;
- Ask some groups to present answers and then guide the whole class to harmonize by explaining how to do it.

### **Synthesis/summarization**

- Guide pupils to summarize how to divide. Insist on the use of the standards written method.

### **Assessment**

- Provide application activities to be done by pupils and check their answers;
- Assign homework to all pupils.

### **Step 2: Division by 3.**

The step related to the division by 3 (**activity 1.17.1, activity 1.17.2 and activity 1.17.3**) is taught in the same way as this previous step.

More notes the teacher should consider:

- Monitoring all learners' activities closely and catering for all learners without leaving any one behind.
- Thoroughly explaining to learners how to use counters to dividing two-digit numbers by 2 or 3 without remainder with the dividend not exceeding 200.
- Appropriate use of different teaching and learning aids.

### **Extra exercises and their answers:**

Use counters to calculate the following by long division.

- a)  $183: 3 = 61$
- b)  $84: 2 = 42$
- c)  $126: 3 = 42$
- d)  $99: 3 = 33$
- e)  $195: 3 = 65$

## **1.5.10 Lesson 10: Word problems involving the division of a number less than 200 by 2 or 3 without remainder**

### **a) Learning objectives:**

#### **Knowledge:**

- Solving word problems that involve dividing numbers less than 200 by 2 or 3 without remainder.

**Skills:**

- Explain to peers the rules followed while solving word problems that involve dividing two-digit numbers with a one-digit number.
- Dividing two-digit numbers by 2 or 3 without remainder with the dividend not exceeding 200.

**Attitudes and values:**

- Appreciating the importance of division in daily life.

**b) Teaching/learning aids:**

A variety of counters: stones, bottle tops, beans, beads, balloons, maize seeds, tomatoes, books, pens, pencils, chalk, and number cards.

**c) Generic competences that a learner develops from the lessons:**

- Critical thinking and being cautious while doing exercises.
- Cooperation and interpersonal skills as he or she work with others in different activities.
- Problem-solving skills in relation to counting as the learner looks for learning aids to help him or her to count without making mistakes.
- Appropriate communication skills when reading or counting out loudly.
- Lifelong learning skills as learners show curiosity to learn more in Mathematics.

**d) Crosscutting issues to be addressed in the lessons:**

**Inclusive education:** Catering for learners with special education needs. Giving to fast-learners extra activities contained in this book. Giving slow learners suitable activities for their level. Giving special treatment to learners with physical impairment, making those with hearing and visual impairment sit in front where possible the teacher uses the special teaching/learning aids.

**Gender:** Addressed when both boys and girls work together in groups and other activities peacefully without discrimination.

**Environment and Sustainability:** Addressed when learners don't destroy the environment while looking for counters and cleaning where they worked from.

**Peace and values education:**

Encourage learners to live and work in harmony and share ideas in a peaceful way with respect of each other's views and rights during group discussion.

## e) Teaching and learning activities

### Introduction/ Review of the previous lesson:

Get 24 stones, share them equally to 2 or 3 learners and they then count and tell the number of stones each learner has.

### Lesson development:

#### Note:

Concerning **the lesson on word problems involving division without remainder**, the teacher will help pupils to solve a one –step problem:

Guide them to *understand the problem, identify facts (givens and requests), draw visual representations related to equal shares and solve the problem using the division.*

Start by guiding pupils to solve some problems in a whole class discussion, provide problems to be solved into groups or in pairs and then give problems to be solved individually. Refer to activity 1.13 and activity 11.18.

#### Teacher's activities:

- Preparing enough teaching/learning aids to help a learner to be able to solve word problems that involve multiplying and dividing numbers less than 200 by 2 or 3 without remainder.
- Guiding learners in exercises of dividing numbers by 2 or 3 without remainder with the dividend not exceeding 200.
- Asks learners to use number cards and counters when doing word problems involving multiplication and division of numbers less than 200 by 2 or 3 without remainder.
- Gives opportunities to each learner to practice doing word problems involving multiplication and division of numbers less than 200 by 2 or 3 without remainder.
- Supports learners with learning difficulties giving them activities that suit their ability.
- Observes gender in all teaching and learning activities that help understanding of the lesson.
- Supplements learners' ideas as they explain to each other when solving the given word problems.

#### Learner's activities:

- Following instructions given by the teacher.
- Ask questions where he or she has not understood.
- Actively participating in all exercises of solving word problems that involve multiplying and dividing numbers less than 200 by 2 or 3 without remainder.

- Helping fellow group members to explain what they don't understand during group discussions.

**f) More notes the teacher should consider:**

- Monitoring all learners' activities closely and catering for all learners without leaving any one behind.
- Thoroughly explaining to learners how to use counters to solve word problems that involve multiplying and dividing numbers less than 200 by 2 or 3 without remainder.
- Appropriate use of different teaching and learning aids.

**g) Extra exercises and their answers:**

Use counters to solve the word problems below:

- 1) Kaneza has 150 books that she wants to share to her 2 children. How many books will each get?

**Answer:** Each learner will get books =  $150:2$   
= 72 books.

- 2) Uwamahoro has 147 iron sheets to help 3 families. How many iron sheets will each family get?

**Answer:** Every family will get iron sheets =  $147:3$   
= 49 iron sheets.

- 3) Kayiranga makes 24 buckets per day. Find the number of buckets he makes in 2 days.

**Answer:** The number of buckets he makes in 2 days =  $24 \times 2 = 48$  buckets.

- 4) Keza plants 34 cabbages per day. Find the number of cabbages she plants in 3 days.

**Answer:**

The number of Cabbages she plants in 3 days =  $34 \times 3 = 102$  cabbages.

## 1.6 Answers for the End Unit assessment 1

- 1) Write in words or in figures
- 187: One hundred and eighty-seven.
  - One hundred and ninety-seven: **197**
- 2) Write the expanded number.
- 7Ones 1 Hundred 5Tens = **157**
  - 5 Ones 1Hundreds 7Tens = **175**
- 3) Find the number that was expanded
- $(1 \times 100) + (3 \times 10) + (1 \times 9) =$  **139**

b)  $100 + 80 + 3 = 183$

4) Tell the place value for the digit underlined.

a) 186    **Hundred**

b) 147    **Tens**

c) 134    **Hundred.**

d) 125ones

5) Use  $<$ ,  $>$  and  $=$  to compare these numbers

a)  $195 > 159$

b.  $141 < 171$

c.  $186 = 186$

6) Arrange the following numbers in the ascending order 179, 189, 198, 187, 178, 197 178, 179, 187, 197, 198

7) Arrange the following numbers in the descending order

198, 187, 178, 107, 189, 199 199, 198, 189, 187, 178, 107

8) Add the following

1)  $143 + 53 = 196$

2)  $87 + 108 = 195$

3)  $75 + 118 = 193$

4) d.  $166 + 33 = 199$

9) Find the difference

a)  $195 - 172 = 23$

b)  $167 - 136 = 31$

c)  $151 - 109 = 42$

d)  $132 - 78 = 54$

10) Complete the following multiplication table:

X 2	1	2	3	4	5	6	7	8	9	10
	2	4	6	8	10	12	14	16	18	20

X 3	1	2	3	4	5	6	7	8	9	10
	3	6	9	12	15	18	21	24	27	30

11) Find the product

a) 43

b) 23

c) 34

d) 32

e) 24

f) 33

    
x 2

    
x 3

   x 2       x 3       x 2       x 3

    
86

    
69

68

96

48

    
99

12) Complete the missing numbers in the following multiplication table:

$\div 2$	0	2	4	6	8	10	12	14	16	18	20
	0	1	2	3	4	5	6	7	8	9	10

$\div 3$	3	6	9	12	15	18	21	24	27	30
	1	2	3	4	5	6	7	8	9	10

13) Divide:

- a)  $86:2 = 43$
- b)  $59:3 = 53$
- c)  $180:2 = 90$
- d)  $126:3 = 42$
- e)  $168:2 = 84$
- f)  $165:3 = 55$

14) Word problems

- a) Both have cows =  $97 + 98 = 195$  cows
- b) The bananas that remained =  $158 - 98 = 61$  bananas
- c) The number of biscuits =  $64 \times 2 = 128$  biscuits
- d) The total bottles of Fanta taken by the visitors =  $62 \times 3 = 186$
- e) The number of books each classroom got =  $98:3 = 66$  books.
- f) The number of trees she will plant in two years =  $94 \times 2 = 188$
- g) The number of jerrycans he will fetch in 3 days =  $11 \times 3 = 33$  jerrycans.
- h) Each child will get cows =  $196:2 = 99$  cows
- i) The number of books in two boxes =  $94 \times 2 = 188$  notebooks.

# UNIT 2

# WHOLE NUMBERS FROM 0 UP TO 500

## 2.1 Key unit competence:

Counting, reading, writing, arranging, comparing, adding and subtracting, multiplying and dividing whole numbers from 0 to 500.

## 2.2 Prerequisite knowledge and skills

Pupils will perform well in this unit if they have knowledge and mastery of the following: Counting, reading, writing, arranging, comparing, adding and subtracting, multiplying and dividing whole numbers from 0 to 200.

## 2.3 Cross-cutting issues to be addressed

Through different tasks and activities, the following cross-cutting issues have to be addressed in this unit:

- **Inclusive education:** ensure that the selected teaching and learning techniques, teaching aids promote education for all.
- **Peace and value Education:** encourage learners to respect others' views and thoughts during group works and class discussions;
- **Gender:** ensure the equal opportunity of boys and girls in the lesson participation.
- **Environment and Sustainability:** ensure that pupils are encouraged to discuss effects of environment and sustainability through solving word problems involving addition, subtraction...
- **Financial education:** lead pupils to make appropriate financial decisions through word problems that involve four basic operations.

## 2.4. List of lessons

No	Title of the lesson	Number of periods
1	Counting groups of objects from 1 to 500.	3
	Reading and writing numbers from 0 to 500 in figures.	
	Reading and writing numbers from 0 to 500 in words.	
2	Grouping numbers from 1 to 500 into ones, tens and hundreds.	1
3	Comparing numbers that do not exceed 500.	1

4	Arranging numbers that do not exceed 500 in ascending and descending order.	1
5	Mental Addition of numbers whose sum does not exceed 500.	2
	Addition of Numbers whose sum does not exceed 500 without carrying.	
6	Addition of Numbers whose sum does not exceed 500 with carrying.	1
7	Word problems involving addition of numbers whose sum does not exceed 500.	1
8	Subtraction of numbers that do not exceed 500 mentally.	2
	Subtraction of numbers that do not exceed 500 without borrowing.	
9	Subtraction of numbers that do not exceed 500 with borrowing.	1
10	Word problems involving subtraction of numbers whose difference does not exceed 500.	1
11	Multiplication of whole numbers by 4 and multiples of 4 that do not exceed 40	1
12	Multiplication of 2digit numbers or 3digit numbers by 4 without carrying.	1
13	Word problems involving multiplication of 2digit numbers or 3digit numbers by 4 without carrying.	1
14	Division of 2digit numbers or 3digit numbers by 4 without remainder.	1
15	Word problems involving division of 2digit numbers or 3digit numbers by 4 without remainder.	1
16	Multiplication of whole numbers by 5 and multiples of 5 that do not exceed 50	1
17	Multiplication of 2digit numbers or 3digit numbers by 5 without carrying.	1
18	Word problems involving multiplication of 2digit numbers or 3digit numbers by 5 without carrying.	1
19	Division of 2digit numbers or 3digit numbers by 5 without remainder.	1
	Word problems involving division of 2digit numbers or 3digit numbers by 5 without remainder.	

20	End unit assessment	1
	Total	24

**Note:** Even though the list of lessons is given here above, the teacher can combine similar lessons where each one is taken as a step in learning.

## 2.5 Guidance on lessons

### 2.5.1 Lesson 1: Counting, reading and writing numbers from 0 to 500

This lesson can be taught in 3 different lessons: counting numbers, reading and writing numbers in figures and the lesson on reading and writing numbers in words.

#### a) Learning objectives:

##### Knowledge:

Showing and explaining the place value of each digit in three-digit numbers.

##### Skills:

Count without mistakes, read and writ numbers from 0 up to 500 both in figures and in words

##### Attitudes and values:

Show the culture of orderliness in daily life.

#### b) Teaching/learning aids:

A variety of counters: stones, bottle tops, beans, beads, balloons, maize seeds, tomatoes, books, pieces of chalk, soya beans and number cards, cuisenaire rods, multi-based, blocks or place value material, local abacus and different charts with numbers.



#### c) Generic competences that a learner develops from the lessons:

- Critical Thinking and being cautious while doing exercises.
- Cooperation and interpersonal skills as he or she work with others in different activities.
- Problem-solving skills in relation to counting objects and money not exceeding 500.

- Appropriate communication skills when reading or counting out loudly.
- Lifelong learning skills as learners show curiosity to learn more in Mathematics.

**d) Crosscutting issues to be addressed in the lessons:**

**Inclusive education:** Catering for learners with special education needs. Giving to fast-learners extra activities contained in this book. Giving slow learners suitable activities for their level. Giving special treatment to learners with physical impairment, making those with hearing and visual impairment sit in front where possible the teacher uses the special teaching/learning aids.

**Gender:** Addressed when both boys and girls work together in groups and other activities peacefully without discrimination.

**Environment and Sustainability:** Addressed when learners don't destroy the environment while looking for counters and cleaning where they worked from.

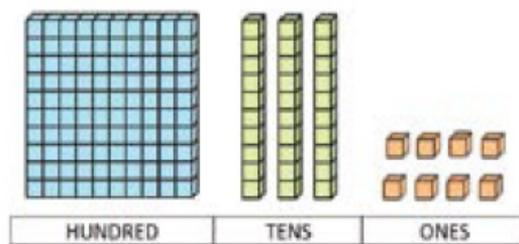
**Peace and values education:**

Encourage learners to live and work in harmony and share ideas in a peaceful way with respect of each other's views during group discussion.

**e) Teaching and learning activities**

- Ask every learner to get the counters that he or she brought, put similar ones together and ask to count them in tens and in hundreds. Let them make at least 5 groups of hundreds.

They can use blocks or rods.



- Using different prompting questions, teacher helps pupils to understand and discover how to read and write the numbers from 201 to 500.
- The teacher leads pupils how to read and write a 3-digit number from 201 to 500 (use from activity 2.1.1 to activity 2.1.12)
- Teacher asks pupils to individually imitate the 3-digit numbers from 201 to 500 written on the chalkboard or on a number card and then write them many times in their notebook using a pen or a pencil (Use from activity 2.1.13 to activity 2.1.14)

- Teacher helps pupils with difficulties to well write the 3-digit numbers by giving them more time on writing activity. He/ she must use all possible ways to make all pupils successful in reading and writing the given 3-digit numbers.

- **Assessment activities**

The teacher provides activities to be done by pupils at home.

All set activities should provide to every pupil the opportunities to demonstrate and apply the new concept learnt in a range of situations.

**f) More notes the teacher should consider:**

- Monitoring all activities closely and catering for all learners without leaving any one behind.
- Thoroughly explaining to learners how to count, read, and write numbers from 0 to 500 in both figures and words.
- Appropriate use of teaching and learning aids.

**g) Extra exercises and their answers:**

**h) Make groups of the following objects.**

- a) 324 books
- b) 275 stones

1) Read and write the following numbers in words or figures.

- a) Three hundred and fourteen      **314.**
- b) 485. **Four hundred and eighty-five.**
- c) Four hundred and eight.      **408.**
- d) 278 **Two hundred and seventy-eight**
- e) Two hundred and forty.      **240.**
- f) 369. **three hundred and sixty-nine.**

**i) Home work:**

Everyone count the number of shops on your way home and be ready to share when you come back.

**2.5.2 Lesson 2: Place value of each digit for numbers from 0 up to 500**

**a) Objectives**

**Knowledge:**

Understand and identify the place value of numbers formed by three digits

**Skills:**

Grouping a threedigit number not less than 500 into Hundreds(H), Tens(T) and Ones (O)

## Values

Develop the capacity of quick critical thinking

### b) Prerequisites /Introduction

To perform well in this lesson, do the following:

- Plan how to help pupils with different impairments;
- Guide pupils to:
  - Work out different activities for partitioning **number between 0 and 200 into ones, tens, hundreds and thousands** given in the previous unit ;
  - Draw the table of place value and complete in it numbers less than 200 read from the number cards.

### c) Teaching resources and learning resources

- The table of place values;
- A variety of counters: stones, bottle tops, beans, beads, balloons, maize seeds, tomatoes, books, chalk, and number cards, Cuisenaire rods, multi-based, blocks or place value material, local abacus and different charts with numbers.
- Number cards with different numbers between 1000 and 2000 in different colors;
- Different types of counters.

### d) Teaching and learning activities:

- Ask pupils to draw a table of place value in their notebooks,
- Ask them to compare their table and the table which is in the pupil's book on **activity 2.2.1**;
- Provide to pupils numbers cards with different numbers between 200 and 500 and ask each one to try to complete each number in his table referring to the example found in **activity 2.2.1**;
- Form groups of pupils and assign them to do activity 2.2.1 , activity 2.2.2 and activity 2.2.3.
- Move around in the class for facilitating pupils where necessary;
- Invite some groups to present their findings and then help them to harmonize;
- Assign each pupil to Write down the number that was partitioned into hundreds (H), tens (T) and ones (O).

### Synthesis/summarization

Guide pupils to summarize how to draw a table of place value, how to

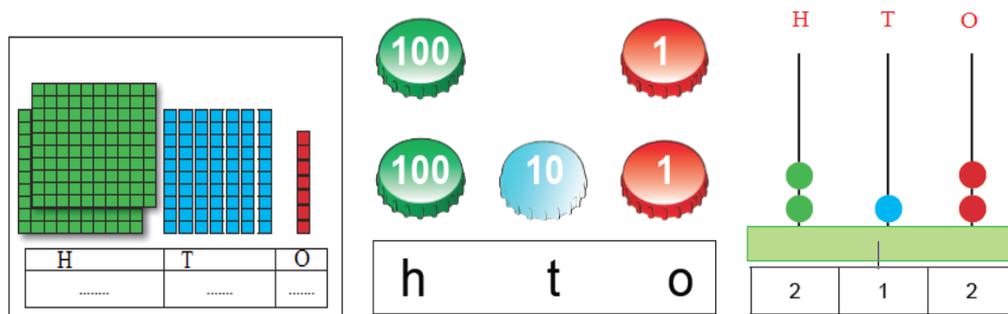
complete a number in such a table and how to partition that number into hundreds (H), tens (T) and ones (O).

### Assessment

- Provide application activities to be done by pupils and check their answers ;
- Assign all pupils homework to be done.

### e) More notes the teacher should consider:

- Monitoring all activities closely and catering for all learners without leaving any one behind.
- Use different materials such as abacus, counters, bottle tops and rods to explain how to decompose a number into hundreds, tens and ones:



### f) Extra exercises and their answers:

1) Grouping the following numbers into ones, tens and hundreds.

- 495= 4hundred 9tens 5ones
- 342= 3hundred 4tens 2ones
- 235= 2hundred 3tens 5ones
- 39= 3tens 9ones.

### 2.5.3 Lesson 3: Comparing numbers up to 500

#### a) Learning objectives:

##### Knowledge:

Comparing numbers from 0 up to 500.

##### Skills:

- Comparing numbers from 0 up to 500 using the comparison (<, >, =) symbols;
- Arranging numbers from 0 to 500 in both ascending order and descending order.

##### Attitudes and values:

Appreciating the importance of comparing and arranging things in daily life.

### **b) Teaching/learning aids:**

- The table of place values;
- A variety of counters: stones, bottle tops, beans, beads, balloons, maize seeds, tomatoes, books, chalk, and number cards, Cuisenaire rods, multi-based, blocks or place value material, local abacus and different charts with numbers.

### **c) Generic competences that a learner develops from the lessons:**

- Critical Thinking and being cautious while doing exercises.
- Cooperation and interpersonal skills as he or she work with others in different activities.
- Problem-solving skills in relation to counting as the learner looks for learning aids to help him or her to count without making mistakes.
- Appropriate communication skills when reading or counting out loudly.
- Lifelong learning skills as learners show curiosity to learn more in Mathematics.

### **d) Crosscutting issues to be addressed in the lessons:**

- **Inclusive education:** Catering for learners with special education needs. Giving to fast-learners extra activities contained in this book. Giving slow learners suitable activities for their level. Giving special treatment to learners with physical impairment, making those with hearing and visual impairment sit in front where possible the teacher uses the special teaching/learning aids.
- **Gender:** Addressed when both boys and girls work together in groups and other activities peacefully without discrimination.
- **Environment and Sustainability:** Addressed when learners don't destroy the environment while looking for counters and cleaning where they worked from.
- **Peace and values education:** Addressed when all learners share ideas in a peaceful way with respect of each other's views.
- **Peace and values education:** Encourage learners to live and work in harmony and share ideas in a peaceful way with respect of each other's views and rights during group discussion.

### **e) Teaching and learning activities**

- Guide pupils to recall how to compare the number of objects which are in two groups: which are many, which are few, etc.
- Guide pupils to draw a table of place value on the chalk board and in their notebooks, then use numbers given in activity 2.3.1 and guide pupils to complete them in a table of place values and help them to

discover how to compare two numbers considering as if they represent number of objects;



- Lead pupils do find how to use comparison symbols to compare those numbers;
- Form groups of pupils and assign them to do from activity 2.3.2 to activity 2.3.4;
- Move around in the class for facilitating pupils where necessary; assign other activities to those who finish first;
- Invite some groups to present their findings and then help them to harmonize;

### Synthesis/summarization

Guide pupils to summarize how to compare numbers using a table of place values: Insist on the comparison of hundreds (H), tens (T) and ones (O).

### Assessment

- Provide application activities to be done by pupils and check their answers;
- Assign all pupils homework to be done.

### f) More notes the teacher should consider:

- Monitoring all activities closely and catering for all learners without leaving any one behind.
- Thoroughly explaining to learners how to use counters to arrange and compare numbers within 100 to 500.
- Appropriate use of teaching and learning aids and catering for learners with learning difficulties.

### Note:

*After this lesson, guide pupils to discover how to arrange numbers in ascending order (use activity 2.4.1 , activity 2.4.2 and activity 2.4.3) and how to arrange numbers in descending order (use activity 2.4.3 and activity 2.4.4).*

### g) Extra exercises and their answers:

1) Arrange these numbers in ascending order.

a) 405, 499, 440, 450.

**Answer: 405,440,450,499.**

b) 312,231,321,213.

**Answer: 213,231,312,321.**

2) Arrange these numbers in descending order.

a) a.208,380,407,380,208.

**Answer: 480,407,380,208**

b) b.351,416,256,315

**Answer: 416,351,315,256.**

3) Use the symbols  $<$ ,  $>$ ,  $=$  to compare the following pairs of numbers:

a) 345  $<$  254

b) 442  $>$  424

c) 425  $=$  425

d) 454  $>$  442

#### **2.5.4 Lesson 4: Addition of numbers whose sum does not exceed 500**

**a) Learning objectives:**

**Knowledge:**

Addition of two or three numbers whose sum does not exceed 500.

**Skills:**

Explaining word problems that involve adding numbers that don't exceed 500.

**Attitudes and values:**

Appreciating the importance of addition in daily life.

**b) Teaching/learning aids:**

A variety of counters: stones, bottle tops, beans, beads, balloons, maize seeds, tomatoes, books, chalk, and number cards, Cuisenaire rods, multi-based, blocks or place value material, local abacus and different charts with numbers.

**c) Generic competences that a learner develops from the lessons:**

- Critical Thinking and being cautious while doing exercises.
- Cooperation and interpersonal skills as he or she works with others in different activities.
- Problem solving skills as the learner solves problems that involve finding the sum of numbers less or equal to 500.
- Appropriate communication skills when reading or counting out loudly.
- Lifelong learning skills as learners show curiosity to learn more in Mathematics.

#### **d) Crosscutting issues to be addressed in the lessons:**

##### **Inclusive education:**

Cater for learners with special education needs.

Give to fast-learners extra activities contained in this book.

Give slow learners suitable activities for their level.

Give special treatment to learners with physical impairment, making those with hearing and visual impairment sit in front where possible the teacher uses the special teaching/learning aids.

**Gender:** Addressed when both boys and girls work together in groups and other activities peacefully without discrimination.

**Environment and Sustainability:** Addressed when learners don't destroy the environment while looking for counters and cleaning where they worked from.

##### **Peace and values education:**

Addressed when all learners share ideas in a peaceful way by respecting each other's views.

##### **Peace and values education:**

Encourage learners to live and work in harmony and share ideas in a peaceful way with respect of each other's views and rights during group discussion.

#### **e) Teaching and learning activities**

##### **Note:**

This lesson can be taught in 3 different steps: Addition without carrying, addition with carrying and word problem involving addition of numbers. In each case, try to emphasize the addition using mental arithmetic and the use of standard written method.

In general, the lesson can be taught as follows:

- Using real objects, teacher asks pupils to make 2 groups of objects and asks pupils to put together those objects from 2 groups and ask them how they can find their total number (Activity 2.5.3, activity 2.5.4 and activity 2.5.5)
- Using pictures of groups of objects in the pupil's book, teacher asks pupils to use representations of 2 groups of similar objects and asks pupils to put together all objects in 2 groups by circling and then count them in order to get the sum. He can also use the table of values:

	Hundreds	Tens	Ones
	3	4	0
+	1	6	0
	5	0	0

$$340 + 160 = 500$$

- Form groups of pupils and assign them to do the **activity 2.5.7** where they have to: draw a table of place values, complete numbers in the table, refer to the example and add the given numbers.
- Move around in the class for facilitating pupils where necessary;
- Invite some groups to present their findings and then help them to harmonize by explaining how to add numbers using a table of place values. Guide them to discover that this method is the same as *adding vertically or the standard written method*.
- Ask some groups to present answers and then guide the whole class to harmonize by explaining how to add numbers *without carrying*.
- Assign the same groups to do **and activity 2.5.8** and move around to each group to verify their performance;
- Ask some groups to present answers and then guide the whole class to harmonize by explaining how to add numbers *with carrying*.

### Synthesis/summarization

- Guide pupils to summarize how to add numbers without or with carrying. Insist on the use of the standards written method which looks like the use of the table of values.

### Assessment

- Assign pupils to work in pair, work out activity 2.6 and verify their answers
- Provide application activities to be done by pupils and check their answers;
- Assign homework to all pupils.

### f) More notes the teacher should consider:

- Monitoring all activities closely and catering for all learners without leaving any one behind.
- Thoroughly explaining to learners how to use counters to add two or three numbers whose sum does not exceed 500.
- Appropriate use of teaching and learning aids.

**g) Extra exercises and their answers:**

Use the table of place values; ones, tens, and hundreds to add the following numbers.

a)  $345 + 123 = 468$

b)  $157 + 213 = 370$

c)  $249 + 175 = 424$

d)  $156 + 267 = 423$

e)  $178 + 221 = 399$

f)  $134 + 208 = 342$

**2.5.5 Lesson 5: subtraction of numbers within the range of 500**

**a) Learning objectives:**

**Knowledge:**

Subtraction of two or three numbers whose difference does not exceed 500.

**Skills:**

Solving word problems of subtraction.

**Attitudes and values:**

Appreciating the importance of subtraction in daily life.

**b) Teaching/learning aids:**

A variety of counters: stones, bottle tops, beans, beads, balloons, maize seeds, tomatoes, books, pens, pencils, chalk, and number cards, Cuisenaire rods, multi-based, blocks or place value material, local abacus and different charts with numbers.

**c) Generic competences that a learner develops from the lessons:**

- Critical Thinking and being cautious while doing exercises.
- Cooperation and interpersonal skills as he or she work with others in different activities.
- Problem-solving skills in relation to subtraction of objects less or equal to 500 or even sorting them.
- Appropriate communication skills when reading or counting out loudly.
- Lifelong learning skills as learners show curiosity to learn more in Mathematics.

**d) Crosscutting issues to be addressed in the lessons:**

**Inclusive education:**

Cater for learners with special education needs.

Give to fast-learners extra activities contained in this book.

Give slow learners suitable activities for their level.

Give special treatment to learners with physical impairment, making those with hearing and visual impairment sit in front where possible the teacher uses the special teaching/learning aids.

**Gender:** Addressed when both boys and girls work together in groups and other activities peacefully without discrimination.

**Environment and Sustainability:** Addressed when learners don't destroy the environment while looking for counters and cleaning where they worked from.

**Peace and values education:**

Encourage learners to live and work in harmony and share ideas in a peaceful way with respect of each other's views and rights during group discussion.

**e) Teaching and learning activities**

- Using counters, teacher asks pupils to make a group counters and then take away some of them and asks pupils to count, tell and write the number of the remaining counters (activity 2.7.2).
- Using pictures of groups of objects in the pupil's book, teacher asks pupils to draw a group of counters. And asks pupils to take away some of them by crossing them and then count, tell and write number of the remaining counters.
- Teacher helps pupils to write and read aloud a mathematical sentence on subtraction of 2 numbers less than 500(activity 2.7.1).
- Form groups of pupils and assign them to do the **activity 2.7.5** where they have to: draw a table of place values, complete numbers in the table, refer to the example and perform the subtraction;
- Move around in the class for facilitating pupils where necessary;
- Invite some groups to present their findings and then help them to harmonize by explaining how to subtract numbers *without borrowing* by the use of a table of place values. Guide them to discover that this method is the same as *subtracting vertically or the standard written method*.
- Assign the same groups to do **activity 2.7.6** and move around to each group to verify their performance;
- Ask some groups to present answers and then guide the whole class to harmonize by explaining how to subtract a number from another *with borrowing*.

### **Synthesis/summarization**

- Guide pupils to summarize how to subtract numbers without borrowing and the subtraction with borrowing. Insist on the use of the standards written method which looks like the use of the table of values.

### **Assessment**

- Assign pupils to work in pair, work out activity 2.8 and verify their answers.
- Provide application activities to be done by pupils and check their answers.

### **f) More notes the teacher should consider:**

- Monitoring all activities closely and catering for all learners without leaving any one behind.
- Thoroughly explaining to learners how to use counters to subtract two or three numbers whose difference does not exceed 500.
- Appropriate use of different teaching and learning aids.

### **g) Extra exercises and their answers:**

- a)  $445 - 123 = 322$
- b)  $357 - 213 = 144$
- c)  $249 - 175 = 74$
- d)  $456 - 267 = 189$
- e)  $378 - 321 = 57$
- f)  $234 - 208 = 26$ .

## **2.5.6 Lesson 6: Word problems involving addition and subtraction of numbers**

### **a) Learning objectives:**

#### **Knowledge:**

Solving word problems involving addition and subtraction related to daily life.

#### **Skills:**

Give examples of word problems involving addition and subtraction related to daily life and solve them as they explain to their peers.

#### **Attitudes and values:**

Appreciating the importance of forming word problems of addition and subtraction of objects they use in daily life.

## **b) Teaching/learning aids:**

A variety of counters: stones, bottle tops, beans, beads, balloons, maize seeds, tomatoes, books, pens, pencils, chalk, and number cards.

## **c) Generic competences that a learner develops from the lessons:**

- Critical Thinking and being cautious while doing exercises.
- Cooperation and interpersonal skills as he or she work with others in different activities.
- Problem-solving skills in relation to removing or putting together objects
- Appropriate communication skills when reading or counting out loudly.
- Lifelong learning skills as learners show curiosity to learn more in Mathematics.

## **d) Crosscutting issues to be addressed in the lessons:**

**Inclusive education:** Catering for learners with special education needs. Giving to fast-learners extra activities contained in this book. Giving slow learners suitable activities for their level. Giving special treatment to learners with physical impairment, making those with hearing and visual impairment sit in front where possible the teacher uses the special teaching/learning aids.

**Gender:** Addressed when both boys and girls work together in groups and other activities peacefully without discrimination.

**Environment and Sustainability:** Addressed when learners don't destroy the environment while looking for counters and cleaning where they worked from.

### **Peace and values education:**

Encourage learners to live and work in harmony and share ideas in a peaceful way with respect of each other's views and rights during group discussion.

## **e) Teaching and learning activities**

### **Teacher's activities**

- Guide pupils to make groups of counters with numbers equal to those given in the given word problem, they then add or remove counters depending on the mathematical operation needed in the word problem, and tell the sum or the number of counters remaining.
- Prepare enough teaching/learning aids to help a learner know how to solve word problems involving addition and subtraction of numbers whose sum and difference respectively don't exceed 500.

- Guide learners when solving word problems involving addition and subtraction of numbers whose sum and difference respectively don't exceed 500.
- Ask learners to use number cards and counters when solving word problems involving addition and subtraction of numbers whose sum and difference respectively don't exceed 500.
- Give an opportunity to each learner to solve word problems involving addition and subtraction of numbers whose sum and difference respectively don't exceed 500.
- Support learners with learning difficulties giving them activities that suit their ability.
- Observe gender in all teaching and learning activities.
- Supplement learners' ideas as they explain to each other how to count without making mistakes.

**Learner's activities:**

- Following instructions given by the teacher.
- Asking questions where he or she has not understood.
- Actively participating when solving word problems involving addition and subtraction of numbers whose sum or difference is less or equal to 500.
- Helping fellow group members during group discussions in case he or she understood it better than they did.

**f) More points the teacher should consider:**

- Monitoring all activities closely and catering for all learners without leaving any one behind.
- Thoroughly explaining to learners, the best methods of solving word problems of addition and subtraction with the sum or difference not exceeding 500 respectively.
- Explaining to learners how to interpret and get the given information out of the word problem, what they are required to do, how to correct themselves and the operation to use and then solve the problem using counters and a table of place values.
- Appropriately using different teaching and learning aids.

**g) Extra exercises and their answers:**

Use the place value table and counters to solve the following word problems.

- 1) Uwera has 214 ripe mangoes and 145 raw mangoes. Find the total mangoes she has altogether.

**Answer:** The total mangoes Uwera has =  $214 + 145 = 349$  mangoes.

- 2) A school has 500 students. There are 321 girls. Find the number of boys in that school.

**Answer:** The number of boys in the school =  $500 - 321 = 179$  boys.

- 3) Rugira planted 324 trees in his fence last year. Find the number of trees he will be having next year if this year he also planted 145 trees.

**Answer:** The total number of trees =  $324 + 145 = 469$

- 4) Murambi cell has 467 houses. 256 of the houses are roofed with tiles. The rest are roofed with ironsheets. Find the number of houses roofed with ironsheets.

**Answer:** Houses roofed with Ironsheets =  $467 - 256 = 211$ .

### 2.5.7 Lesson 7: Multiplication tables of 4 and 5 and their multiples

#### a) Learning objectives:

##### Knowledge:

To mentally recite the multiplication tables of 4 and 5.

##### Skills:

Explain to pupils how multiples of 4 and 5 are found.

##### Attitudes and values:

Appreciating the importance of being able to mentally tell the multiplication tables in daily life.

#### b) Teaching/learning aids:

A variety of counters: stones, bottle tops, beans, beads, balloons, maize seeds, tomatoes, books, pens, pencils, chalk, and number cards, multiplication tables on manila papers.

#### c) Generic competences that a learner develops from the lessons:

- Critical Thinking and being cautious while doing exercises.
- Cooperation and interpersonal skills as he or she work with others in different activities.
- Problem-solving skills in relation to counting as the learner looks for learning aids to help him or her to count without making mistakes.
- Appropriate communication skills when reading or counting out loudly.
- Lifelong learning skills as learners show curiosity to learn more in Mathematics.

#### **d) Crosscutting issues to be addressed in the lessons:**

**Inclusive education:** Cater for learners with special education needs.

Give to fast-learners extra activities contained in this book.

Give slow learners suitable activities for their level.

Give special treatment to learners with physical impairment, making those with hearing and visual impairment sit in front where possible the teacher uses the special teaching/learning aids.

**Gender:** Addressed when both boys and girls work together in groups and other activities peacefully without discrimination.

**Environment and Sustainability:** Addressed when learners don't destroy the environment while looking for counters and cleaning where they worked from.

#### **Peace and values education:**

Encourage learners to live and work in harmony and share ideas in a peaceful way with respect of each other's views and rights during group discussion.

#### **e) Teaching activities:**

##### **Note:**

It is better to teach this lesson in two lessons: Multiplication table of 4 and multiples of 4, Multiplication table of 5 and multiples of 5:

Multiplication table of 4 and multiples of 4

- Pupils in small groups are given real objects or counters less than or equal to 40 and they are requested to make groups of 4 objects or counters each group. Teacher asks them to count and tell the number of groups they make and the number of corresponding objects/ counters they contain.
- Using pictures of groups of objects in the pupil's book, teacher asks pupils to make groups of 4 objects / counters each.
- Teacher asks pupils, one by one, to count objects in each group of objects; 1 group of 4 objects, 2 groups of 4 objects each, 3 groups of 4 objects each and then he/she leads pupils to use the following vocabularies “ **times and number of groups**”
  - 4 times 1 or 1 group of 4 objects
  - 4 times 2 or 2 groups of 4 objects each
  - 4 times 3 or 3 groups of 4 objects each.
- Teacher helps pupils to read and mathematically write the given sentences:

- 4 times 1 or 1 group of 4 objects is written:  $4 \times 1$
- 4 times 2 or 2 groups of 4 objects each is written:  $4 \times 2$
- 4 times 3 or 3 groups of 4 objects each is written:  $4 \times 3$
- Form groups of pupils and ask each group to combine 2 groups, 3 groups, 4 groups, ... 9 groups and 10 groups of 4 counters so that at each case they count the number of counters for new combination of groups formed and complete the number in the multiplication table;
- Move around in the class for facilitating pupils where necessary;
- Invite some groups to present their findings and then help them to harmonize by explaining how to find the multiplication table of 4 and the meaning of multiples of 4.
- Assign the same groups to do application **activity 2.9.2** and move around to each group to verify their performance;
- Ask some groups to present answers and then guide the whole class to harmonize by explaining how to multiply by 4.

### **Synthesis/summarization**

Guide pupils to find multiples of 4.

### **Assessment**

- Provide application activities to be done by pupils and check their answers;

**Note:** The lesson related to: Multiplication by 5 and multiples of 5 not exceeding 50 (**activity 2.15.1 and activity 2.15.2**) is taught in the same way as this lesson.

### **f) More notes the teacher should consider:**

- Monitoring all learners' activities closely and catering for all learners without leaving any one behind.
- Thoroughly explaining to learners how to use counters to form groups equivalent to multiples of 4 and 5.
- Explaining to learner the best ways to use in order to be able to learn mental-recitation of multiplication tables of 4 and 5.
- Appropriate use of different teaching and learning aids.

### g) Extra exercises and their answers

Fill in the missing numbers:

$4 \times \dots = 36.$	<b>Answer: 9</b>	$\dots \times 4 = 32$	<b>Answer: 8</b>
$\dots \times 5 = 15$	<b>Answer: 3</b>	$4 \times \dots = 20$	<b>Answer: 5</b>
$30 = \dots \times 5$	<b>Answer: 6</b>	$28 = \dots \times 4$	<b>Answer: 7</b>
$16 = 4 \times \dots$	<b>Answer: 4</b>	$\dots = 4 \times 10$	<b>Answer: 40</b>
$\dots \times 4 = 12$	<b>Answer: 3</b>	$45 = 5 \times \dots$	<b>Answer: 9</b>
$8 \times 5 = \dots$	<b>Answer: 40</b>	$50 = \dots \times 5$	<b>Answer: 10</b>

### 2.5.8 Lesson 8: Multiplying two-digit numbers by 4 and 5 without carrying

#### a) Learning objectives:

##### Knowledge:

Correctly multiply two-digit numbers by 4 and 5 without carrying.

##### Skills:

- Explain to pupils the rules of multiplying two-digit numbers with a one-digit number.
- Multiplying two-digit numbers by 4 and 5 with the product not exceeding 500.

##### Attitudes and values:

Appreciating the importance of multiplying two-digit numbers with a one-digit number.

#### b) Teaching/learning aids:

A variety of counters: stones, bottle tops, beans, beads, balloons, maize seeds, tomatoes, books, pens, pencils, chalk, and number cards, multiplication tables on manila papers, Table of values.

#### c) Generic competences that a learner develops from the lessons:

- Critical thinking and being cautious while doing exercises.
- Cooperation and interpersonal skills as he or she work with others in different activities.
- Problem-solving skills in relation to counting as the learner looks for learning aids to help him or her to count without making mistakes.
- Appropriate communication skills when reading or counting out loudly.
- Lifelong learning skills as learners show curiosity to learn more in Mathematics.

#### **d) Crosscutting issues to be addressed in the lessons:**

**Inclusive education:** Catering for learners with special education needs. Giving to fast-learners extra activities contained in this book. Giving slow learners suitable activities for their level. Giving special treatment to learners with physical impairment, making those with hearing and visual impairment sit in front where possible the teacher uses the special teaching/learning aids.

**Gender:** Addressed when both boys and girls work together in groups and other activities peacefully without discrimination.

**Environment and Sustainability:** Addressed when learners don't destroy the environment while looking for counters and cleaning where they worked from.

#### **Peace and values education:**

Encourage learners to live and work in harmony and share ideas in a peaceful way with respect of each other's views and rights during group discussion.

#### **e) Teaching and learning activities**

- Follow the example given in the **activity 2.16.1** and guide pupils to discover how to multiply a two digit number by 4 or 5 without carrying;
- Form groups of pupils and assign them to do the **activity 2.16.1** and **activity 2.16.2** where they have to: draw a table of place values, complete numbers in the table, refer to the example and multiply by 4 or 5 to get the product.
- Move around in the class for facilitating pupils where necessary; ask probing questions guiding them to know that they multiply starting by the right, to remember to carry a number where necessary.
- Invite some groups to present their findings and then help them to harmonize by explaining how to multiply a 2 digit number by a single digit. Guide them to discover that this method is the same as *multiplying vertically or the standard written method*.

#### **Synthesis/summarization**

- Guide pupils to summarize how to multiply a 2 digit number by a single digit. Insist on the use of the standards written method which looks like the use of the table of values.

#### **Assessment**

- Provide application activities to be done by pupils and check their answers;
- Assign homework to all pupils.

**f) More notes the teacher should consider:**

- Monitoring all learners' activities closely and catering for all learners without leaving any one behind.
- Thoroughly explaining to learners how to use counters to multiply two-digit numbers with 4 and 5 without carrying.
- Appropriate use of different teaching and learning aids.

**g) Extra exercises and their answers:**

Use the table of place values, number cards, counters and vertically multiply the following numbers;

- a)  $31 \times 4 =$                       **Answer:** 124  
b)  $41 \times 5 =$                       **Answer:** 205  
c)  $51 \times 4 =$                       **Answer:** 204  
d)  $122 \times 4 =$                     **Answer:** 488  
e)  $81 \times 5 =$                       **Answer:** 405  
f)  $91 \times 5 =$                       **Answer:** 455

**2.5.9 Lesson 9: Dividing by 4 or 5 without remainder for numbers less than 500.**

**a) Learning objectives:**

**Knowledge:**

Dividing by 4 or 5 without remainder for numbers less than 500.

**Skills:**

- Explain to pupils the rules of dividing two-digit numbers with a one-digit number.
- Dividing two-digit numbers by 4 or 5 without remainder with the dividend not exceeding 500.

**Attitudes and values:**

- Appreciating the importance of division in daily life.
- Appreciating the importance of dividing two-digit numbers with a one-digit number.

**b) Teaching/learning aids:**

A variety of counters: stones, bottle tops, beans, beads, balloons, maize seeds, tomatoes, books, pens, pencils, chalk, and number cards.

**c) Generic competences that a learner develops from the lessons:**

- Critical thinking and being cautious while doing exercises.
- Cooperation and interpersonal skills as he or she work with others in different activities.

- Problem-solving skills in relation to dividing things equally into 4 or 5.
- Appropriate communication skills when reading or counting out loudly.
- Lifelong learning skills as learners show curiosity to learn more in Mathematics.

**d) Crosscutting issues to be addressed in the lessons:**

**Inclusive education:** Cater for learners with special education needs. Give to fast-learners extra activities contained in this book. Give slow learners suitable activities for their level. Give special treatment to learners with physical impairment, making those with hearing and visual impairment sit in front where possible the teacher uses the special teaching/learning aids.

**Gender:** Addressed when both boys and girls work together in groups and other activities peacefully without discrimination.

**Environment and Sustainability:** Addressed when learners don't destroy the environment while looking for counters and cleaning where they worked from.

**Peace and values education:**

Encourage learners to live and work in harmony and share ideas in a peaceful way with respect of each other's views and rights during group discussion.

**e) Teaching and learning activities:**

This lesson can be taught in two different lessons or steps: Dividing two-digit numbers by 4 and dividing such numbers by 5 without remainder. It is necessary to instil in pupils the use of mental calculation before other methods.

**Dividing two-digit numbers by 4 without remainder**

- Guide learners to revise the multiples of 4
- Guide pupils to count the numbers of counters equal to the dividend and share them equally in 4 groups until they get the number of counters for each group; invite them to write the number sentence for that operation (see activity 2.12.1)
- Form groups of pupils and assign them to do the **activity 2.13.1**, **activity 2.13.2** and **activity 2.13.3** where they have to: complete the division table, refer to the example and divide a two digit number by a one digit number.
- Move around in the class for facilitating pupils where necessary; ask probing questions guiding them to know that they divide starting by the left side and that they can take 2vdigit when necessary.

- Invite some groups to present their findings and then help them to harmonize by explaining how to divide. Guide them to discover when they consider 2 digits of a dividend and that this method is the same as called *vertical division or the standard written method*.

### **Synthesis/summarization**

- Guide pupils to summarize how to divide. Insist on the use of the standards written method.

### **Assessment**

- Provide application activities to be done by pupils and check their answers;
- Assign homework to all pupils.

### **Note:**

*The lesson on dividing a two or three digit numbers by 5 without remainder is taught in the same way as this lesson. Use activity 2.18.1, activity 2.18.2 and activity 2.18.3.*

### **f) More notes the teacher should consider:**

- Monitoring all learners' activities closely and catering for all learners without leaving any one behind.
- Thoroughly explaining to learners how to use counters to dividing two-digit numbers by 4 or 5 without remainder with the dividend not exceeding 500.
- Appropriate use of different teaching and learning aids.

### **g) Extra exercises and their answers:**

Use counters to calculate the following by long division.

$$\begin{array}{ll} 488: 4 = 122 & 444: 4 = 111 \\ 208: 4 = 52 & 255: 5 = 51 \\ 350: 5 = 70 & 455: 5 = 91 \end{array}$$

## **2.5.10 Lesson 10: Word problems involving the division of a two or 3 digit number less than 500 by 4 and 5 without remainder**

### **a) Learning objectives:**

#### **Knowledge:**

Solving word problems that involve dividing numbers less than 500 by 4 or 5 without remainder.

#### **Skills:**

- Explain to peers the rules followed while solving word problems that involve dividing two-digit numbers with a one-digit number.

- Dividing two-digit numbers by 4 or 5 without remainder with the dividend not exceeding 500.

**Attitudes and values:**

Appreciating the importance of division in daily life.

**b) Teaching/learning aids:**

A variety of counters: stones, bottle tops, beans, beads, balloons, maize seeds, tomatoes, books, pens, pencils, chalk, and number cards.

**c) Generic competences that a learner develops from the lessons:**

- Critical thinking and being cautious while doing exercises.
- Cooperation and interpersonal skills as he or she work with others in different activities.
- Problem-solving skills in relation to dividing or multiplication by 4 or 5.
- Appropriate communication skills when reading or counting out loudly.
- Lifelong learning skills as learners show curiosity to learn more in Mathematics.

**d) Crosscutting issues to be addressed in the lessons:**

**Inclusive education:** Caterfor learners with special education needs.

Give to fast-learners extra activities contained in this book. Giveslow learners suitable activities for their level. Givespecial treatment to learners with physical impairment, making those with hearing and visual impairment sit in front where possible the teacher uses the special teaching/learning aids.

**Gender:** Addressed when both boys and girls work together in groups and other activities peacefully without discrimination.

**Environment and Sustainability:** Addressed when learners don't destroy the environment while looking for counters and cleaning where they worked from.

**Peace and values education:**

Encourage learners to live and work in harmony and share ideas in a peaceful way with respect of each other's views and rights during group discussion.

**e) Teaching and learning activities:**

- Using counters, teacher facilitates pupils to work out word problems involving division by 4 or by 5;

Starts by counters or other objects to be shared equally among 4 or 5 pupils and ask them to find the number of objects to be gotten by on pupil.

- Invite pupils to explain and write how they can get the answer;
- Guide pupils to solve some problems in a whole class discussion help pupils to solve a one –step: Refer to activity 2.19 and guide them to *understand the problem, identify facts (givens and requests), draw visual representations related to equal shares and solve the problem using the division.*
- Provide problems to be solved into groups or in pairs and then give problems to be solved individually.

**f) More notes the teacher should consider:**

- Monitoring all learners’ activities closely and catering for all learners without leaving any one behind.
- Thoroughly explaining to learners how to use counters to solve word problems that involve multiplying and dividing numbers less than 500 by 4 or 5 without remainder.
- Appropriate use of different teaching and learning aids.

**g) Extra exercises and their answers:**

Use counters to solve the word problems below:

- 1) Umuhoza has 480 iron sheets she wants to share equally to 4 displaced families. How many iron sheets will each family get?

**Answer:** Every family will get iron sheets =  $480: 4 = 120$  iron sheets

- 2) Munezero has 495 tents she wants to use to support 5 refugee families. How many tents will each family get?

**Answer:**

The number of tents each family gets =  $495: 5 = 99$  tents

- 3) Kayiranga makes 92 breads per day. Find the number of breads she makes in 4 days.

**Answer:**

The number of breads she makes in 4 days =  $92 \times 4 = 368$  breads.

- 4) Makuza’s hens lay 71 eggs per day. Find the number of eggs they lay in 5 days.

**Answer:** The eggs laid in 5 days =  $71 \times 5 = 355$  eggs.

**2.6 Answers for the end unit assessment 2**

- 1) Write in words or in figures
- a) 497: **Four hundred and ninety-seven**
  - b) Three hundred eighty-six.: **386**

2) Underline the correct number

- a) 3 Ones 6Tens 4 Hundreds:      1) 364      2) 463      3) 346  
b) 3Hundreds 2Ones 4Tens:      1) 324      2) 423      3) 342

3) Write the expanded number

- a)  $(4 \times 100) + (8 \times 10) + (7 \times 1) = 487$   
b)  $300 + 70 + 6 = 376$

4) Write this number in a place value table

- a) 268    (b) 475      (c) 473      (d) 352

	Hundreds	Tens	Ones
a)	2	6	8
b)	4	7	5
c)	4	7	3
d)	3	5	2

5) Use  $<$ ,  $>$  and  $=$  to compare numbers

- a)  $295 = 295$     b)  $458 < 478$     c)  $478 > 467$

6) Arrange the following numbers in the ascending order

439, 349, 493, 394, 387 and 479

**Answer: 349, 387, 394, 439, 479, 493.**

7) Arrange the following numbers in the descending order

293, 239, 387, 470, 389 and 499. **Answer: 499, 470, 389, 387, 293, 239.**

8) Work out the following

- a)  $234 + 253 = 487$     b)  $257 + 208 = 465$     c)  $378 + 114 = 492$     d)  $369 + 128 = 497$ .

9) Find the difference

- a)  $459 - 327 = 132$   
b)  $453 - 345 = 108$   
c)  $367 - 236 = 131$   
d)  $381 - 274 = 107$

10) Complete the following multiplication or division table

	1	2	3	4	5	6	7	8	9	10
$\times 4$	4	8	12	16	20	24	28	32	36	40

	1	2	3	4	5	6	7	8	9	10
$\times 5$	5	10	15	20	25	30	35	40	45	50

11) Carry out the product:

a) $92$	b) $82$	c) $81$	d) $91$	e) $61$	f) $80$	g) $70$	h) $90$
$\times 4$	$\times 5$						
368	410	324	455	244	400	280	450

12) Complete the missing numbers in the following multiplication table

: 4	1	2	3	4	5	6	7	8	9	10
	4	8	12	16	20	24	28	32	36	40

: 5	1	2	3	4	5	6	7	8	9	10
	5	10	15	20	25	30	35	40	45	50

13) Work out the division by use of the standard written form

- a)  $488 : 4 = 122$
- b)  $450 : 5 = 90$
- c)  $368 : 4 = 92$
- d)  $464 : 4 = 116$
- e)  $465 : 5 = 93$
- f)  $295 : 5 = 59$

14) Word problems

- a) Our Village planted 256 trees. The neighbouring Village has planted 239 trees. Find the total number of trees planted by the two villages.  
The total number of trees =  $256 + 239 = 495$  trees.
- b) Our school has 489 pupils. The number of boys is 297. Find the number of girls.  
Number of girls =  $489 - 297 = 192$  girls.
- c) Head Mistress gave 4 books to every pupil. How many books did she give to 72 pupils?  
The total number of books she gave =  $72 \times 4 = 288$  books.
- d) Shared 596 books equally among 4 classrooms. How many books can each classroom get?  
Each classroom gets =  $596 : 4 = 149$  books.
- e) Chose the right answer:  
Gisa shared equally 450 pineapples to 5 shops. Each shop got:
  - i.  $450 - 5 = 445$  pineapples
  - ii.  $450 + 5 = 455$  pineapples
  - iii.  $450 : 5 = 90$  pineapples

- f) Muhoza has 105 sweets. He wants to share them equally among his 5 colleagues. How many sweets will one colleague get?  
Each gets sweets =  $105 : 5 = 21$  sweets.

# UNIT 3

# WHOLE NUMBERS FROM 0 UP TO 1000

## 3.1 Key unit competence:

Counting, reading, writing, arranging, comparing, adding and subtracting, multiplying and dividing whole numbers from 0 up to 1000.

## 3.2 Prerequisite

Pupils will easily learn this unit, if they have a good background on the following: to count, read, write, order, compare, add, subtract, multiply and divide numbers from 0 to 500.

## 3.3 Cross-cutting issues to be addressed

- **Gender balance:** provide equal opportunity to boys and girls in the lesson
- **Inclusive education:** promote education for all learners in the teaching and learning activities.
- **Environment and sustainability:** This will be addressed when pupils will be maintaining hygiene for their classroom and for materials they used.
- **Financial education:** addressed when pupils discuss word problem involving how to use money and how to manage learning materials or how to prepare activity plan.
- **Peace and values education:** addressed when pupils are encouraged to work collaboratively and peacefully in their group.

## 3.4 Generic competences to be developed

**Cooperation:** developed when pupils work collaboratively in group to develop interpersonal relations and life skills;

**Communication:** developed when pupils discuss either in groups or in the whole class, present findings, debate etc.

**Creativity and innovation:** developed when pupils make number cards, apply skills in solving real life problems, etc.

**Problem solving:** when pupils use acquired skills to solve problems from their real life situation.

**Lifelong learning:** when the learner is engaged in activities showing her/him to have the need for more learning with a curiosity of applying the knowledge learnt in a range of situations.

### 3.5 List of lessons

No	Lesson title	Number of periods
1	Counting groups of objects from 0 to 1000.	2
2	Reading and writing numbers from 0 to 1000 in figures.	3
3	Reading and writing numbers from 0 to 1000 in words.	3
4	Grouping numbers that do not exceed 999	3
5	Comparing numbers that do not exceed 1000.	3
6	Arranging numbers that do not exceed 1000 in ascending and descending order.	4
7	Mental Addition of numbers whose sum does not exceed 1000.	1
8	Addition of Numbers whose sum does not exceed 1000 without carrying.	3
9	Addition of Numbers whose sum does not exceed 1000 with carrying.	3
10	Word problems involving addition of numbers whose sum does not exceed 1000.	2
11	Subtraction of numbers that do not exceed 1000 mentally.	1
12	Subtraction of numbers that do not exceed 1000 without borrowing.	3
	Subtraction of numbers that do not exceed 1000 with borrowing.	3
13	Word problems involving subtraction of numbers whose difference does not exceed 1000.	2
14	Multiplication of whole numbers by 6 and multiples of 6 that do not exceed 60	3
15	Multiplication of 2 digit numbers or 3 digit numbers by 6 without carrying.	3
16	Word problems involving multiplication of 2digit numbers or 3digit numbers by 6 without carrying.	2
17	Division of 2 digit numbers or 3 digit numbers by 6 without remainder.	2
18	Word problems involving division of 2 digit numbers or 3digit numbers by 6 without remainder.	3
19	Multiplication of whole numbers by 10 and 100 with the product not exceeding 999.	3

20	End unit assessment	2
	Total number of periods	54

### 3.6 Teaching and learning activities for lessons

#### 3.6.1 Lesson 1: Counting, reading and writing numbers from 0 to 1000.

##### a) Learning objectives:

###### Knowledge:

Showing and explaining the place value of each digit in three-digit numbers.

###### Skills:

- Counting without mistakes, reading and writing numbers from 0 up to 1000.
- Reading accurately numbers that do not exceed 1000.

###### Attitudes and values:

Show the culture of orderliness in daily life.

##### b) Teaching/learning aids:

A variety of counters: stones, bottle tops, beans, beads, balloons, maize seeds, tomatoes, books, pieces of chalk, soya beans and number cards.

##### c) Generic competences that a learner develops from the lessons:

- Critical Thinking and being cautious while doing exercises.
- Cooperation and interpersonal skills as he or she work with others in different activities.
- Problem-solving skills in relation to counting objects and money not exceeding 500.
- Appropriate communication skills when reading or counting out loudly.
- Lifelong learning skills as learners show curiosity to learn more in Mathematics.

##### d) Crosscutting issues to be addressed in the lessons:

**Inclusive education:** Cater for learners with special education needs.

Give to fast-learners extra activities contained in this book. Give slow learners suitable activities for their level. Give special treatment to learners with physical impairment, making those with hearing and visual impairment sit in front where possible the teacher uses the special teaching/learning aids.

**Gender:** Addressed when both boys and girls work together in groups and other activities peacefully without discrimination.

**Environment and Sustainability:** Addressed when learners don't destroy the environment while looking for counters and cleaning where they worked from.

**Peace and values education:**

Encourage learners to live and work in harmony and share ideas in a peaceful way with respect of each other's views during group discussion.

**e) Teaching and learning activities:**

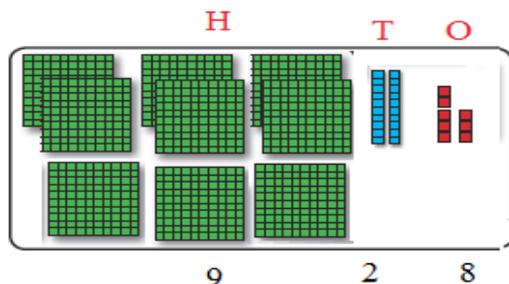
**Note:**

This lesson can be taught in 3 different lessons or main steps: counting objects less than 1000, reading numbers less than 1000 and writing in words and in figures numbers not greater 1000.

Generally, you can teach it as follows:

- Ask every learner to get the counters that he or she brought and put similar ones together and ask all pupils to make different collections of 100 similar counters.
- Ask pupils to count them in tens and in hundreds. Let them make 10 groups of hundreds.

They can also use blocks or rods:



- Using different prompting questions, teacher helps pupils to take 5 collections of 100 counters and ask them to start adding counters from 1, 2, 3, and continue the process by saying the number of counters they get (see activity 3.1.6)
- Using different prompting questions, teacher helps pupils understand and discover how to read and write the numbers from 101 to 200 (use from activity 3.1.1 to activity 3.1.10);
- The teacher leads pupils how to read and write a 3-digit number from 501 to 999 (use from activity 3.1.11 to activity 3.1.15);
- Teacher asks pupils to individually imitate the 3-digit numbers from 501 to 999 written on the chalkboard or on a number card and then write them many times in their notebook using a pen or a pencil;

- Teacher helps pupils with difficulties to well write the 3-digit numbers by giving them more time on writing activity. He/ she must use all possible ways to make all pupils successful in reading and writing the given 3-digit numbers.

### **Assessment activities**

The teacher provides activities to be done by pupils at home.

All set activities should provide to every pupil the opportunities to demonstrate and apply the new concept learnt in a range of situations.

### **f) More notes the teacher should consider:**

- Monitoring all activities closely and catering for all learners without leaving any one behind.
- Explaining deeply the best ways of counting groups of objects without making mistakes.
- Thoroughly explaining to learners how to count, read, and write numbers from 0 to 1000 in both figures and words.
- Appropriate use of different teaching and learning aids.

### **g) Extra exercises and their answers:**

- 1) In groups, form groups of the following objects.
  - a) 624 books
  - b) 775 stones
- 2) Read and write the following numbers in words or figures.
  - a) Five hundred and nine: **509.**
  - b) 885 : **Eight hundred eighty five.**
  - c) six hundred and eight: **608.**
  - d) 778: **Seven hundred seventy eight**
  - e) Eight hundred and forty-four: **844.**
  - f) 969: **Nine hundred sixty nine.**

## **3.6.2 Lesson 2: Place value of each digit for numbers from 0 up to 999**

### **a) Objectives**

#### **Knowledge:**

Writing and identifying the place value of numbers formed by three digits

#### **Skills:**

Grouping a threedigit number not less than 1000 into Hundreds(H), Tens(T) and Ones (O)

## Values

Develop the capacity of quick critical thinking

### b) Prerequisites /Introduction

To perform well in this lesson, do the following:

- Plan how to help pupils with different impairments;
- Guide pupils to:
  - Work out different activities for partitioning **number between 0 and 500 into ones, tens, hundreds and thousands** given in the previous unit ;
  - Draw the table of place value and complete in it numbers less than 500 read from the number cards.

### c) Teaching resources and learning resources

- The table of place values;
- A variety of counters: stones, bottle tops, beans, beads, balloons, maize seeds, tomatoes, books, chalk, and number cards, Cuisenaire rods, multi-based, blocks or place value material, local abacus and different charts with numbers.
- Number cards with different numbers between 500 and 1000 in different colors;
- Different types of counters.

### d) Teaching and learning activities:

- Ask pupils to draw a table of place value in their notebooks,
- Ask them to compare their table and the table which is in the pupil's book on **activity 3.2.1**;
- Provide to pupils numbers cards with different numbers between 500 and 1000 and ask each one to try to complete each number in his table referring to the example found in **activity 3.2.1**;
- Form groups of pupils and assign them to do activity 3.2.1 , activity 3.2.2 and activity 3.2.3.
- Move around in the class for facilitating pupils where necessary;
- Invite some groups to present their findings and then help them to harmonize;
- Assign each pupil to Write down the number that was partitioned into hundreds (H), tens (T) and ones (O).

## Synthesis/summarization

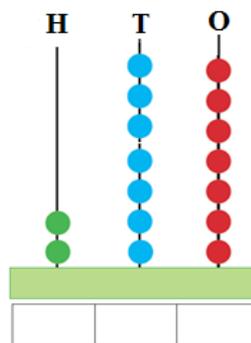
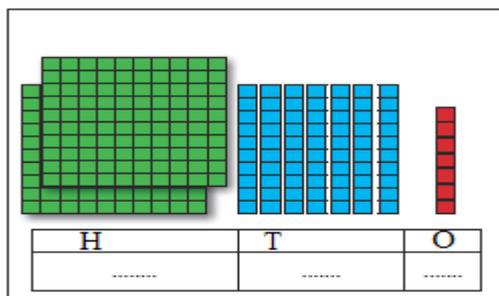
Guide pupils to summarize how to draw a table of place value, how to complete a number in such a table and how to partition that number into hundreds (H), tens (T) and ones (O).

### Assessment

- Provide application activities to be done by pupils and check their answers ;
- Assign all pupils homework to be done.

### e) More notes the teacher should consider:

- Monitoring all activities closely and catering for all learners without leaving any one behind.
- Use different materials such as counters, rods or local abacus and explain how to decompose a number into hundreds, tens and ones:



### f) Extra exercises and their answers:

Decompose the following numbers into ones, tens and hundreds.

- 795= 7hundreds 9tens 5ones
- 642= 6hundreds 4tens 2ones
- 935= 9hundreds 3tens 5ones
- 894= 8 hundreds 9tens 4ones.

## 3.6.2 Lesson 2: Comparing and arranging whole numbers up to 999

### a) Objectives

#### Knowledge:

comparing of numbers from 0 up to 999.

- Explain how to arrange numbers in ascending or descending order

#### Skills:

- Use the symbols  $<$ ,  $>$  or  $=$  to compare numbers from 0 up to 999

- Arranging numbers from 0 to 999 in both ascending order and descending order.

**Attitudes and values:**

Appreciating the importance of comparing and arranging things in daily life.

**b) Teaching/learning aids:**

A variety of counters: stones, bottle tops, beans, beads, balloons, maize seeds, tomatoes, books, chalk, and number cards, Cuisenaire rods, multi-based, blocks or place value material, local abacus and different charts with numbers.

**c) Generic competences that a learner develops from the lessons:**

- Critical Thinking and being cautious while doing exercises.
- Cooperation and interpersonal skills as he or she work with others in different activities.
- Problem-solving skills in relation to counting and arranging objects in ascending and descending order.
- Appropriate communication skills when reading or counting out loudly.
- Lifelong learning skills as learners show curiosity to learn more in Mathematics.

**d) Crosscutting issues to be addressed in the lessons:**

- **Inclusive education:** Catering for learners with special education needs. Giving to fast-learners extra activities contained in this book. Giving slow learners suitable activities for their level. Giving special treatment to learners with physical impairment, making those with hearing and visual impairment sit in front where possible the teacher uses the special teaching/learning aids.
- **Gender:** Addressed when both boys and girls work together in groups and other activities peacefully without discrimination.
- **Environment and Sustainability:** Addressed when learners don't destroy the environment while looking for counters and cleaning where they worked from.
- **Peace and values education:** Addressed when all learners share ideas in a peaceful way with respect of each other's views.
- **Peace and values education:** Encourage learners to live and work in harmony and share ideas in a peaceful way with respect of each other's views and rights during group discussion.

### **e) Teaching and learning activities:**

- Guide pupils to recall how to compare the number of objects which are in two groups: which are many, which are few, etc.
- Guide pupils to draw a table of place value on the chalk board and in their notebooks, then use numbers given in activity 3.3.4 and guide pupils to complete them in a table of place values and help them to discover how to compare two numbers considering as if they represent number of objects;
- Lead pupils do find how to use comparison symbols to compare those numbers;
- Form groups of pupils and assign them to do from activity 3.3.1 to activity 3.3.4;
- Move around in the class for facilitating pupils where necessary; assign other activities to those who finish first;
- Invite some groups to present their findings and then help them to harmonize;

### **Synthesis/summarization**

Guide pupils to summarize how to compare numbers using a table of place values: Insist on the comparison of hundreds (H), tens (T) and ones (O).

### **Assessment**

- Provide application activities to be done by pupils and check their answers;
- Assign all pupils a homework to be done.

### **Note:**

After this lesson, guide pupils to discover how to arrange numbers in ascending order (use activity 3.4.1 , activity 3.4.2 and activity 3.4.3) and how to arrange numbers in descending order(use activity 3.4.4, activity 3.4.5 and activity 3.4.6).

### **f) More notes the teacher should consider:**

- Monitoring all activities closely and catering for all learners without leaving any one behind.
- Thoroughly explaining to learners how to use counters to decompose numbers into hundred, tens, and ones.
- Deeply explaining to learners how to arrange and compare numbers from 0 to 1000.
- Appropriate use of different teaching and learning aids and catering for learners with learning difficulties.

**g) Extra exercises and their answers:**

- 1) Arrange these numbers in ascending order.
  - a) 905, 504, 640, 850    Answer: 504, 640, 850, 905
  - b) 812, 531, 721, 913    Answer: 531, 721, 812, 913
- 2) Arrange these numbers in descending order.
  - a) 908, 880, 780, 807    Answer: 908, 880, 807, 780.
  - b) 651, 516, 156, 615    Answer: 651, 615, 516, 156.
- 3) Use the symbols  $<$ ,  $>$ ,  $=$  to compare the following pairs of numbers:
  - a) 945  $<$  854
  - b) 642  $>$  524
  - c) 825  $=$  825
  - d) 754  $>$  642

**3.6.3 Lesson 3: Addition of numbers whose sum does not exceed 1000**

**a) Learning objectives:**

**Knowledge:**

Addition of two or three numbers whose sum does not exceed 1000.

**Skills:**

Explaining how to add two or three numbers whose sum does not exceed 1000.

**Attitudes and values:**

Appreciating the importance of addition in daily life.

**b) Teaching/learning aids:**

A variety of counters: stones, bottle tops, beans, beads, balloons, maize seeds, tomatoes, books, chalk, and number cards.

**c) Generic competences that a learner develops from the lessons:**

- Critical Thinking and being cautious while doing exercises.
- Cooperation and interpersonal skills as he or she work with others in different activities.
- Problem-solving skills as the learners solves problems that involve finding the sum of numbers less or equal to 1000.
- Appropriate communication skills when reading or counting out loudly.
- Lifelong learning skills as learners show curiosity to learn more in Mathematics.

#### **d) Crosscutting issues to be addressed in the lessons:**

**Inclusive education:** Catering for learners with special education needs. Giving to fast-learners extra activities contained in this book. Giving slow learners suitable activities for their level. Giving special treatment to learners with physical impairment, making those with hearing and visual impairment sit in front where possible the teacher uses the special teaching/learning aids.

**Gender:** Addressed when both boys and girls work together in groups and other activities peacefully without discrimination.

**Environment and Sustainability:** Addressed when learners don't destroy the environment while looking for counters and cleaning where they worked from.

#### **Peace and values education:**

Addressed when all learners share ideas in a peaceful way with respect of each other's views.

#### **Peace and values education:**

Encourage learners to live and work in harmony and share ideas in a peaceful way with respect of each other's views and rights during group discussion.

#### **e) Teaching steps:**

##### **Note:**

**This lesson can be taught in 3 different steps:** Addition without carrying, addition with carrying and word problem involving addition of numbers. In each case, try to emphasize the addition using mental arithmetic and the use of standard written method.

In general, the lesson can be taught as follows:

- Using real objects, teacher asks pupils to make 2 groups of objects and asks pupils to put together those objects from 2 groups and ask them how they can find their total number (Activity 3.5.1 and activity 3.5.2)
- Using pictures of groups of objects, teacher asks pupils to use representations of 2 groups of similar objects and asks pupils to put together all objects in 2 groups by circling and then count them in order to get the sum. He can also use the table of values (see activity 3.5.4).

Thousands	Hundreds	Tens	Ones
1	3	4	7
	1	6	2
+			
1	5	0	9

- Form groups of pupils and assign them to do the **activity 3.5.4** and **activity 3.5.5** where they have to: draw a table of place values, complete numbers in the table, refer to the example and add the given numbers.
- Move around in the class for facilitating pupils where necessary;
- Invite some groups to present their findings and then help them to harmonize by explaining how to add numbers using a table of place values. Guide them to discover that this method is the same as *adding vertically or the standard written method*.
- Ask some groups to present answers and then guide the whole class to harmonize by explaining how to add numbers *without carrying*.
- Assign the same groups to do **and activity 3.5.6** and move around to each group to verify their performance;
- Ask some groups to present answers and then guide the whole class to harmonize by explaining how to add numbers *with carrying*.

### Synthesis/summarization

- Guide pupils to summarize how to add numbers without or with carrying. Insist on the use of the standards written method which looks like the use of the table of values.

### Assessment

- Provide application activities to be done by pupils and check their answers;
- Assign homework to all pupils.

### Note:

Concerning **the lesson on word problems involving addition**, the teacher will help pupils to solve a one –step problem: guide them to *understand the problem, identify facts (givens and requests), draw visual representations and solve the problem using the addition*.

Start by guiding pupils to solve some problems in a whole class discussion, provide problems to be solved into groups and then give problems to be solved individually (see activity 3.6).

**f) More notes the teacher should consider:**

- Monitoring all activities closely and catering for all learners without leaving any one behind.
- Thoroughly explaining to learners how to add two or three numbers whose sum does not exceed 1000.
- Appropriate use of different teaching and learning aids.

**g) Extra exercises and their answers:**

Use the table of place values; ones, tens, and hundreds to add the following numbers.

- a)  $345 + 523 = 868$
- b)  $157 + 713 = 870$
- c)  $749 + 175 = 924$
- d)  $656 + 267 = 923$
- e)  $678 + 221 = 899$
- f)  $734 + 208 = 942$

**3.6.4 Lesson 4: Subtraction of numbers whose minuend does not exceed 1000**

**a) Learning objectives:**

**Knowledge:**

Subtraction of two or three numbers whose difference does not exceed 1000.

**Skills:**

Finding the difference of two numbers of groups of objects whose difference does not exceed 1000.

**Attitudes and values:**

Appreciating the importance of subtraction in daily life.

**b) Teaching/learning aids:**

A variety of counters: stones, bottle tops, beans, beads, balloons, maize seeds, tomatoes, books, pens, pencils, chalk, and number cards.

**c) Generic competences that a learner develops from the lessons:**

- Critical Thinking and being cautious while doing exercises.
- Cooperation and interpersonal skills as he or she work with others in different activities.
- Problem-solving skills in relation to subtraction of objects with numbers less or equal to 1000.
- Appropriate communication skills when reading or counting out loudly.

- Lifelong learning skills as learners show curiosity to learn more in Mathematics.

#### **d) Crosscutting issues to be addressed in the lessons:**

##### **Inclusive education:**

Cater for learners with special education needs.

Give to fast-learners extra activities contained in this book.

Give slow learners suitable activities for their level.

Give special treatment to learners with physical impairment, making those with hearing and visual impairment sit in front where possible the teacher uses the special teaching/learning aids.

**Gender:** Addressed when both boys and girls work together in groups and other activities peacefully without discrimination.

**Environment and Sustainability:** Addressed when learners don't destroy the environment while looking for counters and cleaning where they worked from.

##### **Peace and values education:**

Encourage learners to live and work in harmony and share ideas in a peaceful way with respect of each other's views and rights during group discussion.

#### **e) Teaching steps:**

- Using counters, teacher asks pupils to make a group counters and then take away some of them and asks pupils to count, tell and write the number of the remaining counters (**activity 3.7.2**).
- Using pictures of groups of objects in the pupil's book, teacher asks pupils to draw a group of counters. And asks pupils to take away some of them by crossing them and then count, tell and write number of the remaining counters.
- Teacher helps pupils to write and read aloud a mathematical sentence on subtraction of 2 numbers less than 500 (**activity 3.7.1**).
- Form groups of pupils and assign them to do the **activity 3.7.5** where they have to: draw a table of place values, complete numbers in the table, refer to the example and perform the subtraction;
- Move around in the class for facilitating pupils where necessary;
- Invite some groups to present their findings and then help them to harmonize by explaining how to subtract numbers *without borrowing* by the use of a table of place values. Guide them to discover that this method is the same as *subtracting vertically or the standard written method*.

- Assign the same groups to do **activity 3.7.6** and move around to each group to verify their performance;
- Ask some groups to present answers and then guide the whole class to harmonize by explaining how to subtract a number from another *with borrowing*.

### **Synthesis/summarization**

- Guide pupils to summarize how to subtract numbers without borrowing and the subtraction with borrowing. Insist on the use of the standards written method which looks like the use of the table of values.

### **Assessment**

- Provide application activities to be done by pupils and check their answers.

### **Note:**

Concerning **the lesson on word problems involving subtraction**, the teacher will help pupils to solve a one –step problem: guide them to *understand the problem, identify facts (givens and requests), draw visual representations and solve the problem using the addition*.

Start by guiding pupils to solve some problems in a whole class discussion, provide problems to be solved into groups and then give problems to be solved individually (see activity 3.8).

### **f) More notes the teacher should consider:**

- Monitoring all activities closely and catering for all learners without leaving any one behind.
- Explaining deeply how best to subtract numbers whose difference does not exceed 1000 with or without borrowing.
- Explaining deeply how best to subtract two or three numbers whose difference does not exceed 1000 with or without borrowing using a table of place values.
- Appropriate use of different teaching and learning aids.

### **g) Extra exercises and their answers:**

- $845 - 523 = 322$
- $957 - 713 = 244$
- $949 - 875 = 74$
- $756 - 567 = 189$
- $678 - 521 = 157$
- $834 - 808 = 26$ .

### 3.6.5 Lesson 5: Word problems involving addition and subtraction of numbers from 0 to 1000

#### a) Learning objectives:

##### **Knowledge:**

Solving word problems involving addition and subtraction related to daily life.

##### **Skills:**

Give examples of word problems involving addition and subtraction related to daily life and solve them as they explain to their peers.

##### **Attitudes and values:**

Appreciating the importance of forming word problems of addition and subtraction of objects they use in daily life.

#### b) Teaching/learning aids:

A variety of counters: stones, bottle tops, beans, beads, balloons, maize seeds, tomatoes, books, pens, pencils, chalk, and number cards.

#### c) Generic competences that a learner develops from the lessons:

- Critical Thinking and being cautious while doing exercises.
- Cooperation and interpersonal skills as he or she work with others in different activities.
- Problem-solving skills in relation to removing or putting together objects
- Appropriate communication skills when reading or counting out loudly.
- Lifelong learning skills as learners show curiosity to learn more in Mathematics.

#### d) Crosscutting issues to be addressed in the lessons:

**Inclusive education:** Cater for learners with special education needs.

Give to fast-learners extra activities contained in this book. Give slow learners suitable activities for their level. Give special treatment to learners with physical impairment, making those with hearing and visual impairment sit in front where possible the teacher uses the special teaching/learning aids.

**Gender:** Addressed when both boys and girls work together in groups and other activities peacefully without discrimination.

**Environment and Sustainability:** Addressed when learners don't destroy the environment while looking for counters and cleaning where they worked from.

**Peace and values education:**

Encourage learners to live and work in harmony and share ideas in a peaceful way with respect of each other's views and rights during group discussion.

**e) Teaching steps:****Introduction/ Review of the previous lesson:**

Make groups of counters with numbers equal to those given in the given word problem, they then add or remove counters depending on the mathematical operation in the word problem, and tell the sum or the number of counters remaining.

**Lesson development:*****Teacher's activities:***

- Prepare enough teaching/learning aids to help a learner know how to solve word problems involving addition and subtraction of numbers whose sum and difference respectively don't exceed 1000.
- Guide learners when solving word problems involving addition and subtraction of numbers whose sum and difference respectively don't exceed 1000.
- Ask learners to use number cards and counters when solving word problems involving addition and subtraction of numbers whose sum and difference respectively don't exceed 1000.
- Give an opportunity to each learner to solve word problems involving addition and subtraction of numbers whose sum and difference respectively don't exceed 1000.
- Support learners with learning difficulties giving them activities that suit their ability.
- Observe gender in all teaching and learning activities.
- Supplement learners' ideas as they explain to each other how to count without making mistakes.

**Learner's activities:**

- Following instructions given by the teacher.
- Ask questions where he or she has not understood.
- Actively participating when solving word problems involving addition and subtraction of numbers whose sum or difference is less or equal to 1000.
- Helping fellow group members during group discussions in case he or she understood it better than they did.

**f) More points the teacher should consider:**

- Monitoring all activities closely and catering for all learners without leaving any one behind.
- Thoroughly explaining to learners, the best methods of solving word problems of addition and subtraction with the sum or difference not exceeding 1000 respectively.
- Explaining to learners how to interpret and get the given information out of the word problem, what they are required to do, how to correct themselves and the operation to use and then solve the problem using counters and a table of place values.
- Appropriately using different teaching and learning aids.

**g) Extra exercises and their answers:**

Use the table of ones, tens and hundreds and counters to solve the following word problems.

1) Mutabazi has 614 cows and 345 bulls. Find the total of cattle he has altogether.

2) **Answer:** The total number of cattle =  $614 + 345 = 959$  cattle

3) A school has 1000 students. There are 521 girls. Find the number of boys in that school.

4) **Answer:** The number of boys in the school =  $1000 - 521 = 479$  boys.

5) Rugira planted 924 trees in his forest last year. Find the number of trees he will remain with if he wants to cut 594 trees.

The total number of trees that will remain =  $924 - 594 = 330$

6) Rugerero cell has 967 houses. 556 of the houses were destroyed by the storm. Find the number of houses that were not destroyed by the storm.  
Houses not destroyed =  $967 - 556 = 411$ .

**3.6.6 Lesson 6: Multiplication table of 6 and multiples of 6**

**a) Learning objectives:**

**Knowledge:**

To recite mentally the multiplication tables of 6.

**Skills:**

Explain to peers how to get multiples 6 and be able to use it in multiplication by 6.

**Attitudes and values:**

Appreciating the importance of being able to recite mentally the multiplication tables in daily life.

## **b) Teaching/learning aids**

A variety of counters: stones, bottle tops, beans, beads, balloons, maize seeds, tomatoes, books, pens, pencils, chalk, and number cards.

## **c) Generic competences that a learner develops from the lessons:**

- Critical Thinking and being cautious while doing exercises.
- Cooperation and interpersonal skills as he or she work with others in different activities.
- Problem-solving skills in relation to counting and tell 6 times the number of objects he or she is given.
- Appropriate communication skills when reading or counting out loudly.
- Lifelong learning skills as learners show curiosity to learn more in Mathematics.

## **d) Crosscutting issues to be addressed in the lessons:**

**Inclusive education:** Cater for learners with special education needs. Give to fast-learners extra activities contained in this book. Give slow learners suitable activities for their level. Give special treatment to learners with physical impairment, making those with hearing and visual impairment sit in front where possible the teacher uses the special teaching/learning aids.

**Gender:** Addressed when both boys and girls work together in groups and other activities peacefully without discrimination.

**Environment and Sustainability:** Addressed when learners don't destroy the environment while looking for counters and cleaning where they worked from.

### **Peace and values education:**

Encourage learners to live and work in harmony and share ideas in a peaceful way with respect of each other's views and rights during group discussion.

## **e) Teaching steps:**

- Pupils in small groups are given real objects or counters less than or equal to 60 and they are requested to make groups of 6 objects or counters each group. Teacher asks them to count and tell the number of groups they make and the number of corresponding objects/counter they contain.
- Using pictures of groups of objects in the pupil's book, teacher asks pupils to make groups of 6 objects / counters each.
- Teacher asks pupils, one by one, to count objects in each group of objects; 1 group of 6 objects, 2 groups of 6 objects each, 3 groups

of 6 objects each and then he/she leads pupils to use the following vocabularies “ **times and number of groups**”(activity 3.9.1).

- 6 times 1 or 1 group of 6 objects
- 6 times 2 or 2 groups of 6 objects each
- 6 times 3 or 3 groups of 6 objects each.
- Teacher helps pupils to read and mathematically write the given sentences:
  - 6 times 1 or 1 group of 6 objects is written:  $6 \times 1$
  - 6 times 2 or 2 groups of 6 objects each is written:  $6 \times 2$
  - 6 times 3 or 3 groups of 6 2 objects each is written:  $6 \times 3$
- Form groups of pupils and ask each group to combine 2 groups, 3 groups, 4 groups, ... 9 groups and 10 groups of 6 counters so that at each case they count the number of counters for new combination of groups formed and complete the number in the multiplication table;
- Move around in the class for facilitating pupils where necessary;
- Invite some groups to present their findings and then help them to harmonize by explaining how to find the multiplication table of 6 and the meaning of multiples of 6.
- Assign the same groups to do application **activity 3.9.2** and move around to each group to verify their performance;
- Ask some groups to present answers and then guide the whole class to harmonize by explaining how to multiply by 6.

### **Synthesis/summarization**

Guide pupils to find multiples of 6.

### **Assessment**

- Provide application activities to be done by pupils and check their answers;

### **f) More notes the teacher should consider:**

- Monitoring all learners’ activities closely and catering for all learners without leaving any one behind.
- Thoroughly explaining to learners how to use counters to get multiples of 6.
- Explaining to learner the best ways to use in order to be able to learn mental-recitation of the multiplication table of 6.
- Appropriate use of different teaching and learning aids.

### **g) Extra exercises and their answers:**

1) Fill in the missing numbers:

$6 \times \dots = 36.$	<b>Answer:</b> 6	$\dots \times 6 = 24$	<b>Answer:</b> 4
$\dots \times 6 = 48$	<b>Answer:</b> 8	$2 \times 6 = \dots$	<b>Answer:</b> 12
$60 = \dots \times 6$	<b>Answer:</b> 10	$\dots \times 6 = 6$	<b>Answer:</b> 1
$42 = 6 \times \dots$	<b>Answer:</b> 7	$6 \times \dots = 30$	<b>Answer:</b> 5
		$0 = \dots \times 6$	<b>Answer:</b> 0

2) Work in groups and make of counters equalling to multiples of 6.

### **3.6.7 Lesson 7: Multiplying two or three digit numbers by 6**

#### **a) Learning objectives:**

##### **Knowledge:**

Correctly multiply two-digit numbers by 6.

##### **Skills:**

- Explain to pupils the rules of multiplying two-digit numbers with a one-digit number.
- Multiplying two-digit numbers by 6 with the product not exceeding 1000.

##### **Attitudes and values:**

Appreciate the importance of multiplying two-digit numbers with a one-digit number.

##### **b) Teaching/learning aids:**

A variety of counters: stones, bottle tops, beans, beads, balloons, maize seeds, tomatoes, books, pens, pencils, chalk, and number cards.

##### **c) Generic competences that a learner develops from the lessons:**

- Critical thinking and being cautious while doing exercises.
- Cooperation and interpersonal skills as he or she work with others in different activities.
- Problem-solving skills in relation to getting six times the things he or she is given.
- Appropriate communication skills when reading or counting out loudly.
- Lifelong learning skills as learners show curiosity to learn more in Mathematics.

##### **d) Crosscutting issues to be addressed in the lessons:**

##### **Inclusive education:**

Caterfor learners with special education needs. Giveto fast-learners extra activities contained in this book.

Give slow learners suitable activities appropriate to their level.

Give special treatment to learners with physical impairment, making those with hearing and visual impairment sit in front where possible the teacher uses the special teaching/learning aids.

**Gender:** Addressed when both boys and girls work together in groups and other activities peacefully without discrimination.

**Environment and Sustainability:** Addressed when learners don't destroy the environment while looking for counters and cleaning where they worked from.

**Peace and values education:**

Encourage learners to live and work in harmony and share ideas in a peaceful way with respect of each other's views and rights during group discussion.

**e) Teaching steps:**

- Refer to the example given in the **activity 3.10.1** and guide pupils to discover how to multiply a two digit number by 6 without carrying: draw a table of place values, complete numbers in the table, refer to the example and multiply by 6 to get the product.
- Form groups of pupils and assign them to do the **activity 3.10.2** where they have to refer to the example and multiply by 6 to get the product.
- Move around in the class for facilitating pupils where necessary; ask probing questions guiding them to know that they multiply starting by the right, to remember to carry a digit where necessary.
- Invite some groups to present their findings and then help them to harmonize by explaining how to multiply a 2 or 3 digit number by 6. Guide them to discover that this method is the same as *multiplying vertically or the standard written method*.

**Synthesis/summarization**

- Guide pupils to summarize how to multiply a 2 or 3 digit number by 6. Insist on the use of the standards written method which looks like the use of the table of values.

**Assessment**

- Provide application activities to be done by pupils and check their answers;
- Assign homework to all pupils.

**Note:**

Concerning **the lesson on word problems involving multiplication by 6**, the teacher will help pupils to solve a one –step problem:

Guide them to *understand the problem, identify facts (givens and requests), draw visual representations related to equal shares and solve the problem using the division.*

Refer to activity 3.11 and start by guiding pupils to solve some problems in a whole class discussion, provide problems to be solved into groups or in pairs and then give problems to be solved individually.

**f) More notes the teacher should consider:**

- Monitoring all learners' activities closely and catering for all learners without leaving any one behind.
- Thoroughly explaining to learners how to use counters to multiply two-digit numbers with 6.
- Appropriate use of different teaching and learning aids.

**g) Extra exercises and their answers:**

Use the table of place values, number cards, counters and vertically multiply the following numbers;

- a)  $111 \times 6 =$                       Answer: 666
- b)  $12 \times 6 =$                          Answer: 72
- c)  $101 \times 6 =$                       Answer: 606
- d)  $22 \times 6 =$                          Answer: 132
- e)  $81 \times 6 =$                          Answer: 486
- f)  $91 \times 6 =$                          Answer: 546

**3.6.8 Lesson 8: Dividing numbers less than 1000 by 6 without remainder**

**a) Learning objectives:**

**Knowledge:**

Explain the division of numbers less than 1000 by 6 without remainder.

**Skills:**

Explain to peers the rules of dividing two-digit numbers with a one-digit number.

Divide two-digit numbers by 6 without remainder where the dividend not exceeding 1000.

**Attitudes and values:**

Appreciating the importance of division in daily life.

Appreciating the importance of dividing two-digit numbers with a one-digit number.

### **b) Teaching/learning aids:**

A variety of counters: stones, bottle tops, beans, beads, balloons, maize seeds, tomatoes, books, pens, pencils, chalk, and number cards.

### **c) Generic competences that a learner develops from the lessons:**

- Critical thinking and being cautious while doing exercises.
- Cooperation and interpersonal skills as he or she work with others in different activities.
- Problem-solving skills in relation to dividing things equally into 6 things and people.
- Appropriate communication skills when reading or counting out loudly.
- Lifelong learning skills as learners show curiosity to learn more in Mathematics.

### **d) Crosscutting issues to be addressed in the lessons:**

**Inclusive education:** Cater for learners with special education needs. Giving to fast-learners extra activities contained in this book. Giving slow learners suitable activities for their level. Giving special treatment to learners with physical impairment, making those with hearing and visual impairment sit in front where possible the teacher uses the special teaching/learning aids.

**Gender:** Addressed when both boys and girls work together in groups and other activities peacefully without discrimination.

**Environment and Sustainability:** Addressed when learners don't destroy the environment while looking for counters and cleaning where they worked from.

### **Peace and values education:**

Encourage learners to live and work in harmony and share ideas in a peaceful way with respect of each other's views and rights during group discussion.

### **e) Teaching steps:**

- Guide learners to revise the multiples of 6;
- Guide pupils to count the numbers of counters equal to the dividend and share them equally in 6 groups until they get the number of counters for each group; invite them to write the number sentence for that operation (see activity 3.12)
- Form groups of pupils and assign them to do the **activity 3.13** where they have to: refer to the example and divide a two or three digit number by 6.

- Move around in the class for facilitating pupils where necessary; ask probing questions guiding them to know that they divide starting by the left side and that they can take 2 digits when necessary.
- Invite some groups to present their findings and then help them to harmonize by explaining how to divide. Guide them to discover when they consider 2 digits of a dividend and that this method is the same as called *vertical division or the standard written method*.

### **Synthesis/summarization**

- Guide pupils to summarize how to divide. Insist on the use of the standards written method.

### **Assessment**

- Provide application activities to be done by pupils and check their answers;
- Assign homework to all pupils.

### **f) More notes the teacher should consider:**

- Monitoring all learners' activities closely and catering for all learners without leaving any one behind.
- Thoroughly explaining to learners how to use counters to divide two-digit numbers by 6 without remainder with the dividend not exceeding 1000.
- Appropriate use of different teaching and learning aids.

### **g) Extra exercises and their answers:**

Use counters to calculate the following by long division.

$$666:6 = 111$$

$$726:6 = 121$$

$$936:6 = 156$$

$$846:6 = 141$$

$$930:6 = 155$$

$$876:6 = 146$$

## **3.6.9 Lesson 9: Word problems involving the division of a number by 6**

### **a) Learning objectives:**

#### **Knowledge:**

Solving word problems that involve dividing numbers less than 1000 by 6 without remainder.

#### **Skills:**

Explain to pupils the rules followed while solving word problems that involve dividing two-digit numbers with a one-digit number.

Dividing two-digit numbers by 6 without remainder with the dividend not exceeding 1000.

**Attitudes and values:**

Appreciating the importance of division in daily life.

**b) Teaching/learning aids:**

A variety of counters: stones, bottle tops, beans, beads, balloons, maize seeds, tomatoes, books, pens, pencils, chalk, and number cards.

**c) Generic competences that a learner develops from the lessons:**

- Critical thinking and being cautious while doing exercises.
- Cooperation and interpersonal skills as he or she work with others in different activities.
- Problem-solving skills in relation to dividing or multiplication by 6.
- Appropriate communication skills when reading or counting out loudly.
- Lifelong learning skills as learners show curiosity to learn more in Mathematics.

**d) Crosscutting issues to be addressed in the lessons:**

**Inclusive education:** Catering for learners with special education needs. Giving to fast-learners extra activities contained in this book. Giving slow learners suitable activities for their level. Giving special treatment to learners with physical impairment, making those with hearing and visual impairment sit in front where possible the teacher uses the special teaching/learning aids.

**Gender:** Addressed when both boys and girls work together in groups and other activities peacefully without discrimination.

**Environment and Sustainability:** Addressed when learners don't destroy the environment while looking for counters and cleaning where they worked from.

**Peace and values education:**

Encourage learners to live and work in harmony and share ideas in a peaceful way with respect of each other's views and rights during group discussion.

**e) Teaching steps:**

- Prepare enough teaching/learning aids to help a learner to be able to solve word problems that involve multiplying and dividing numbers less than 1000 by 6 without remainder;
- Make a big group of counters, divide it equally into 6 small groups and then count the number of counters in each group.
- Help pupils to solve a one –step or a two-step problem: Guide them to *understand the problem, identify facts (givens and requests), draw*

*visual representations related to equal shares and solve the problem using the division.*

- Refer to 3.14 and start by guiding pupils to solve some problems in a whole class discussion, provide problems to be solved into groups or in pairs and then give problems to be solved individually.

**f) More notes the teacher should consider:**

- Monitoring all learners' activities closely and catering for all learners without leaving any one behind.
- Thoroughly explaining to learners how to use counters to solve word problems that involve multiplying and dividing numbers less than 1000 by 6 without remainder.
- Appropriate use of different teaching and learning aids.

**g) Extra exercises and their answers:**

Use counters to solve the word problems which involve dividing and multiplying numbers less than 1000 by 6:

- 1) UNHCR is going to support 111 refugee families with tents. Each family will get 6 tents. What is the total number of tents that UNHCR will give out altogether?

**Answer:** The total number of tents to be given out =  $111 \times 6 = 666$  tents

- 2) Soap factory manufactures 141 bars of soap every day. Find the number of bars of soap it manufactures in 6 days.

**Answer:**

The number of bars of soap made in 6 days =  $141 \times 6 = 846$  bars of soap.

- 3) A football conference room hosts 151 people per day. Find the number of people who the room hosts in 6 days.

**Answer:**

The number of people it hosts in 6 days =  $151 \times 6 = 906$ .

- 4) 960 people who attended the prayers' conference were made to sit in 6 columns. Find how many people sat in each column.

In each column there were  $960 : 6 = 160$  people.

### **3.6.10 Lesson 10: Multiplication of whole numbers by 10 or by 100**

**a) Learning objectives:**

**Knowledge:**

Understand the multiplication of two-digit numbers by 10 or 100 where the product is less than 1000.

**Skills:**

Explain to peers the rules of multiplying by 10 or 100.

**Attitudes and values:**

Appreciate the importance of being able to multiply faster in daily life.

**b) Teaching/learning aids:**

A variety of counters: stones, bottle tops, beans, beads, balloons, maize seeds, tomatoes, books, pens, pencils, chalk, and number cards.

**c) Generic competences that a learner develops from the lessons:**

- Critical thinking and being cautious while doing exercises.
- Cooperation and interpersonal skills as he or she work with others in different activities.
- Problem-solving skills in relation to do mental multiplication of numbers with 10 or 100.
- Appropriate communication skills when reading or counting out loudly.
- Lifelong learning skills as learners show curiosity to learn more in Mathematics.

**d) Crosscutting issues to be addressed in the lessons:**

**Inclusive education:** Catering for learners with special education needs. Giving to fast-learners extra activities contained in this book. Giving slow learners suitable activities for their level. Giving special treatment to learners with physical impairment, making those with hearing and visual impairment sit in front where possible the teacher uses the special teaching/learning aids.

**Gender:** Addressed when both boys and girls work together in groups and other activities peacefully without discrimination.

**Environment and Sustainability:** Addressed when learners don't destroy the environment while looking for counters and cleaning where they worked from.

**Peace and values education:**

Encourage learners to live and work in harmony and share ideas in a peaceful way with respect of each other's views and rights during group discussion.

**e) Teaching steps:**

- Make groups of counters of numbers equal to multiples of 10 less or equal to 100.
- Prepare enough teaching/learning aids to help a learner to be able to mentally know the rules of multiplying by 10 or 100.

- Guiding learners as they do mental multiplication of numbers by 10 or 100.
- Asks learners to use number cards and counters when in case they haven't understood how to do mental multiplication of numbers by 10 or 100 yet.
- Gives opportunities to each learner to practice doing mental multiplication of numbers by 10 or 100.
- Supports learners with learning difficulties giving them activities that suit their ability.
- Observes gender in all teaching and learning activities that help understanding of the lesson.
- Supplements learners' ideas as they explain to each other how to count without making mistakes.
- Allow learners to ask questions where he or she has not understood.

**f) More notes the teacher should consider:**

- Monitoring all learners' activities closely and catering for all learners without leaving any one behind.
- Thoroughly explaining to learners how to use counters to look for multiples of 10 that don't exceed 100.
- Explaining how to be able to mentally recite the multiplication table of 10 and multiples of 10.
- Appropriate use of different teaching and learning aids.

**g) Extra exercises and their answers:**

Multiplying numbers by 10 or 100 to fill the missing numbers;

1)

- a)  $100 \times 6 = 600$
- b)  $10 \times 48 = 480$
- c)  $650 = 10 \times 65$
- d)  $420 = 42 \times 10$
- e)  $10 \times 24 = 240$
- f)  $9 \times 100 = 900$
- g)  $10 \times 100 = 1000$
- h)  $100 \times 3 = 300$
- i)  $500 = 5 \times 100$

2) In your groups, make groups of counters with numbers equalling to the multiples of 10.

### 3.7 Answers to end of unit assessment 3

1) Write in words or in figures

a) 976: **Nine hundred and seventy-six.**

b) Eight hundred thirty-five: **835.**

2) Underline the correct number

a) 9 O 7 H 6 T: 1) 976 2) 796 3) 769

b) 8 O 4 T 9 H: 1) 948 2) 849 3) 498

3) Write the expanded number

a)  $(8 \times 100) + (7 \times 10) + (9 \times 1) = \mathbf{879}$

b)  $900 + 90 + 9 = \mathbf{999}$

4) Write these numbers in a place value table

a) 896 b) 759 c) 837 d) 925

Numbers	Hundred (H)	Tens (T)	Ones (O)
896	8	9	6
759	7	5	9
837	8	3	7
925	9	2	5

5) Use  $<$ ,  $>$  and  $=$  to compare numbers

a)  $985 > 895$  b.  $768 = 768$  c.  $594 < 854$

6) Arrange the following numbers in the ascending order

793, 947, 986, 969, 678, 789 **678, 789, 793, 947, 969, 986**

7) Arrange the following numbers in the descending order

972, 984, 837, 749, 839, 949 **984, 972, 949, 839, 837, 749**

8) Add the following:

a)  $534 + 453 = 987$  c.  $572 + 418 = 990$

b)  $738 + 241 = 979$  d.  $693 + 289 = 982$

9) Subtract the following

a)  $857 - 727 = 130$  c.  $935 - 798 = 137$

b)  $967 - 856 = 111$  d.  $618 - 579 = 39$

10) Complete the following multiplication or division table

$\times 6$	1	2	3	4	5	6	7	8	9	10
	6	12	18	24	30	36	42	48	54	60

11) Multiply the following numbers

a. 91	b. 80	c. 71	d. 61	e. 51	f. 90
X 6	x 6	x 6	x 6	x 6	x 6
_____	_____	_____	_____	_____	_____
546	480	426	366	306	540

12) Multiplying numbers by 10 or by 100

a)  $9 \times 100 = 900$    b)  $89 \times 10 = 890$    c)  $10 \times 98 = 980$    d)  $100 \times 8 = 800$

13) Complete the missing numbers in the following division table

: 6	6	12	18	24	30	36	42	48	54	60
	1	2	3	4	5	6	7	8	9	10

14) Divide the following :

a) $966 : 6 = 161$	c. $684 : 6 = 114$	e. $564 : 6 = 94$
b) $870 : 6 = 145$	d. $774 : 6 = 129$	f. $954 : 6 = 159$

15) Word problems:

- The cows that remained = 410 ( $978 - 568 = 410$ ) cows.
- The number is 432 ( $999 - 567 = 432$ )
- The number of books that remained is 202 ( $967 - 765 = 202$ )
- The number is 432. ( $987 - 556 = 432$ )
- The number is 311. ( $879 - 568 = 311$ )
- The number of people in Buhanzi village = 862 ( $235 + 262 + 365 = 862$ )
- Every village will have 144 nets ( $864 : 6 = 144$ )
- The number of pupils in P2 is 306 ( $51 \times 6 = 306$ )
- In each box he will pack 31 bottles ( $186 : 6 = 31$ )

# UNIT 4

## FRACTIONS $\frac{1}{2}$ , $\frac{1}{4}$ and $\frac{1}{8}$

### 4.1 Key unit competence

Reading, writing, drawing and shading  $\frac{1}{2}$ ,  $\frac{1}{4}$  and  $\frac{1}{8}$

### 4.2 Prerequisite

Pupils will easily learn this unit, if they have a good background on the following:

Reading, writing and illustrating  $\frac{1}{2}$  and  $\frac{1}{4}$ .

### 4.3 Cross-cutting issues to be addressed

- **Gender balance:** provide equal opportunity to boys and girls in the lesson
- **Inclusive education:** promote education for all learners in the teaching and learning activities.
- **Environment and sustainability:** This will be addressed when pupils will be maintaining hygiene for their classroom and for materials they used.
- **Financial education:** addressed when pupils discuss word problem involving how to use a fraction of money and save another quantity.
- **Peace and values education:** addressed when pupils are encouraged to work collaboratively and peacefully in their group.

### 4.4 Generic competences to be developed

**Cooperation:** developed when pupils work collaboratively in group to develop interpersonal relations and life skills;

**Communication:** developed when pupils discuss either in groups or in the whole class, present findings, debate etc.

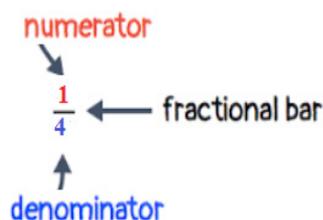
**Creativity and innovation:** developed when pupils make number cards, apply skills in solving real life problems, etc.

**Problem solving:** when pupils use acquired skills to solve problems from their real life situation.

**Lifelong learning:** when the learner is engaged in activities showing her/him to have the need for more learning with a curiosity of applying the knowledge learnt in a range of situations.

**Key vocabularies or concepts**

- **Numerator:** The top number of a fraction
- **Denominator:** The bottom number of a fraction
- **Fractional bar:** a small bare separating a numerator and a denominator.
- **A whole:** it is one unit equivalent to a fraction whose numerator equals to a denominator.
- **Proper fraction:** numerator is less than the denominator.
- **Improper fraction:** numerator is greater than or equal to denominator.



**4.5 Lessons in Unit 4**

Number	Title of the lesson	Number of periods
1	Reading, writing, drawing and shading fractions $\frac{1}{2}$	1
2	Reading, writing, drawing and shading fractions $\frac{1}{4}$	1
3	Reading, writing, drawing and shading fraction $\frac{1}{8}$	1
4	Comparing Fractions $\frac{1}{2}, \frac{1}{4}$ and $\frac{1}{8}$	2
5	Combining fractions to make a whole	1
6	Importance of Fractions in daily life.	1
	Total number of periods	6

## 4.6 Guidance on the teaching and learning activities

### 4.6.1 Lessons 1: Reading, writing and shading the fractions: $\frac{1}{2}$

#### a) Learning objectives:

##### Knowledge:

Showing the fractions  $\frac{1}{2}$  of a whole.

##### Skills:

Dividing a whole into 2 equal parts.

Reading and writing fractions:  $\frac{1}{2}$

##### Attitudes and values:

Developing a culture of sharing with others.

#### b) Teaching/learning aids:

Different materials which include a piece of paper, an orange, a pawpaw, a sugarcane etc

#### c) Generic competences that a learner develops from the lessons:

- Critical Thinking and being cautious while doing exercises.
- Cooperation and interpersonal skills as he or she work with others in different activities.
- Problem-solving skills in relation to showing parts of a whole.
- Appropriate communication skills when reading or counting out loudly.
- Lifelong learning skills as learners show curiosity to learn more in Mathematics.

#### d) Crosscutting issues to be addressed in the lessons:

**Inclusive education:** Catering for learners with special education needs. Giving to fast-learners extra activities contained in this book. Giving slow learners suitable activities for their level. Giving special treatment to learners with physical impairment, making those with hearing and visual impairment sit in front where possible the teacher uses the special teaching/learning aids.

**Gender:** Addressed when both boys and girls work together in groups and other activities peacefully without discrimination.

**Environment and Sustainability:** Addressed when learners don't destroy the environment while looking for counters and cleaning where they worked from.

## Peace and values education:

Encourage learners to live and work in harmony and share ideas in a peaceful way with respect of each other's views during group discussion.

### e) Teaching steps:

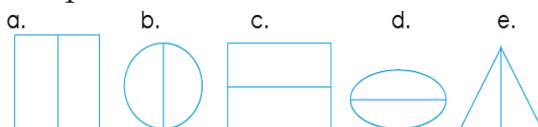
- Using different objects for cutting, teacher helps pupils to understand and discover that a whole can be divided into 2 equal parts.
- Teacher may divide an orange into 2 equal parts and then show pupils how 2 equal parts can be put together to make a full orange or a whole.
- Teacher may ask 2 pupils to equally share 1 orange and then asks other pupils to find a share of each pupil. He/ she explains to pupils that each part is **a half** or **1 part out of 2 equal parts** of an orange.
- Using cut outs of a square on different papers, teacher asks pupils to find out 2 different parts which can be putted together to make a square. Then, he/she asks pupils to compare the 2 parts and discover that they are all equal. **(see from activity 4.1.1 to activity 4.1.5)**
- Teacher asks pupils to fold a paper and then divide it into 2 equal parts and then compare the 2 parts in order to find that the 2 parts are equal. He/she leads pupils to find out that one **part is a half of a whole** or **1 part out of 2 equal parts**.
- Teacher asks pupils to study different pictures in the pupil's book, explain how a whole is divided into 2 equal parts and show  $\frac{1}{2}$  of a whole.
- Teacher leads pupils on how to write and read the fraction  $\frac{1}{2}$ . He/she helps them to read and write  $\frac{1}{2}$  on chalkboard and then in their notebooks.
- Teacher helps pupils to understand that  $\frac{1}{2}$  is a fraction made by 2 parts :the numerator and denominator.

$$\begin{array}{c} \text{Fraction bar} \leftarrow \frac{1}{2} \rightarrow \text{Numerator} \\ \text{Denominator} \end{array}$$

### • Assessment

- Teacher can use drawings of different shapes(rectangle, square...)

divided into 2 equal parts and asks pupils to individually shade a half or  $\frac{1}{2}$  of a shape.



**f) More notes the teacher should consider:**

- Monitoring all activities closely and catering for all learners without leaving any one behind.
- Explaining deeply the best ways of reading, writing, drawing fraction  $\frac{1}{2}$  and a wholeshowing which is bigger or smaller.
- Appropriate use of different teaching and learning aids.

**4.6.2 Lessons 2: Reading, writing and shading fractions:  $\frac{1}{4}$**

This lesson is taught in the same way as the previous lesson; however, the whole is divided into 4 equal parts and pupils will be asked to show  $\frac{1}{4}$  of a whole, to read  $\frac{1}{4}$  as a quarter or one fourth or one over four and they will shade the part illustrating a quarter. Use from **activity 4.2.1** to **activity 4.2.6**.

**4.6.3 Lessons 3: Reading, writing and shading fractions:  $\frac{1}{8}$**

This lesson is taught in the same way as the lesson 4.7.1; however, the whole is divided into 8 equal parts and pupils will be asked to show  $\frac{1}{8}$  of a whole, to read  $\frac{1}{8}$  as one eighth or one over eight and they will shade the part illustrating  $\frac{1}{8}$  of a whole. Use from **activity 4.3.1** to **activity 4.3.6**.

**4.6.4 Lessons 4: Comparing fractions  $\frac{1}{2}$ ,  $\frac{1}{4}$  and  $\frac{1}{8}$**

**a) Objectives**

**Knowledge:**

Understand how to compare fractions  $\frac{1}{2}$ ,  $\frac{1}{4}$  and  $\frac{1}{8}$

**Skills:**

Comparing fractions  $\frac{1}{2}$ ,  $\frac{1}{4}$  and  $\frac{1}{8}$

**Values**

- Develop the capacity of quick critical thinking to compare fractions.
- Develop the spirit of equal sharing.
- Show the concern of trustworthiness when sharing with others.

**b) Prerequisites /Introduction**

To perform well in this lesson, do the following:

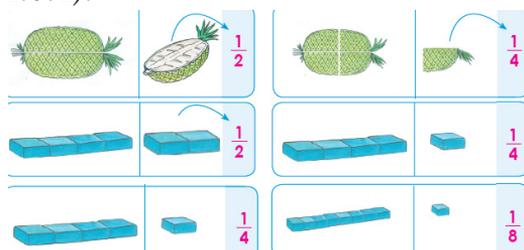
- Plan how to help pupils with different impairments;
- Guide pupils to:
  - Work out different activities for shading fractions to show equal portions of a whole;
  - Read fractions  $\frac{1}{2}$ ,  $\frac{1}{4}$  and  $\frac{1}{8}$ .
  - Recognize fractions as equal shares of a whole set.
  - Recognize a whole, one half, one quarter and one eighth.

**c) Teaching resources and learning resources**

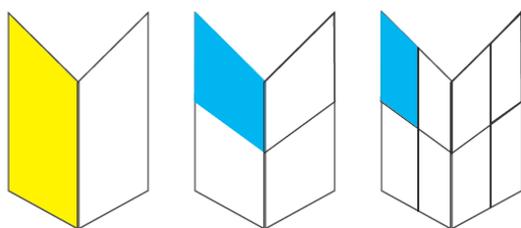
- Different objects to be cut: sugar cane, oranges, sticks, soap, sheets of paper, etc.
- Safe materials to be used: scissors or plastic knife to cut a whole into portions of equal sizes;
- Semi concrete objects: drawings illustrating different fractions, rectangles, squares, circles, etc.

**d) Teaching and learning activities:**

- Show pupils how to partition concrete objects or manipulative materials into equal parts and compare parts to the whole to introduce proper fractions, for example to Partition paper equally by folding (activity 4.5.1):



- Use a semi concrete drawing and ask other pupils to say the fraction of the shaded parts and ask them to compare fractions they find (activity 4.5.2): You can also use such drawing:



- Show other values of two fractions with fraction strips and Cuisenaire rods and ask pupils to compare fractions using  $<$ ,  $>$  or  $=$  (activity 4.5.3).
- Organize groups of pupils and give them activities to do, you can give them fraction cards and ask pupils to compare pairs of those fractions using cards with comparison symbols ( $<$ ,  $>$  or  $=$ );
- Move around in the classroom and provide probing questions for assistance where necessary;
- Invite some groups to present and guide the whole class to harmonize on how to compare fractions.

### Synthesis/summarization

- Guide pupils to summarize how to compare fractions  $\frac{1}{2}$ ,  $\frac{1}{4}$  and  $\frac{1}{8}$ .
- Emphasize fraction as: *equal size portions of a whole or as equal shares of a whole set.*

### Assessment

- Provide activities to be done by pupils and check their answers;
- Assign all pupils to do the homework.

## 4.6.5 Lessons 5: Combine fractions to make a whole

### a) Objectives

#### Knowledge:

Understand the meaning of the putting together parts to make a whole.

#### Skills:

Add fractions of the same whole to restore initial object.

#### Values

- Develop the capacity of quick critical thinking to add fractions.
- Develop the spirit of equal sharing.
- Show the concern of trustworthiness when sharing with others.

### b) Prerequisites /Introduction

To perform well in this lesson, do the following:

- Plan how to help pupils with different impairments;
- Guide pupils to:

Use concrete objects and carry out different activities for putting together different portions of a whole and say the related fraction.

### c) Teaching resources and learning resources

- Different objects to be cut: sugar cane, oranges, sticks, soap, sheets of paper, etc.
- Safe materials to be used: scissors or plastic knife to cut a whole into portions of equal sizes;
- Semi concrete objects: drawings illustrating different fractions, rectangles, squares, circles, etc.

### d) Teaching and learning activities:

- Invite one pupil and guide him/her on how to demonstrate how to form a whole from its parts through paper folding activity or use fraction charts, diagrams etc;
- Ask other pupils to say the result of the part obtained when those portions are put together (see **activity 4.6**)
- Show other values of two proper fractions with fraction strips and Cuisenaire rods and ask pupils to put them together and say the result;
- Organize groups of pupils and give them activities to do, you can also give them fraction cards with  $\frac{1}{2}$  or  $\frac{1}{4}$  or  $\frac{1}{8}$  and ask pupils to **find fraction or the number of fractions of the same value** to be combined to find a whole using cards with addition symbol (+) and equality symbol (=) and a card with a whole.
- Move around in the classroom and provide probing questions for assistance where necessary;
- Invite some groups to present and guide the whole class to harmonize on how to **add portions to make a whole**.

### Synthesis/summarization

- Guide pupils to summarize how to form a whole using its portions.

### Assessment

- Provide activities to be done by pupils and check their answers.
- Assign homework to all pupils.

### Additional activities

- 1) Draw the following fractions;  $\frac{1}{2}$ ,  $\frac{1}{4}$ , and  $\frac{1}{8}$ .
- 2) Name the following fractions:
  - a)  $\frac{1}{2}$ : **A half**
  - b)  $\frac{1}{4}$ : **A quarter**.

c)  $\frac{1}{8}$ . **An eighth**

3) Use  $>$ ,  $<$  and  $=$  to compare the following fractions

$\frac{1}{2} = \frac{1}{2}$ .  $\frac{1}{2} > \frac{1}{4}$

$\frac{1}{2} > \frac{1}{8}$ .  $\frac{1}{2} < \frac{2}{2}$ .

$\frac{1}{4} > \frac{1}{8}$ .  $\frac{1}{8} = \frac{1}{8}$

$\frac{1}{4} = \frac{1}{4}$ .  $\frac{1}{8} < \frac{1}{2}$

$\frac{1}{4} < \frac{1}{2}$ .

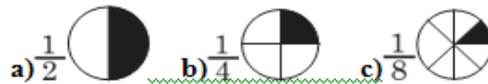
**4.6.6 Lessons 6: Importance of fractions**

Refer to **activity 4.7** and organise a group work activity to discuss the importance of fractions. Invite groups to discuss their findings in a whole class discussion and guide them to conclude.

**4.7 Answers for the end unit assessment 4**

1) a)  $\frac{1}{2}$ : A half.    b)  $\frac{1}{4}$ : A quarter    c)  $\frac{1}{8}$  one eighth.

2) Draw a circle and shade the following fractions.



3) Shade  $\frac{1}{8}$  of this picture.



4) Use  $>$ ,  $=$  and  $<$  to compare these fractions.

i)  $\frac{1}{2} < \frac{8}{8}$     b)  $\frac{2}{2} > \frac{1}{4}$     c)  $\frac{1}{4} > \frac{1}{8}$     d)  $\frac{4}{4} > \frac{1}{2}$     e)  $\frac{8}{8} > \frac{1}{8}$     f)  $\frac{4}{4} > \frac{1}{8}$

g)  $\frac{1}{4} < \frac{1}{2}$     h)  $\frac{1}{8} < \frac{2}{2}$     i)  $\frac{1}{4} < \frac{4}{4}$     j)  $\frac{2}{2} > \frac{1}{8}$     k)  $\frac{1}{8} = \frac{1}{8}$     l)  $\frac{8}{8} > \frac{1}{4}$

5) Answer by Yes or No

- |     |     |     |
|-----|-----|-----|
| Yes | Yes | Yes |
| No  | Yes | Yes |
| Yes | Yes | Yes |
| No  | No  | Yes |
| Yes | Yes |     |

# UNIT 5

# MEASUREMENTS OF LENGTH

## 5.1 Key unit competence

Measuring, comparing, adding, subtracting, multiplying and dividing length measurements with a whole number.

## 5.2 Prerequisite

Pupils will easily learn this unit, if they have a good background on the length measurements expressed in meter as it was learnt in P1.

## 5.3 Cross-cutting issues to be addressed

- **Gender balance:** provide equal opportunity to boys and girls in the lesson
- **Inclusive education:** promote education for all learners in the teaching and learning activities.
- **Environment and sustainability:** This will be addressed when pupils will be maintaining hygiene for their classroom and for materials they used.
- **Peace and values education:** addressed when pupils are encouraged to work collaboratively and peacefully in their group.

## 5.4 Generic competences to be developed

**Cooperation:** developed when pupils work collaboratively in group to develop interpersonal relations and life skills;

**Communication:** developed when pupils discuss either in groups or in the whole class, present findings, debate etc.

**Creativity and innovation:** developed when pupils make number cards, apply skills in solving real life problems, etc.

**Problem solving:** when pupils use acquired skills to solve problems from their real life situation.

**Lifelong learning:** when the learner is engaged in activities showing her/him to have the need for more learning with a curiosity of applying the knowledge learnt in a range of situations.

## 5.5. List of lessons of Unit 5

No	Lessons	Number of periods
1	Measuring lengths for objects by the use of a meter ruler	1
2	Dividing a meter into 10 equal parts	1
3	Dividing a decimetre into 10 equal parts.	1
4	Converting units of measurements.	1
5	Comparing and arranging units of length. m, dm, and cm.	1
6	Adding units of length. m, dm, and cm.	1
7	Subtracting units of length. m, dm, and cm.	1
8	Multiplying units of length m, dm, and cm by a whole number.	1
9	Dividing units of length m, dm, and cm by a whole number.	1
10	Word problems involving units of length m, dm, and cm.	1
11	Importance of length measurements.	1
12	End unit assessment	1
	Total	12

## 5.6 Guidance on different lessons

### 5.6.1 Lesson1: Measuring lengths for objects by the use of a meter ruler

#### a) Learning objectives:

##### Knowledge:

Understanding length measurements in meter.

##### Skills:

Measuring length of objects in m

##### Attitudes and values:

Appreciate the importance of using length measurements in daily life.

Develop the culture of honesty in measuring length of various objects.

#### b) Teaching/learning aids:

Chalkboard, chalk, sticks with different lengths, long ropes, tape measure, folding meter, meter ruler notebooks, pens, pupil's book, and charts containing pictures of lengths of objects.

#### c) Generic competences that a learner develops from the lessons:

- Critical Thinking and being cautious while doing exercises.

- Cooperation and interpersonal skills as he or she works with others in different activities.
- Problem-solving skills in relation to using units of measuring length.
- Appropriate communication skills when reading or counting out loudly.
- Lifelong learning skills as learners show curiosity to learn more in Mathematics.

**d) Crosscutting issues to be addressed in the lessons:**

**Inclusive education:** Catering for learners with special education needs. Giving to fast-learners extra activities contained in this book. Giving slow learners suitable activities for their level. Giving special treatment to learners with physical impairment, making those with hearing and visual impairment sit in front where possible the teacher uses the special teaching/learning aids.

**Gender:** Addressed when both boys and girls work together in groups and other activities peacefully without discrimination.

**Environment and Sustainability:** Addressed when learners don't destroy the environment while looking for counters and cleaning where they worked from.

**Peace and values education:**

Encourage learners to live and work in harmony and share ideas in a peaceful way with respect of each other's views during group discussion.

**e) Teaching steps:**

- Through prompting questions, teacher asks pupils to talk about the length measuring tools (**activity 5.1**)



- In small groups, teacher asks pupils to measure a stick or a rope of 1 meter using a meter ruler, so that everyone in group have a measuring tool of 1 meter ;
- He/she asks pupils to measure the length of the classroom using his / her measuring tool and then they say the number of meters they find after measuring ;

- Individually, teacher asks every pupil to measure 10 m using his/ her measuring tool ( rope or stick of 1 meter) and write the number of meters they find after measuring.
- Teacher explains to pupils that a **meter** is a **standard** unit of length measurements. He /she explains that 1 meter measured using a meter ruler is the same as 1 meter measured using a folding meter or a tape meter.

**Note:** before measuring lengths using standard tools like a meter ruler, teacher has to encourage pupils to make estimations first.

### **Assessment**

The teacher provides activities to be done by pupils at school or at home. He/she can ask them to measure the length of their house at home using a meter ruler and record the measured length in meters. He/she may ask pupils to measure lengths of different objects less or equal to 10 meters.

#### **f) More notes the teacher should consider:**

- Monitoring all activities closely and catering for all learners without leaving any one behind.
- Explaining deeply how to measure length of different objects with the help of a 1meter ruler, a 30cm ruler or other kinds of meters.
- Prepares a field trip to visit tailors, where building is taking place or any other place near school where they use instruments of measurement.
- Monitoring group activities where learners are discussing the importance of using measurements of length and their real-life applications.
- Appropriate use of different teaching and learning aids.

### **5.6.2 Lesson 2: Dividing a meter into 10 equal parts**

#### **a) Learning objectives:**

##### **Knowledge:**

Understanding the meaning of onedecimetre (1dm).

##### **Skills:**

- Divide 1m into 10 equal parts;
- Discover the use of 1dm.

##### **Attitudes and values:**

- Appreciate the importance of using decimetre as a length measurement in daily life.
- Develop the culture of honesty in measuring length of various objects.

### **b) Teaching/learning aids:**

Chalkboard, chalks, sticks with different lengths, long ropes, tape measure, folding meter, meter ruler notebooks, pens, pupil's book, charts containing pictures of lengths of objects.

### **c) Teaching steps**

- Invite pupils to observe learning materials and explain instructions on activities to be done (use activity 5.2);
- Show them how you cut a 1m sugar cane in 10 equal parts and to measure the length of each part;
- Form groups of pupils and give them instruments for length measurement and ask them to: take a rope or a thread or a stick of 1m and ask each group to cut it in 10 equal parts.
- Ask some groups to present the findings and guide the whole class to harmonize the length for each part, tell them that this length is called one decimeter.

Guide them to discover that there are 10 dm in one meter: **1m = 10dm**

- When the length of one meter (1m) is divided in 10 parts of the same length, each part measures one decimeter (1dm).
- Then, **1m equals to 10 decimeters. 1m = 10 dm**

### **5.6.3 Lesson 3: Dividing a decimetre into 10 equal parts**

This lesson is taught in the same way as the previous;

Refer to the **activity 5.3** in the pupil's book and show pupils how to divide 1dm in 10 equal parts.

Show them that the length for each part is called one centimetre (1cm).

Let them discover that there are 10 cm in one 1dm. **1dm = 10cm**

**Guide pupils to conclude that** the units of length get greater in the multiple of 10 where

**1m = 10dm and 1dm = 10 cm**

### **5.6.4 Lesson 4: Conversion of Units of length m, dm and cm**

#### **a) Objectives**

#### **Knowledge:**

Understanding the relationship between m, dm and cm and their conversion.

#### **Skills:**

- Draw a table of conversion and convert length measurements
- Convert m into dm and dm into cm.

## Values

- Measure quickly and accurately;
- Develop the culture of kindness when measuring the length of different objects.
- Appreciate the importance of length measurements in real life.

## b) Prerequisites /Introduction

To perform well in this lesson, do the following:

- Plan how to help pupils with different impairments;
- Organize learning materials to be used by pupils.
- Guide pupils to:
  - Work out different activities for adding length measurement expressed in m,
  - Establish the relationship between m and dm and between dm and cm.

## c) Teaching resources and learning resources

- Different instruments of measuring the length: meter or centimeter rulers, folding meter, measuring tape, etc,
- Gridded paper, diagrams or pictures of exact measurements.
- Conversion table of length measurements with m, dm and cm.

## d) Teaching and learning activities:

- Explain pupils how to draw a conversion table of length measurements with m, dm and cm;
- Write 1m and 1 dm in the table and ask them to give the value of 1m in dm, the value of 1dm in cm and the value of 1m in cm.(1m=10dm, 1dm = cm and 1m=... cm?)
- Guide pupils to establish the that  $1\text{m} = 10\text{dm} = 100\text{cm}$
- Organize groups of pupils and ask them to refer to the example and do the activities 5.4.1;
- Move around in the classroom and provide probing questions for assistance where necessary;
- Invite some groups to present and guide the whole class to harmonize on how to convert the units of length measurements.

## Synthesis/summarization

Guide pupils to summarize the relationship between length measurements, and how to convert from a unit to another using a conversion table.

## Assessment

- Provide activities to be done by pupils and check their answers.

- Assign all pupils homework.

#### **5.6.4 Lesson 4: Comparing lengths and arranging length measurements**

##### **a) Objectives**

##### **Knowledge:**

Understand how to compare units of length measurement and to compare lengths of objects.

##### **Skills:**

Measure and compare lengths of objects using standard units: m, dm and cm

##### **Values**

- Measure quickly and accurately;
- Develop the culture of kindness when measuring the length of different objects.
- Appreciate the importance of length measurements in real life.

##### **b) Prerequisites /Introduction**

To perform well in this lesson, do the following:

- Plan how to help pupils with different impairments;
- Organize learning materials to be used by pupils.
- Guide pupils to: Work out different activities for comparing the lengths of different objects using m, dm and cm.

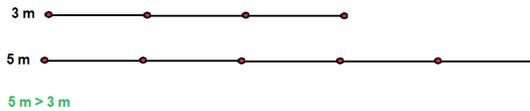
##### **c) Teaching resources and learning resources**

##### **Step 1:**

- Different instruments of measuring the length: meter or centimeter rulers, folding meter, measuring tape, etc,
- Objects of different lengths to be measured and compared: rooms, hall, garden.
- Gridded paper, diagrams or pictures of exact measurements.
- Conversion table of length measurements.

##### **d) Teaching and learning activities:**

- Show pupils objects of different lengths and ask them to compare the lengths of them before measuring where they say the highest and the shortest;
- Invite one pupil in front of others and guide him/her on how to measure and record lengths of objects using a meter ruler and then compare the obtained measurements using  $<$ ,  $>$  or  $=$  ;



- Organize groups of pupils and give them activities to do (for example Activity 5.5);
- Move around in the classroom and provide probing questions for assistance where necessary;
- Invite some groups to present and guide the whole class to harmonize on how to compare lengths of objects.

### Synthesis/summarization

- Guide pupils to summarize how to compare lengths of objects: *use a conversion table to convert all lengths in the smallest unit given and then to compare obtained values.*

### Assessment

- Provide activities to be done by pupils and check their answers;
- Assign all pupils a homework to do.

### Step 2:

Refer to **activity 5.7.1** and **activity 5.7.2** and guide pupils to order the lengths for objects from the shortest to the longest (from smallest to the biggest).

### e) Extra exercises and their answers:

- 1) Use  $>$ ,  $<$  and  $=$  to compare
  - a)  $5\text{cm} < 8\text{dm}$
  - b)  $7\text{m} > 9\text{cm}$
  - c)  $3\text{dm} > 3\text{cm}$
  - d)  $9\text{cm} < 5\text{dm}$
  - e)  $7\text{m} > 6\text{dm}$
  - f)  $2\text{cm} < 5\text{m}$
- 2) Arrange from shortest to longest.
  - a) 8dm, 7cm, 1m, 3dm
  - b) Answer: 7cm, 3dm, 8dm, 1m
  - c) 9cm, 4dm, 7cm, 6m
  - d) Answer: 7cm, 9cm, 4dm, 6m
  - e) 6dm, 7m, 2cm, 4dm
  - f) Answer: 2cm, 4dm, 6dm, 7m
  - g) 7cm, 8dm, 1m, 9cm.
  - h) Answer: 7cm, 9cm, 8dm, 1m.

### 3) Arrange from longest to shortest

- 1) 1dm, 7cm, 8dm, 2m.
- 2) Answer: 2m, 8dm, 1dm, 7cm.
- 3) 2dm, 6m, 9cm, 3dm
- 4) Answer: 6m, 3dm, 2dm, 9cm
- 5) 3m, 5m, 1m, 4m
- 6) Answer: 5m, 4m, 3m, 1m.
- 7) 4m, 8m, 3m, 1m
- 8) Answer: 8m, 4m, 3m, 1m.

## 5.6.5 Lesson 5: Addition and subtraction of length measurements

### a) Objectives

#### Knowledge:

Understand the meaning of the sum of length measurements.

#### Skills:

- Use conversion tables to convert from one unit of length to another before adding them;
- Demonstrate addition of lengths using number sentences in the conventional manner.

#### Values

- Measure quickly and accurately;
- Develop the culture of kindness when measuring the length of different objects.
- Appreciate the importance of length measurements in real life.

### b) Prerequisites /Introduction

To perform well in this lesson, do the following:

- Plan how to help pupils with different impairments;
- Organize learning materials to be used by pupils
- Guide pupils to:
  - Work out different activities for adding the lengths of different objects using m, dm and cm.

### c) Teaching resources and learning resources

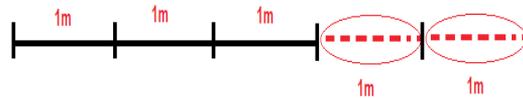
- Different instruments of measuring the length: meter or centimeter rulers, folding meter, measuring tape, etc,
- Objects of different lengths to be measured and compared: rooms, hall, garden.

- Gridded paper, diagrams or pictures of exact measurements.
- Conversion table of length measurements.

#### d) Teaching activities

##### Step1: addition

- Teacher helps pupils to accurately measure lengths using a meter ruler, a rope or a stick of 1 meter. He /she asks pupils to measure 2 consecutive lengths and then record their measures and make the sum
- By drawing, teacher helps pupils to add lengths in meters



- Teacher writes on the chalkboard  $3\text{ m} + 2\text{ m} = 5\text{ m}$ , He/ she explains that adding lengths measurements, we add numbers and write length unit (m).
- Form groups of pupils and guide them how to use a conversion table when you have different length measurements (refer to activity 5.8).

Example : $8\text{ m} + 60\text{ cm} = \dots\text{ dm}$			
Required unit: dm	m	dm	cm
	8	0	
Answer: $8\text{ m} + 60\text{ cm} = 86\text{ dm}$	+	↓	6
	8	6	

- Teacher asks pupils to solve a word problem that involving addition of length measurements in meters and individually, pupils try to solve it by showing their working steps on chalkboard. Teacher helps them to accurately add length measurements in meter and find the correct answer.

##### Step 2 : Subtraction

- Teacher helps pupils to discover, by measuring, that a rope of 9 meters (9m) is longer than a rope of 3 meters (3m) and the difference in lengths is 6 meters (6m).

Using a pair of scissors, teacher may ask pupils to cut out 3 meters from 9 meters of rope and then measure the length of the remaining rope which is 6 meters (6 m).

- Using a meter ruler, pupils may be asked to measure, draw and write 3 meters on the chalkboard, and then measure, draw and write 2 meters on the chalkboard. Teacher asks them to find the difference between the 2 lengths which is 1 meter.



- Teacher refers to **activity 5.9** and guide pupils how to use conversion table to make subtraction of length measurements:

Example: $47\text{ dm} - 3\text{ m} = \dots\text{ cm}$			
The required unit is <b>cm</b>	m	dm	cm
<b>Answer:</b>	4	7	0
$47\text{ dm} - 3\text{ m} = 170\text{ cm}$	-	3	0
	1	7	0

- In small groups, teacher asks pupils to work out subtraction activities and solve word problems that involve subtraction of length measurements by showing their working steps on chalkboard. Teacher helps them to accurately subtract length measurements and find the correct answers.

### e) Additional activities

#### 1) Add the following measurements

- 1)  $7\text{ m} + 1\text{ dm} = 710\text{ cm}$
- 2)  $4\text{ m} + 3\text{ cm} = 403\text{ cm}$
- 3)  $8\text{ m} + 2\text{ dm} = 82\text{ dm}$
- 4)  $5\text{ dm} + 4\text{ cm} = 54\text{ cm}$
- 5)  $7\text{ dm} + 3\text{ m} = 37\text{ dm}$
- 6)  $6\text{ cm} + 4\text{ m} = 406\text{ cm}$

#### 2) Find the difference:

- 1)  $7\text{ dm} - 5\text{ cm} = 65\text{ cm}$
- 2)  $9\text{ dm} - 6\text{ dm} = 3\text{ dm}$
- 3)  $8\text{ m} - 5\text{ m} = 3\text{ m}$
- 4)  $6\text{ dm} - 2\text{ dm} = 4\text{ dm}$
- 5)  $5\text{ m} - 1\text{ m} = 4\text{ m}$
- 6)  $4\text{ m} - 2\text{ m} = 2\text{ m}$ .

#### 3) Mention three people who use lengths of measurements in your community .

**Answer: Builders, tailors, carpenters.**

#### 4) Is learning measurements of length important? How?

#### 5) Solve word problems

- a) Batamuriza bought a 9m cloth and her mother bought 10dm. How many cm of cloth do both have altogether?

**Total cloth in cm = 9m + 10dm = 910 cm**

- b) Muneza bought 6m long wood. He used 500cm to make a chair. How many centimeters did he remain with?

**He remained with 100cm of wood = (600cm – 500cm)**

- c) Bineza has 60dm of a Kitenge cloth. Ikirezi has 300cm of the same cloth.

How many meters of cloth do they have altogether?

Both have (60 dm + 300cm) = 9m of cloth.

### 6) Homework:

Discuss with your parents the importance of measurements of length, ask them where they usually use them and the things they use for measuring length.

### 5.6.6 Lesson 6: Multiplication of units of length per a whole number

#### a) Objectives

#### Knowledge:

Understand the meaning of the multiplication of **length measurements by a one digit number**

#### Skills:

- Demonstrate the multiplication of a length by a whole number as a repeated addition;
- Calculate the product of **length measurements by a one digit number** using

A standard written method

#### Values

- Develop the capacity of quick critical thinking to find the product of length measurement by a whole number.
- Develop the culture of kindness when measuring the length of different objects.
- Appreciate the importance of length measurements in real life.

#### b) Prerequisites /Introduction

To perform well in this lesson, do the following:

- Plan how to help pupils with different impairments;
- Guide pupils to:
- Multiply a 3 digit number by one digit number;
- Use concrete objects such as 5 sticks of the same length for example 1m

and show that the multiplication of 1m by 5 is the length of 5 sticks put on the same line one at the extremity of another.

### c) Teaching resources and learning resources

- Different instruments of measuring the length: meter or centimeter rulers, folding meter, measuring tape, etc,
- Objects of the same lengths to be aligned and measured: sticks, pens, rulers pencils, ...
- Gridded paper, diagrams or pictures of exact measurements.
- Conversion table of length measurements.

### d) Teaching and learning activities:

- Invite one pupil in front of others and guide him/her on how to demonstrate the multiplication of length measurement by a number using concrete materials: two sticks where each one measures 10 cm



- Ask other pupils to say the total length for them when they are put on the same line one by another, then they will see that it is equal two 10cm x 2.
- Organize groups of pupils and give them activities to do (for example Activity 5.10);

**Example :** 70cm x 2 = ... dm

$$70 \text{ cm} \times 2 = 140 \text{ cm}$$

$$140 \text{ cm} = 14 \text{ dm}$$

$$70 \text{ cm} \times 2 = 14 \text{ dm}$$

m	dm	cm
	7	0
x		2
1	4	<del>0</del>

- Move around in the classroom and provide probing questions for assistance where necessary;
- Invite some groups to present and guide the whole class to harmonize on how to find a product of length measurement by a number.

### Synthesis/summarization

Guide pupils to summarize how to find a product of length measurement by a number: **convert the measurement in the smallest unit given, multiply the obtained value by the given number and copy that small unit then convert the result in the requested unit.**

### Assessment

- Provide activities to be done by pupils and check their answers.
- Assign homework to all pupils.

## 5.6.7 Lesson 7: Division of length by a whole number

### a) Objectives

#### Knowledge:

Understand the meaning of the division of **length measurement by a one digit number**.

#### Skills:

- Demonstrate the division of a length by a whole number as a grouping of equal parts from an initial length.
- Calculate the quotient of a **length measurement by a one digit number** using a standard written method.

#### Values

- Develop the capacity of quick critical thinking to find the product of length measurement by a whole number.
- Develop the culture of kindness when measuring the length of different objects.
- Appreciate the importance of length measurements in real life.

### b) Prerequisites /Introduction

To perform well in this lesson, do the following:

- Plan how to help pupils with different impairments;
- Guide pupils to:
  - Divide a 3 digit number by one digit number;
  - Use a concrete object such as a long stick of 6m to be cut in 3 equal parts of the same length and show that division of 6m by 3 is the length of 1 part.

### c) Teaching resources and learning resources

- Different instruments of measuring the length: meter or centimeter rulers, folding meter, measuring tape, etc;
- Objects of the same lengths to be aligned and measured: sticks, pens, rulers pencils, etc.
- Gridded paper, diagrams or pictures of exact measurements.
- Conversion table of length measurements.

### d) Teaching and learning activities:

- Invite one pupil in front of others and guide him/her on how to demonstrate the division a length measurement in a given number of parts: long stick of 6cm to be cut in 3 equal parts of the same length:



- Ask other pupils to say the length for each part: they will see that it is equal to  $3\text{cm} = 6\text{ cm} : 2$ .
- Organize groups of pupils and give them activities to do (for example Activity 5.11);

**Example:**  $960\text{ cm} : 3 = \dots\text{dm}$

**Solution:** The required unit is **dm**

$$960\text{ cm} : 3 = 320\text{ cm}$$

$$320\text{ cm} = 32\text{ dm}$$

$$960\text{ cm} : 3 = 32\text{ dm}$$

$$\begin{array}{r} 960 \quad | \quad 3 \\ \hline 9 \quad \downarrow \downarrow \quad | \quad 320 \\ \cancel{0}60 \quad | \\ \hline - 6 \quad \downarrow \\ \hline \cancel{0}0 \quad | \\ \hline - 0 \\ \hline 0 \end{array}$$

- Move around in the classroom and provide probing questions for assistance where necessary;
- Invite some groups to present and guide the whole class to harmonize on how to divide a length by a whole number.

### Synthesis/summarization

Guide pupils to summarize how to divide a length by a whole number: **convert the measurement in the smallest unit given, divide** the obtained value by the given number and copy that small unit then convert the result in the requested unit.

### Assessment

- Provide activities to be done by pupils and check their answers.
- Assign homework to all pupils.

### Note

Concerning **the lesson on word problems involving the division of length measurements by a whole number**, the teacher will help pupils to solve a one –step:

- guide them to *understand the problem*,
- *identify facts (givens and requests)*,
- *draw visual representations and solve the problem using the addition.*

Start by guiding pupils to solve some problems in groups or in a whole class discussion, provide problems to be solved into groups or in pairs and then give problems to be solved individually (use **activity 5.12**).

### 5.6.7 Lesson 7: The role of units of length

follow **activity 5.13.1, activity 5.13.2 and activity 5.13.3** and organise a group work activity to discuss the importance of units of length. Invite groups to discuss their findings in a whole class discussion and guide them to conclude.

## 5.7 Answers for the end unit assessment 5

1) Comment by Yes or No

a) The length for my class table is 100 cm.

**No**

b) The meter is the standard unit of length measurement.

**Yes**

c) We use the tape to measure the length of a cloth.

**Yes**

d) Units of length help us to find the measure of length for objects

**Yes**

e) I use a meter ruler to measure the length for my notebook.

**No**

f) The units of length vary from one the next in the multiple of ten.

**Yes**

2) Use a conversion table to convert

a)  $7\text{m} = 70\text{dm}$ .                      (f)  $900\text{ cm} = 90\text{dm}$

b)  $850\text{ cm} = 85\text{dm}$                       (g)  $9\text{dm} = 90\text{cm}$

c)  $5\text{m} = 50\text{dm}$ .                      (h)  $78\text{dm} = 780\text{cm}$

d)  $600\text{ cm} = 60\text{dm}$ .                      (i)  $450\text{ cm} = 45\text{dm}$

e)  $70\text{ dm} = 7\text{m}$ .                      (j)  $9\text{m} = 90\text{dm}$

3) Use  $<$ ,  $>$  or  $=$  to compare lengths

a)  $6\text{ m } 8\text{ dm } 5\text{cm} = 685\text{ cm}$

b)  $9\text{ m } 8\text{dm} = 980\text{cm}$

c)  $650\text{ cm} < 75\text{ dm}$

d)  $65\text{dm} > 75\text{cm}$

e)  $689\text{cm} < 7\text{m}$

f)  $9\text{m} > 678\text{cm}$

4) Arrange the length for objects from the shortest to the longest: 9 m, 75 dm, 8 m, 85 dm.

**75dm, 8m, 85dm, 9m**

5) Arrange the length for objects from the longest to the shortest: 756 cm, 87 dm, 967 cm, 68 dm.

**967cm, 87dm, 756cm, 68dm.**

## 6) Work out:

(a)  $6 \text{ m} + 9 \text{ dm} = 690\text{cm}$

(e)  $848 \text{ m} : 4 = 212\text{m}$

(b)  $500 \text{ cm} + 80\text{d m} = 13 \text{ m}$

(f)  $750 \text{ dm} : 5 = 15\text{m}$

(c)  $987 \text{ cm} - 9 \text{ m } 8\text{dm} = 7\text{cm}$

(g)  $90 \text{ cm} \times 5 = 45\text{dm}$

(d)  $9 \text{ m } 7 \text{ cm} - 9\text{m } 7\text{cm} = 0\text{dm}$

(h)  $72 \text{ cm} \times 4 = 288\text{cm}$

## 7) Word problems

- a) Gisa walks on foot to go to visit his friend. He covers a distance of 45m. Convert this distance in dm.

**In dm =  $45 \times 10 = 450\text{dm}$ .**

- b) Keza bought a long cloth of 79m. She sold 70 dm from it. How long is the remained cloth?

**She remained with  $79\text{m} - 70\text{dm} = 72\text{meters}$**

- c) Mucuruzi bought a cloth of 75m. He divided it in 5 equal parts. Find the length for each part.

**Each part =  $75\text{m} : 5 = 15\text{m}$**

- d) During the running race, the competitor Gwiza made 100m in 6 consecutive periods. Find the total length covered by Gwiza.

**Total length =  $100\text{m} \times 6 = 600\text{m}$**

# UNIT 6

## LITRE , THE STANDARD UNIT OF CAPACITY MEASUREMENTS

### 6.1 Key unit competence:

Comparing, adding, subtracting, multiplying and dividing capacity measurements expressed in liters (l) by whole numbers.

### 6.2 Prerequisite

Pupils will easily learn this unit, if they have a good background on the use of different containers of liquids in real life situations.

### 6.3 Cross-cutting issues to be addressed

- **Standardization Culture:** While measuring the capacity, pupils will discover how to verify the exact capacity of containers and will sensitize the population about the culture of measuring the capacity when buying and selling.
- **Financial Education:** when a child knows that the quantity of objects was measured, he/she will never misuse them but will maintain and protect that quantity.
- **Gender balance:** provide equal opportunity to boys and girls in the lesson
- **Inclusive education:** promote education for all learners in the teaching and learning activities.
- **Environment and sustainability:** This will be addressed when pupils will be maintaining hygiene for their classroom and for materials they used.
- **Peace and values education:** addressed when pupils are encouraged to work collaboratively and peacefully in their group.

### 6.4 Generic competences to be developed

**Cooperation:** developed when pupils work collaboratively in group to develop interpersonal relations and life skills;

**Communication:** developed when pupils discuss either in groups or in the whole class, present findings, debate etc.

**Creativity and innovation:** developed when pupils make number cards, apply skills in solving real life problems, etc.

**Problem solving:** when pupils use acquired skills to solve problems from their real life situation.

**Lifelong learning:** when the learner is engaged in activities showing her/him to have the need for more learning with a curiosity of applying the knowledge learnt in a range of situations.

## 6.5 List of lessons

No	Lessons	Number of periods
1	Measuring liquids using a litre.	1
2	Comparing capacity of liquid containers and capacity measurements of liquids	1
3	Addition of capacity measurements of liquids and solving related Word problems	1
4	Subtraction of capacity measurements of liquids and solving related Word problems	1
5	Multiplication of capacity measurements with a whole number and solving related Word problems.	1
6	Division of capacity measurements with a whole number and solving related Word problems.	
7	Importance of Capacity measurements	1
8	End unit assessment	
	Total	6

## 6.6 Guidance on lessons

### 6.6.1 Lesson 1: Measuring liquids with a liter as a measuring tool

#### a) Objectives

##### Knowledge:

Understanding the meaning of capacity of a liquid in a container.

##### Skills:

- Read and write the capacity measurements.
- Use appropriate instruments to measure the capacity of liquids in containers.

##### Values

- Measure quickly and accurately;
- Develop the culture of kindness when measuring the capacity of liquid container.
- Appreciate the importance of capacity measurements in real life.

## b) Prerequisites /Introduction

To perform well in this lesson, do the following:

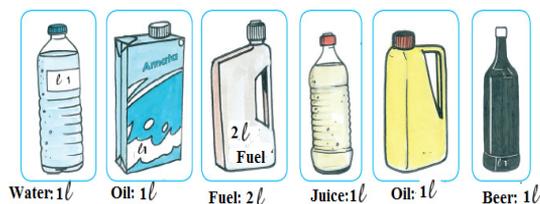
- Plan how to help pupils with different impairments;
- Guide pupils to: Work out different activities for using appropriate bottles to measure the capacity of liquid containers.

## c) Teaching resources and learning resources

- Different bottles to be used when measuring the capacity of liquids in containers;

## d) Teaching and learning activities:

- Invite pupils to observe learning materials and explain instructions on activities to be done (use activity 6.1) where they give different types of liquids that can be measured with a liter.



- Guide them to discover how to measure the capacity of a liquid container: use of a bottle called liter with a quantity known at international level.
- Guide pupils to measure the quantity of water that is equal to 1l and inform them that liter is a standard unit of capacity for liquids.
- Form groups of pupils and give them bottles and ask them to: measure the capacity of different liquids and record them on sheets of paper;
- Assign groups the activity 6.2.1, activity 6.2.2 and activity 6.2.3.
- Ask some groups to present the findings and guide the whole class to harmonize how to measure the capacity and how to read and write them correctly.

## Synthesis/summarization

Guide pupils to summarize how to measure the capacity of liquids, instruments to be used, and to highlight the standard unit of capacity: the liter (l).

## Assessment

Provide activities to pupils from the pupil's book.

## 6.6.2 Lesson 2: Comparing capacity measurements of liquids

### a) Objectives

#### Knowledge:

Understand how to compare capacity measurements and to compare volumes of liquids expressed in liters.

#### Skills:

Measure and compare capacity measurements.

#### Values

- Measure quickly and accurately;
- Develop the culture of kindness when measuring the capacity of different liquid containers.
  
- Appreciate the importance of capacity measurements in real life.

### b) Prerequisites /Introduction

To perform well in this lesson, do the following:

- Plan how to help pupils with different impairments;
- Organize learning materials to be used by pupils
- Guide pupils to: work out different activities for comparing the capacity of different liquid containers.

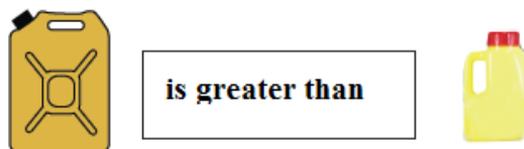
### c) Teaching resources and learning resources

- Different bottles containing liquids whose capacity is labeled:



### d) Teaching and learning activities:

- Show pupils objects of different volume and ask them to compare their capacity before measuring (refer to activity 6.3.1);



- Invite one pupil in front of others and guide him/her to discover the capacity of liquid which is labeled on the container, write it on the black board and other pupils will be asked to compare them using greater, less or equal quantities;

- Let them use comparison symbols (<, > or =) to compare the quantities of liquids observed (activity 6.3.2) ;
- Organize groups of pupils and give them activities to do to arrange capacities in ascending order or in descending order (for example activity 6.3.3, and activity 6.3.4) ;
- - Move around in the classroom and provide probing questions for assistance where necessary;
- - Invite some groups to present and guide the whole class to harmonize on how to compare capacity of liquid containers and how to arrange them in ascending or descending order.

### **Synthesis/summarization**

- Guide pupils to summarize how to compare capacity of liquid containers and how to arrange them in ascending or descending order.

### **Assessment**

- Provide activities to be done by pupils and check their answers;
- Assign all pupils a homework to do.

Extra exercises and their answers:

#### **e) Use >, < and = to compare**

$$25l < 48l$$

$$29l > 25l$$

$$37l < 69l$$

$$87l < 96l$$

$$13l = 13l$$

$$92l > 75l$$

Arrange from smallest to highest amount.

1) 118l, 47l, 111l, 43l.

**Answer:** 43l, 47l, 111l, 118l

2) 39l, 24l, 57l, 66l

**Answer:** 24l, 39l, 57l, 66l,

3) 39l, 67l, 62l, 54l

**Answer:** 39l, 54l, 62l, 67l

4) 75l, 81l, 119l, 98l.

**Answer:** 75l, 81l, 98l, 119l.

#### **e) Arrange from the highest amount to the lowest.**

1) 51l, 87l, 38l, 92l

**Answer:** 92l, 87l, 51l, 38l.

2) 82l, 56l, 89l, 23l

**Answer:** 89l, 82l, 56l, 23l.

3) 93l,75l,101l,84l

**Answer:**101l,93l,84l,75l

4) 84l, 48l,93l,81l.

**Answer:**93l,84l,81l,48l.

### **6.6.3 Lesson 3: Addition of capacities expressed in litres**

#### **a) Objectives**

##### **Knowledge:**

Understand the meaning of the sum of capacity measurements.

##### **Skills:**

- Demonstrate addition of capacity measurements using number sentences in the conventional manner.

##### **Values**

- Measure quickly and accurately;
- Develop the culture of kindness when measuring the capacity of different liquid containers.
- Appreciate the importance of capacity measurements in real life.

#### **b) Prerequisites /Introduction**

To perform well in this lesson, do the following:

- Plan how to help pupils with different impairments;
- Organize learning materials to be used by pupils
- Guide pupils to:
  - Work out different activities for adding the capacity of different liquid containers.
  - Estimate the capacity of familiar containers by comparing them and guessing which one is 'heavier' or 'lighter.'

#### **c) Teaching resources and learning resources**

- Different bottles to be used when measuring the capacity of liquids in containers;

#### **d) Teaching and learning activities:**

- Guide pupils to discover that quantity of the same liquids can be poured in the same container, when the capacity for every quantity is known, the capacity for the sum can be calculated (use question one for activity 6.4.1)
- Guide pupils to notice how capacity measurements are added using the standard written method:

Example:  $172\text{ l} + 124\text{ l} =$

$172\text{ l} + 124\text{ l} =$	$+ \begin{array}{r} 172\text{ l} \\ 124\text{ l} \\ \hline 296\text{ l} \end{array}$	$+ \begin{array}{r} 1 \\ 152\text{ l} \\ + 38\text{ l} \\ \hline 190 \end{array}$	$+ \begin{array}{r} 11 \\ 172\text{ l} \\ + 38\text{ l} \\ \hline 210\text{ l} \end{array}$
$152\text{ l} + 38\text{ l} =$			
$172\text{ l} + 38\text{ l} =$			

- Organize groups of pupils and give them activities to do (for example question two for Activity 6.4.1);
- Move around in the classroom and provide probing questions for assistance where necessary;
- Invite some groups to present and guide the whole class to harmonize on how to add capacity measurements;
- After this session, assign each group the activity 6.5 to solve word problems involving the sum of capacity measurements.

**e) Synthesis/summarization**

- Guide pupils to summarize how to add capacity measurements using standard written method.

**f) Assessment**

- Provide activities to be done by pupils and check their answers.
- Assign homework to be done by all pupils.

**Note:**

Concerning **the lesson on word problems involving addition of capacity measurements**, the teacher will help pupils to solve a one –step: Start by guiding pupils to solve some problems in groups or in a whole class discussion, provide problems to be solved into groups or in pairs and then give problems to be solved individually (**use activity 6.5**).

**6.6.4 Lesson 4: subtraction or difference of capacities in litres**

**a) Objectives**

**Knowledge:**

Understand the meaning of the difference of **capacity** measurements.

**Skills:**

- Demonstrate subtraction of capacity using number sentences in the conventional manner.

**Values**

- Measure quickly and accurately;
- Develop the culture of kindness when measuring the **capacity** of different liquids.
- Appreciate the importance of capacity measurements in real life.

## b) Prerequisites /Introduction

To perform well in this lesson, do the following:

- Plan how to help pupils with different impairments;
- Organize learning materials to be used by pupils
- Guide pupils to: work out different activities for subtracting the capacity of different liquids.

## c) Teaching resources and learning resources

- Different bottles to be used when measuring the capacity of liquids in containers;

## d) Teaching and learning activities:

- Guide pupils to discover that some quantity of a liquid can be poured from the container to another, when the capacity for the previous quantity is known, the capacity for the remained quantity can be calculated (use question one for **activity 6.6**)
- Guide pupils to notice how to subtract capacity measurements using the standard written method:

<b>Example:</b>			
$723\text{ l} - 312\text{ l} = 411\text{ l}$	$723\text{ l}$	$- 312\text{ l}$	$423\text{ l}$
$423\text{ l} - 309\text{ l} = 114\text{ l}$	$411\text{ l}$	$- 309\text{ l}$	$114\text{ l}$

- Organize groups of pupils and give them activities to do (for example question two for **Activity 6.6**);
- Move around in the classroom and provide probing questions for assistance where necessary;
- Invite some groups to present and guide the whole class to harmonize on how to subtract capacity measurements;
- After this session, assign each group the **activity 6.7** to solve word problems involving the subtraction of capacity measurements.

## Synthesis/summarization

- Guide pupils to summarize how to add capacity measurements using standard written method.

## Assessment

- Provide activities to be done by pupils and check their answers.
- Assign homework to be done by all pupils.

## Note:

Concerning **the lesson on word problems involving addition of capacity measurements**, the teacher will help pupils to solve a one –step:

Start by guiding pupils to solve some problems in groups or in a whole class discussion, provide problems to be solved into groups or in pairs and then give problems to be solved individually (**use activity 6.7**).

### **6.6.5 Lesson 5: Multiplication of units of capacity per a whole number**

#### **a) Objectives**

##### **Knowledge:**

Understand the meaning of the multiplication of capacity **measurements by a one digit number**

##### **Skills:**

- Demonstrate the multiplication of a capacity **measurement** by a whole number as a repeated addition;
- find the product of capacity **measurements by a one digit number** using a standard written method.

##### **Values**

- Develop the capacity of quick critical thinking to find the product of capacity measurement by a whole number.
- Develop the culture of kindness when measuring the capacity of different liquids.
- Appreciate the importance of capacity measurements in real life.

#### **b) Prerequisites /Introduction**

To perform well in this lesson, do the following:

- Plan how to help pupils with different impairments;
- Guide pupils to:
  - Multiply a 2 digit number by one digit number;
  - Use concrete objects such as 3 bottles of water with the same quantity in liters for example 1 liter and show that the multiplication of 1 l by 3 is the total capacity of water from 3 bottles of the same capacity already put together.

#### **c) Teaching resources and learning resources**

- Bottles of the same capacity to be used when measuring the capacity of liquids in containers;

#### **d) Teaching and learning activities:**

- Invite one pupil in front of others and guide him/her on how to demonstrate the multiplication of capacity measurement by a number using concrete materials: two bottles of water where each one measures 1 liter;

- Ask other pupils to say the total capacity for them when they are put together in the same container, then they will see that it is equal two 1 l x 2 = 2 l.
- Guide pupils to highlight how to multiply (see activity 6.8):

**Example:**

$$72 \text{ l} \times 4 = 288 \text{ l}$$

$$\begin{array}{r} 72 \text{ l} \\ \times 4 \\ \hline 288 \text{ l} \end{array}$$

- Organize groups of pupils and give them activities to do (for example Activity 6.8);
- Move around in the classroom and provide probing questions for assistance where necessary;
- Invite some groups to present and guide the whole class to harmonize on how to find a product of capacity measurement by a number.

### Synthesis/summarization

Guide pupils to summarize how to find a product of capacity measurement by a number: multiply the value by the given number and copy the unit liter.

### Assessment

- Provide activities to be done by pupils and check their answers.
- Assign homework to all pupils.

### Note

Concerning **the lesson on word problems involving multiplication of capacity measurements by a number**, the teacher will help pupils to solve a one –step:

Start by guiding pupils to solve some problems in groups or in a whole class discussion, provide problems to be solved into groups or in pairs and then give problems to be solved individually (**Use activity 6.9**).

## 6.6.6 Lesson 6: Division of capacity measurements by a whole number

### a) Prerequisites /Introduction

To perform well in this lesson, do the following:

- Plan how to help pupils with different impairments;
- Guide pupils to:
  - Divide a 2 digit number by one digit number;
  - Use a concrete object such as a small jerry can containing 5 liters of water to be shared equally in 5 small bottles and then measure the capacity for one small bottle.

## b) Teaching resources and learning resources

Different bottles to be used when measuring the capacity of liquids in containers.

## c) Teaching and learning activities:

- Guide pupils to demonstrate the distribution of a capacity measurement in a given number of quantities: bottle containing 10 liters of water to be shared equally among 2 small jerrycans and measure the quantity for one jerrycan;



- Ask other pupils to say the capacity for water in one jerrycan: they will see that it is equal to 10 liters:  $2 \times 5$  liters; (use activity 6.10)
- Show them how to divide using a standard written method:

Example:

$$255 \text{ l} \div 5 = 51 \text{ l}$$

255 l	5
- 25	
005	51 l
- 5	
0	

- Organize groups of pupils and give them activities to do (Activity 6.10);
- Move around in the classroom and provide probing questions for assistance where necessary;
- Invite some groups to present and guide the whole class to harmonize on how to divide a capacity measurement by a whole number.

## d) Synthesis/summarization

Guide pupils to summarize how to divide a capacity measurement by a whole number: **divide** the obtained value by the given number and add that unit of measurement (*l*).

## e) Assessment

- Provide activities to be done by pupils and check their answers.
- Assign homework to all pupils.

## Note

Concerning **the lesson on word problems involving the division of capacity measurements by a whole number**, the teacher will help pupils to solve a one-step:

Start by guiding pupils to solve some problems in groups or in a whole class discussion, provide problems to be solved into groups or in pairs and then give problems to be solved individually (**activity 6.10**).

### 6.6.7 Lesson 7: Importance of capacity measurements

Refer to activity 6.12.1, activity 6.12.2 and activity 6.12.3 and organise a group work activity to discuss the importance of units of capacity measurements. Invite groups to discuss their findings in a whole class discussion and guide them to conclude.

More notes the teacher should consider:

- Monitor all activities closely and catering for all learners without leaving any one behind.
- Explain deeply how to measure capacity of different liquids using a container in liters.
- Prepare a field trip to visit people who use a liter as a standard unit to measure capacity and different containers used to carry liquids in daily-life for example those selling milk, oil etc.
- Monitor group activities where learners are discussing the importance of using liter as a standard unit for measuring capacity of liquids in daily life.

#### Additional activities

a) Do the following:

$$47l + 143l = 190l$$

$$34l + 53l = 87l$$

$$12l + 82l = 94l$$

$$55l + 44l = 99l$$

$$57l + 53l = 110l$$

$$95l : 5 = 19l$$

$$47l \times 2 = 94l$$

$$119l - 110l = 9l$$

$$208l - 192l = 16l$$

$$86l \times 5 = 172l$$

$$955l : 5 = 191l$$

$$34l \times 5 = 170l$$

- b) Give two people who often apply the use of a liter as a standard unit of capacity measurement of liquids. Farmers and businessmen.
- c) How important is learning measurement of capacity of liquids.

**Applied in the buying and selling of fluids like water, milk, petrol and other fluids.**

- d) Uwamahoro bought 8 liters of milk and her mother bought 9 litres. How many liters do they have altogether?

**Both have 8litres + 9litres = 17liters.**

- e) Butera fetched a full tank of 1000litres. They used 500liters of water to wash clothes. How many liters remained?

**The amount of water that remained =  $1000l - 500l = 500l$**

- f) Keza has  $600l$  of Banana juice. Kaneza has  $300l$  of banana juice.  
What is the total number of liters do both have?

**Total liters =  $600l + 300l = 900l$**

## 6.7 Answers to the end unit assessment 6

### 1) Comment by Yes or No

- a) Liter is the standard unit of measuring the capacity of liquids.

**Yes**

- b) We use the liter to measure the length of a field.

**No**

- c) Liter is used to measure the quantity of liquids such as water.

**Yes**

### 2) Use $<$ , $>$ or $=$ to compare

- a)  $586l < 856l$  (c)  $287l = 287l$

- b)  $549l > 478l$  (d)  $918l > 908l$

### 3) Arrange the capacity measurements for objects from the smallest to the biggest.

$785l, 758l, 857l, 875l, 578l, 587l$ .

Answer:  $578l, 587l, 758l, 785l, 857l, 875l$

### 4) Arrange the capacity measurements for objects from the biggest to the smallest.

$908l, 890l, 980l, 809l$

**$809l, 890l, 908l, 980l$**

### 5) Find the answer

- (a)  $548l + 387l = 935l$

- (c)  $978l - 789l = 189l$

- (b)  $81l \times 5 = 405l$

- (d)  $720l : 4 = 180l$

### 6) Problems

- a) There are  $975l$  of water in a tank. If I use  $789l$  to wash clothes, how much water remained in the tank?

**The water that remained in the tank =  $975l - 789l = 421l$**

- (b) Kirabo has  $20l$  of petrol. She wants to keep them in the small jerricans with the capacity of  $5l$ . How many jerricans will she use?

**She will use  $20l : 5l = 4$  jerricans.**



c) Our tank of water is filled by 6 drums. How much water can fill the tank if each drum has 91l?

**The amount of water that can fill the tank =  $91\text{l} \times 6 = 546\text{l}$  of water.**

# UNIT 7

## KILOGRAM (kg) AS A STANDARD UNIT OF MASS

### 7.1 Key unit competence:

Weighing, comparing, adding and subtracting weights of various objects up to 10kg.

### 7.2 Prerequisite

Pupils will easily learn this unit, if they have a good background on the comparison of weights of objects to say which is lighter or heavier.

### 7.3 Cross-cutting issues to be addressed

- **Standardization Culture:** While measuring masses, pupils will discover how to verify the exact mass of objects and will sensitize the population about the culture of measuring the weight of goods when buying and selling.
- **Financial Education:** when the pupil knows that the quantity of objects was weighted, he/she will never waste them but will maintain and protect that quantity.
- **Gender balance:** provide equal opportunity to boys and girls in the lesson
- **Inclusive education:** promote education for all learners in the teaching and learning activities.
- **Environment and sustainability:** This will be addressed when pupils will be maintaining hygiene for their classroom and for materials they used.
- **Peace and values education:** addressed when pupils are encouraged to work collaboratively and peacefully in their group.

### 7.4 Generic competences to be developed

**Cooperation:** developed when pupils work collaboratively in group to develop interpersonal relations and life skills;

**Communication:** developed when pupils discuss either in groups or in the whole class, present findings, debate etc.

**Creativity and innovation:** developed when pupils make number cards, apply skills in solving real life problems, etc.

**Problem solving:** when pupils use acquired skills to solve problems from their real life situation.

**Lifelong learning:** when the learner is engaged in activities showing her/him to have the need for more learning with a curiosity of applying the knowledge learnt in a range of situations.

### 7.5. List of lessons of unit 7

No	Lessons	Number of periods
1	Kilogram as a standard unit of mass	1
2	Measuring mass using different types of balances.	1
3	Importance of kg as mass measurement	1
4	Comparing and arranging masses of objects.	2
5	Addition of mass measurements and related word problems	2
6	Subtraction of units of mass and related word problems	2
7	Multiplication of mass measurements with a whole number and related word problems	1
8	Division of mass measurements with a whole number and related word problems	1
9	End unit assessment	1
	<b>Total</b>	12

### 7.6 Guidance on lessons

#### 7.6.1 Lesson 1: Kilogram as a standard unit of mass

##### a) Prerequisites /Introduction

To perform well in this lesson, do the following:

- Plan how to help pupils with different impairments;
- Guide pupils to work out different activities for comparing the lightness or the heaviness of objects.

##### b) Teaching resources and learning resources

- Different types of balances of measuring the mass: spring, digital balance, top beam balance, double beam balance,
- Different objects whose mass is labeled on them.

##### c) Teaching and learning activities:

- Invite pupils to observe learning materials and explain instructions on activities to be done (use activity 7.1):



- Ask pupils to lift two objects in different hands and say which is lighter or heavier.
- Guide them to discover how to measure the mass of an object and materials to be used: use a top beam balance and tell them that they are measuring the mass expressed in kilogram (kg), pupils will measure and verify whether the labeled mass is the one shown by the balance.



- Form groups of pupils and give them balances and ask them to: measure the mass of different objects and record them on sheets of paper;
- Assign groups activity 7.3.1, activity 7.3.2 and activity 7.3.4 for discussion;
- Ask some groups to present the findings and guide the whole class to harmonize how to measure the mass and how to read and write them correctly.

### **Synthesis/summarization**

Guide pupils to summarize how to measure the mass and how to read and write them correctly and let them highlight that the standard unit of mass is Kilogram (kg).

### **Assessment**

Provide activities to pupils from the pupil's book(activity 7.3.4).

## **7.6.2 Lesson 2: Measuring masses of objects in Kg and types of balances**

### **a) Prerequisites /Introduction**

To perform well in this lesson, do the following:

- Plan how to help pupils with different impairments;
- Guide pupils to work out different activities for identifying the mass (weight) of objects when they are labeled.

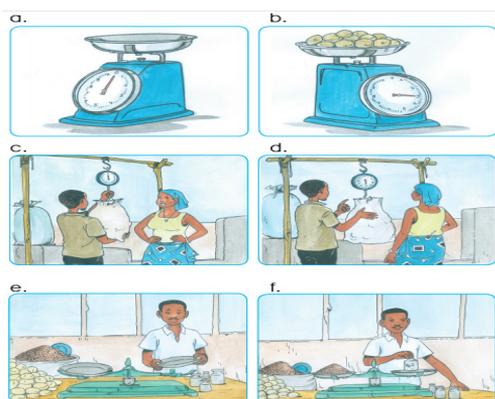
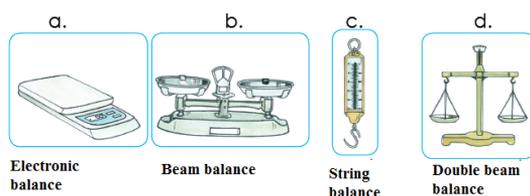
### b) Teaching resources and learning resources

- Different types of balances of measuring the mass: spring, digital balance, top beam balance, double beam balance,
- Different objects whose mass is labeled on them.

**Note:** be sure that objects to be measured have the exact mass in kg and that the balance is well set.

### c) Teaching and learning activities:

- Invite pupils to observe balances and explain instructions on activities to be done (use activity 7.2);
- Guide them to discover how to measure the mass of an object and materials to be used;
- Show them different types of balance and discuss how they are used (activity 7.3.3)



- Form groups of pupils and give them a single top beam balance or a double beam balances and ask them to: measure the mass of different objects and record them on sheets of paper;
- Ask some groups to present the findings and guide the whole class to harmonize how to measure the mass and how to read and write them correctly.

## **Synthesis/summarization**

Guide pupils to summarize how to measure the mass and different types of balances commonly used in the market and in the society.

### **Assessment**

Provide activities to be done by pupils by weighing different masses in kg.

After this lesson, organize a group discussion to discuss how balances are set, how they are used, the correct weight and non correct weight (weighted on fake balances which do not meet standards).

## **7.6.3 Lesson 3: Comparing and arranging masses (weights) of objects**

### **a) Prerequisites /Introduction**

To perform well in this lesson, do the following:

- Plan how to help pupils with different impairments;
- Organize learning materials to be used by pupils;
- Guide pupils to work out different activities for comparing the mass of different objects.

### **b) Teaching and learning resources**

- Different types of balances of measuring the mass: spring, digital balance, top beam balance, double beam balance, etc.

### **c) Teaching and learning activities:**

- Show pupils objects of different weights and ask them to compare their masses by lifting them before measuring where they say the lightest and the heaviest;
- Invite one pupil in front of others and guide him/her on how to measure and record mass of objects using a balance and then compare the obtained measurements using  $<$ ,  $>$  or  $=$  ;
- Organize groups of pupils and give them activities to do (for example Activity 7.5.1, activity 7.5.2 and activity 7.5.3);
- Move around in the classroom and provide probing questions for assistance where necessary;
- Invite some groups to present and guide the whole class to harmonize on how to compare weights of objects.
- After this session, assign groups to do activity 7.5.4 and 7.5.5 to arrange weights (masses) in ascending or descending order.

## **Synthesis/summarization**

- Guide pupils to summarize how to compare weights of objects, and how to arrange them in a given order.

## Assessment

- Provide activities to be done by pupils and check their answers;
- Assign all pupils a homework to do.

### d) Extra exercises and their answers:

#### 1) Use $>$ , $<$ and $=$ to compare.

125kg $<$ 848kg	929kg $>$ 725kg
437kg $<$ 569kg	487kg $<$ 496kg
913kg $>$ 183kg	592kg $<$ 875kg

#### 2) Arrange from lightest to heaviest.

218kg, 547kg, 91kg, 543kg

**Answer:** 91kg, 218kg, 543kg, 547kg.

339kg, 624kg, 257kg, 666kg

**Answer:** 257kg, 339kg, 624kg, 666kg.

496kg, 767kg, 362kg, 754kg

**Answer:** 362kg, 496kg, 754kg, 767kg.

475kg, 881kg, 419kg, 898kg

**Answer:** 419kg, 475kg, 881kg, 898kg.

#### 3) Arrange from the highest amount to the lowest.

1) 251kg 687kg 238 kg 692 kg

**Answer:** 692kg 687 kg 251kg 238kg

2) 382kg 756kg 389kg 723kg

**Answer:** 756kg 723kg 389kg 382 kg

3) 493kg 875kg 411kg 884kg.

**Answer:** 884kg 875kg 493kg 411kg

4) 584kg 948kg 593kg 981kg

**Answer:** 981kg 948kg 593 kg 584kg.

## 7.6.4 Lesson 4: Addition of masses in kilogram and related word problems

### a) Prerequisites /Introduction

To perform well in this lesson, do the following:

- Plan how to help pupils with different impairments;
- Organize learning materials to be used by pupils
- Guide pupils to:
- Work out different activities for: measure the mass for two different objects, putting them together and estimating their weights in kg.

## b) Teaching and learning resources

- Balances of measuring the mass;
- Objects of different weights to be measured.

## c) Teaching and learning activities:

- Invite one pupil in front of others and guide him/her on how to demonstrate the addition of mass measurements starting by using a balance followed to measure the weights for each object and then add them using standard written method;

Example:  $205 \text{ kg} + 414 \text{ kg} =$

$$205 \text{ kg} + 414 \text{ kg} = 619 \text{ kg}$$

$205 \text{ kg}$
$+ 414 \text{ kg}$
$619 \text{ kg}$

- Organize groups of pupils and give them activities to do (for example Activity 7.6);
- Move around in the classroom and provide probing questions for assistance where necessary;
- Invite some groups to present and guide the whole class to harmonize on how to add mass measurements;

## Synthesis/summarization

- Guide pupils to summarize how to add mass measurements: **add them using standard written method.**

## Assessment

- Provide activities to be done by pupils and check their answers.
- Assign homework to be done by all pupils.

## Note:

Concerning **the lesson on word problems involving addition of length measurements**, the teacher will help pupils to solve a one-step:

Start by guiding pupils to solve some problems in groups or in a whole class discussion, provide problems to be solved into groups or in pairs and then give problems to be solved individually (**Activity 7.7**).

## d) Extra exercises and their answers

Work out the following:

- 1)  $247 \text{ kg} + 443 \text{ kg} = 690 \text{ kg}$
- 2)  $534 \text{ kg} + 353 \text{ kg} = 887 \text{ kg}$
- 3)  $112 \text{ kg} + 882 = \text{kg } 994$
- 4)  $255 \text{ kg} + 144 \text{ kg} = 399 \text{ kg}$
- 5)  $157 \text{ kg} + 143 \text{ kg} = 300 \text{ kg}$

- 6) Work out the word problem
- a) Give 3 things with which they apply the use of a kilogram as a standard unit of measurement of their mass.  
Food, medicine, books etc.

b) How important is learning measurement of mass.

Applied in the buying and selling as we get to know the amount of items by weight that we have bought or sold.

Applied in knowing our body weight and decide whether to follow a plan to cut or gain more weight.

- c) Kalisa bought 18kg of sugar and her mother bought 12kg. How many kg do they have altogether?

Both have  $18\text{kg} + 12\text{kg} = 30\text{kg}$

- d) Kaneza has 600kg of rice. Kamana has 250kg. What is the total number of kg of rice do both have?

Total kilograms of Rice =  $600\text{kg} + 250\text{kg} = 850\text{kg}$ .

### 7.6.5 Lesson 5: subtraction of masses in kilogram and related word problems

#### a) Prerequisites /Introduction

To perform well in this lesson, do the following:

- Plan how to help pupils with different impairments;
- Organize learning materials to be used by pupils.
- Guide pupils to work out different activities for subtracting the **mass** of different objects.

#### b) Teaching resources and learning resources

- Different instruments of measuring the **mass**;
- - Objects of different **mass or weights** to be measured;
- Handouts with questions

#### c) Teaching and learning activities:

- Invite one pupil in front of others and guide him/her on how to demonstrate subtraction of **mass** measurements starting by using a balance to measure objects and remove some of them from the balance and see the mass of remaining objects,
- Guide pupils to realize that they could do it using standard written method;

**Example:**  $475 \text{ kg} - 364 \text{ kg} =$

$$475 \text{ kg} - 364 \text{ kg} = \boxed{111 \text{ kg}}$$

$$\begin{array}{r} 475 \text{ kg} \\ - 364 \text{ kg} \\ \hline 111 \text{ kg} \end{array}$$

- Organize groups of pupils and give them activities to do (for example Activity 7.8);
- Move around in the classroom and provide probing questions for assistance where necessary;
- Invite some groups to present and guide the whole class to harmonize on how to carry out the subtraction involving mass measurements.

### Synthesis/summarization

- Guide pupils to summarize how to subtract **mass** measurements: **use a standard written method to subtract values and copy the unit kg.**

### Note:

Concerning **the lesson on word problems involving subtraction mass measurements**, the teacher will help pupils to solve a one –step problem: Start by guiding pupils to solve some problems in groups or in a whole class discussion, provide problems to be solved into groups or in pairs and then give problems to be solved individually (**use activity 7.9**).

### Assessment

- Provide activities to be done by pupils and check their answers.
- Assign homework to be done by all pupils.

## 7.6.5 Lesson 5: Multiplication of mass measurements by a whole number and related word problems

### a) Prerequisites /Introduction

To perform well in this lesson, do the following:

- Plan how to help pupils with different impairments;
- Guide pupils to:
  - Multiply a 2 digit number by one digit number;
  - Use concrete objects such as stones with the same **mass** for example 1kg each and show that the multiplication of 1kg by 3 is the mass of 3 stones of the same mass when they are put together.

### b) Teaching resources and learning resources

- Different balances of measuring the **mass**;
- Objects of the same **mass or weights** to be measured;

### c) Teaching and learning activities:

- Invite one pupil in front of others and guide him/her on how to demonstrate the multiplication of mass measurement by a number using concrete materials: two stones where each one measures 1kg;
- Ask other pupils to say the total mass for them when they are put together on the same balance, then they will see that it is equal two  $1\text{kg} \times 2 = 2\text{kg}$ . show them how to multiply using the standard written method:

Example:  $82\text{ kg} \times 4 =$

$$82\text{ kg} \times 4 = 328\text{ kg}$$

$$\begin{array}{r} 82\text{ kg} \\ \times 4\text{ kg} \\ \hline 328\text{ kg} \end{array}$$

- Organize groups of pupils and give them activities to do (for example **Activity 7.10**);
- Move around in the classroom and provide probing questions for assistance where necessary;
- Invite some groups to present and guide the whole class to harmonize on how to find a product of mass measurement by a number.

### Synthesis/summarization

Guide pupils to summarize how to find a product of mass measurement by a number: **multiply the value by the given number and copy the unit kg.**

### Note:

Concerning **the lesson on word problems involving the multiplication of mass measurements** by a number, the teacher will help pupils to solve a one –step problem:

Start by guiding pupils to solve some problems in groups or in a whole class discussion, provide problems to be solved into groups or in pairs and then give problems to be solved individually (**use activity 7.11**).

### Assessment

- Provide activities to be done by pupils and check their answers.
- Assign homework to all pupils.

## 7.6.6 Lesson 6: Division of mass measurements by a whole number

### a) Prerequisites /Introduction

To perform well in this lesson, do the following:

- Plan how to help pupils with different impairments;
- Guide pupils to:

- Divide a 2 digit number by one digit number;
- Use a concrete object such as a bottle containing 5kg of water to be shared equally in 5 small bottles and then measure the mass for each small bottle.

**b) Teaching resources and learning resources**

- Different balances of measuring the **mass**;
- Objects of different **mass or weights** to be measured and compared;

**c) Teaching and learning activities:**

- Invite some pupils in front of others and guide them on how to demonstrate the division a mass measurement in a given number of quantities: bottle containing 5kg of water to be shared equally in 5 small bottles and measure the quantity for one bottle;
- Ask other pupils to say the mass for each quantity: they will see that it is equal to 5kg:  $5=1\text{kg}$ ; show them how to divide using the standard written method:

Example: 75 kg : 3 =	$\begin{array}{r} 75 \text{ kg} \quad 3 \\ - 6 \downarrow \\ \hline 15 \\ - 15 \\ \hline 00 \end{array}$
$75 \text{ kg} : 3 = 25 \text{ kg}$	$\begin{array}{r} 75 \text{ kg} \quad 3 \\ - 6 \downarrow \\ \hline 15 \\ - 15 \\ \hline 00 \end{array}$

- Organize groups of pupils and give them activities to do (for example **Activity 7.12**);
- Move around in the classroom and provide probing questions for assistance where necessary;
- Invite some groups to present and guide the whole class to harmonize on how to divide a weight by a whole number;

**Synthesis/summarization**

Guide pupils to summarize how to divide a mass by a whole number: **divide** the value by the given number and copy the unit kg.

**Note**

Concerning **the lesson on word problems involving the division of mass measurements by a whole number**, the teacher will help pupils to solve a one –step:

Start by guiding pupils to solve some problems in groups or in a whole class discussion, provide problems to be solved into groups or in pairs and then give problems to be solved individually (**activity 7.13**).

**Assessment**

- Provide activities to be done by pupils and check their answers.
- Assign homework to all pupils.

## 7.7 Answers for the end unit assessment 7

1) Comment by Yes or No

a) Kg is the standard unit of mass measurements;

**Yes**

b) Kg is used to measure the capacity of liquids.

**No**

c) Use the liter when you want to measure the mass for objects.

**No**

2) Give 3 types of balances.

**Answer:** Beam balance, Electronic balance, String balance.

3) Use  $<$ ,  $>$  or  $=$  to compare masses

a)  $721\text{Kg} > 271\text{kg}$

b)  $657\text{ kg} < 756\text{kg}$

c)  $74\text{Kg} = 74\text{kg}$

d)  $67\text{Kg} < 76\text{kg}$

e)  $582\text{Kg} > 532\text{ kg}$

f)  $659\text{Kg} > 559\text{kg}$

4) Arrange the mass measurements from the lightest to the heaviest 478 Kg, 874 kg, 487 kg, 784 kg, 847 kg, 748 kg.

**Answer: 478 Kg, 487 kg, 748 kg, 784 kg, 847 kg, 874 kg.**

5) Arrange the mass measurements from the heaviest to the lightest 836 Kg, 368 kg, 638 kg, 863 kg, 386 kg, 683 kg.

**Answer : 863 kg, 836 Kg, 683 kg, 638 kg, 386 kg, 368 kg.**

6) Find the answer

a)  $645\text{ Kg} + 294\text{ kg} = 939\text{kg}$

b)  $809\text{ Kg} + 178\text{ kg} = 987\text{kg}$

c)  $738\text{ Kg} - 598\text{ kg} = 140\text{kg}$

d)  $696\text{ Kg} - 467\text{ kg} = 229\text{kg}$

e)  $995\text{ Kg} : 5 = 199\text{kg}$

f)  $960\text{ Kg} : 6 = 160\text{kg}$

g)  $92\text{ Kg} \times 4 = 368\text{kg}$

h)  $72\text{ Kg} \times 3 = 216\text{kg}$

7) Solve word problems

a) Abatoni bought 6 sacks of cement. If one sack weighs 50kg, Find the number of kg she bought.

**The number of kg of cement =  $50 \times 6 = 300\text{kg}$**

- b) During the beginning of season B of Agriculture, Rwema shared 85kg equally to his 5 children. Find the quantity for each child.

**Each child got  $85:5=17\text{kg}$**

- c) In the first season of agriculture we got a harvest of 356 kg of rice. In the second season we got 278 kg and we got 319 kg in the third season. Find the total harvest we got in these three seasons.

**Total harvest =  $356\text{ kg} + 278\text{ kg} + 319\text{ kg} = 953\text{kg}$**

- d) The store of our school had 895kg of beans. If the school used 547 kg of beans for students' meal, find the quantity of beans which remained in the store.

**In the store remained  $895\text{kg} - 547\text{kg} = 348\text{kg}$**

- e) Last year I got 215kg of rice as a harvest. In this year I got 185 kg of rice. What was the harvest for two years.

**Total harvest =  $215\text{kg} + 185\text{kg} = 400\text{kg}$**

- f) Share 472 kg of sugar equally to 4 families; How much sugar will each family get?

**Each family will get  $472\text{kg}:4= 118\text{kg}$**

- g) Kamana weighs 45kg. His sister weighs 55kg. Find the total weight for Kamana and his sister.

**Both weigh  $45\text{kg} + 55\text{kg} = 100\text{kg}$ .**

# UNIT 8

## RWANDAN CURRENCY FROM 1FRW UP TO 1000 FRW

### 8.1 Key unit competence

Counting and exchanging Rwandan currency up to 1000Frw.

### 8.2 Prerequisite

Pupils will easily learn this unit, if they have a good background on counting and exchanging money up to 100Frwlearnt in P1. Represent the value of money in coins and notes.

### 8.3 Cross-cutting issues to be addressed

- **Standardization Culture:** While using correctly Rwandan currency respecting the value of money and well maintaining the status of Rwandan francs.
- **Financial Education:** when a child knows the value of money, he/ she will never misuse it but will save and protect it .
- **Gender balance:** provide equal opportunity to boys and girls in the lesson
- **Inclusive education:** promote education for all learners in the teaching and learning activities.
- **Peace and values education:** addressed when pupils are encouraged to work collaboratively and peacefully in their group.

### 8.4 Generic competences to be developed

**Cooperation:** developed when pupils work collaboratively in group to develop interpersonal relations and life skills;

**Communication:** developed when pupils discuss either in groups or in the whole class, present findings, debate etc.

**Creativity and innovation:** developed when pupils make a combination of notes ad coins to totalise a given amount of money, etc.

**Problem solving:** when pupils use acquired skills to solve problems from their real life situation.

**Lifelong learning:** when the learner is engaged in activities showing her/him to have the need for more learning with a curiosity of applying the knowledge learnt in a range of situations related to the selling and buying.

## 8.5. List of lessons in Unit 8

No	Title of the lessons	Number of periods
1	Features of Rwandan currency from 1Frw to 1000Frw.	1
2	Uses of money.	1
3	Source of money.	
4	Buying and selling goods.	1
5	Exchange of Rwandan currency from 1Frw to 1000Frw.	1
6	Listing down items before buying them.	1
7	Good use and management of money.	
8	The culture of saving.	1
9	Preparing small income generating projects.	
10	Comparing Rwandan currency that does not exceed 1000Frw.	1
11	Addition and subtraction of Rwandan currency that does not exceed 1000Frw.	1
12	Multiplication and division of Rwandan currency that does not exceed 1000Frw.	1
13	Word problems involving addition and subtraction of Rwandan currency that does not exceed 1000Frw.	1
14	Word problems involving multiplication and division of Rwandan currency that does not exceed 1000Frw.	1
15	End unit assessment	1
	Total	12

## 8.6 Guidance on different lessons

### 8.6 .1 Lesson1: Features of Rwandan currency from 1Frw to 1000Frw

#### a) Learning objectives:

##### Knowledge:

Identifying and writing the value of Rwandan currency from 1Frw to 1000Frw.

Tell the value of Rwandan currency from 1Frw up to 1000Frw.

**Skills:**

Counting Rwandan currency from 1Frw up to 1000Frw correctly.

Using properly Rwandan currency from 1Frw up to 1000Frw in buying and selling of goods as well as in exchange.

Planning how to use and how to save money less than or equal to 1000Frw.

**Attitudes and values:**

Develop the culture of spending money wisely according to every one's income.

Develop the culture of honesty in using money.

Develop the culture of saving and owning small business that generate income.

**b) Teaching/learning aids:**

Rwandan currency from 1Frw to 1000Frw, Drawings and pictures of Rwandan currency.

**c) Generic competences that a learner develops from the lessons:**

- Critical Thinking and being cautious while doing exercises.
- Cooperation and interpersonal skills as he or she work with others in different activities.
- Problem-solving skills in relation to good use, management and saving of money
- Appropriate communication skills when reading figures representing the values of Rwandan currency.
- Lifelong learning skills as learners show curiosity to learn more in Mathematics.

**d) Crosscutting issues to be addressed in the lessons:**

**Inclusive education:** Catering for learners with special education needs. Giving to fast-learners extra activities contained in this book. Giving slow learners suitable activities for their level. Giving special treatment to learners with physical impairment, making those with hearing and visual impairment sit in front where possible the teacher uses the special teaching/learning aids.

**Gender:** Addressed when both boys and girls work together in groups and other activities peacefully without discrimination.

**Environment and Sustainability:** Addressed when learners don't destroy the environment while looking for counters and cleaning where they worked from.

**Peace and values education:**

Encourage learners to live and work in harmony and share ideas in a peaceful way with respect of each other's views during group discussion.

**Financial education:**

This is addressed as they explain how to appropriately spend money.

**e) Teaching steps:**

- Prepare enough teaching/learning aids to help a learner be able to individually differentiate and show the value of Rwandan currency from 1Frw to 1000Frw.
- Invite pupils to observe coins and notes used in Rwandan francs and explain instructions on activities to be done (use activity 8.1.1);
- Guide them how to discover the characteristics of coins as it was done in P1;
- Form groups of pupils and give them coins and notes used in Rwandan francs not greater than 1000Frw and ask them to describe each of them: the value, the color, matter in which it is made;
- Assign groups the activity 8.1.2 for discussion;
- Ask some groups to present the findings and guide the whole class to harmonize the core characteristics of coins and notes how to read them correctly.

**Synthesis/summarization**

Guide pupils to summarize the core characteristics of coins and notes how to read them correctly.

**Assessment**

Provide activities to pupils from the pupil's book.

**f) More notes the teacher should consider:**

- Monitoring all activities closely and catering for all learners without leaving any one behind.
- Explaining deeply how to spend money in a good way.
- Prepares enough teaching and learning aids that learners will use during games about buying and selling.
- Monitoring group activities where learners are discussing how to appropriately spend money.
- Appropriate use of different teaching and learning aids.

**g) Extra exercises and their answers:**

1) Tell the important features on the following Rwandan currency notes.

a) 1000F note.

Rwandan coat of arms and blue colour.

b) 500F note.

Rwandan coat of arms and a laptop.

c) 100F coin.

Rwandan coat of arms and silver colour.

**8.6 .2 Lesson 2: Uses of money and source of money**

- The teacher can guide a session for discussing the **importance of money** (activity 8.2.1, activity 8.2.2 and activity 8.2.3) and the **sources of money** (activity 8.3.1, activity 8.3.2 and activity 8.3.3).
- Invite learners themselves to give the importance of money.
- Guide discussions about the source of money and how it is used.

**8.6 .3 Lesson 3: Buying and selling goods**

**a) Objectives**

**Knowledge:**

Understand how to use money when buying and selling.

**Skills:**

Demonstrate the ability to buy elementary goods using money less or equal to 1000Frw

**Values**

Develop the culture of buying good you need depending on the money available.

**b) Prerequisites /Introduction**

To perform well in this lesson, do the following:

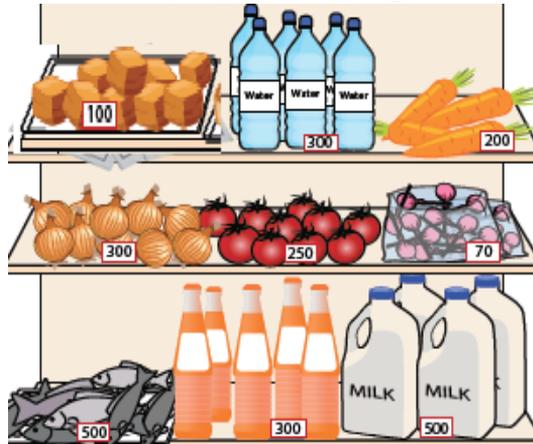
- Plan how to help pupils with different impairments;
- Organize learning materials;
- Guide pupils to discuss scenarios for buying and selling using the money less than 1000Frw.

**c) Teaching resources and learning resources**

- Different coins and notes used in Rwandan francs up to 1000Frw;
- Pictorials of coins and notes and toy money;
- Different scenarios involving the need for buying and selling.

#### d) Teaching and learning activities:

- Organize a scenario for buying and selling:



- There is a table having different commodities whose prices are labeled on (use Activity 8.4.1)
- Role-play the seller who will receive money, he /she will be able to totalize the money to be paid,
- Pupils will come with a given amount of money and a list of commodities to be bought depending on the money they have (not greater than 1000Frw).
- Organize groups of pupils and give them activities to do (for example Activity 8.4.2 );
- Move around in the classroom and provide probing questions for assistance where necessary;
- Invite some groups to present and guide the whole class to harmonize on how to buy merchandises.

#### Synthesis/summarization

Guide pupils to summarize how to plan what one can buy depending on the money he/she has.

#### Assessment

- Provide activities to be done by pupils and check their answers.
- Assign homework to all pupils.

#### e) Extra activity

If someone gave you 1000F, what would you use it for?

## 8.6 .4 Lesson 4: Exchange of Rwandan currency from 1Frw up to 1000Frw

### a) Objectives

#### Knowledge:

- Understand the value of Rwandan money from 1 Frw up to 1000 FRW;
- Identify Rwandan currency between 1Frw and 1000Frw

#### Skills:

- Count Rwandan money less than or equal to 1000 Frw;
- Demonstrate different combinations of notes and coins to represent a given amount of money;

#### Values

- Measure quickly and accurately;
- Develop the culture of trustworthy in using Rwandan money
- Develop the habit of using money in the right way;

### b) Prerequisites /Introduction

To perform well in this lesson, do the following:

- Plan how to help pupils with different impairments;
- Organize learning materials to be used by pupils.
- Guide pupils to:
  - Work out different activities for combinations of notes and coins to represent a given amount of money not exceeding 1000 Frw.

### c) Teaching resources and learning resources

Different coins and notes used in Rwandan francs up to 1000Frw.

### d) Teaching and learning activities:

- Present notes and coins used in Rwanda to pupils, guide them to change an amount of money using other coins and notes;
- Organize groups of pupils and give them activities to do (for example **activity 8.5.1** and **activity 8.5.2**).
- Move around in the classroom and provide probing questions for assistance where necessary;
- Invite some groups to present and guide the whole class to harmonize on how to combine notes and coins to represent a given amount of money up to 1000Frw.
- You can put coins and notes in a basket and give a child an amount of money and ask him/her to go to change it using a combination of other coins and notes.

### e) **Synthesis/summarization**

- Guide pupils to summarize how to combine notes and coins to represent a given amount of money less than 1000Frw.

### f) **Assessment**

- Provide activities to be done by pupils and check their answers.
- Assign all pupils a homework to be done.

## **8.6 .5 Lesson 5: Good use and management of money**

This is a lesson which can be taught in a whole class discussion and then in group or individually.

### **Listing down items before buying them**

Pupils can be guided to discover that it is necessary to list down merchandise to be bought before going to buy depending on the money they have and also to avoid misusing that money (use activity **8.6.1, activity 8.6.2 and activity 8.6.3**).

### **Listing down items before buying them**

Pupils will be guided to select the most important things they can prioritize to buy when they have money (use **Activity 8.7. 1**). In addition, pupils will decide on how they must keep money to avoid damaging coins and notes (use **activity 8.7.2**).

## **8.6 .6 Lesson 6: Saving money and small income generating projects**

### **a) Objective**

**Knowledge:** -Explain how to save money

**Skills:**

Preparing a small income generating projects.

**Attitude and values:**

Having the culture of saving money

### **b) Teaching and learning activities**

- Refer to **activity 8.8** and guide pupils to discover that: It is necessary to save money, the advantages of saving money and that every person including pupils can save money.
- Give learners clear instructions to follow when debating on how to spend money.
- Refer to **activity 8.9** and guide pupils to discover that: People need money to solve problem; There are different ways of finding money including the creation of small income generating projects;

- Guide pupils to decide on small income generating projects they can run at home.

**Learner's activities:**

- Following instructions as given by the teacher.
- Ask questions where he or she has not understood before doing a task.
- Actively participating in explaining the value of Rwandan currency, looking for it and how to save it.

**c) More notes the teacher should consider:**

- Monitoring all activities closely and catering for all learners without leaving any one behind.
- Explaining deeply how to spend money in a good way.
- Prepares enough teaching and learning aids that learners will use during games about buying and selling.
- Monitoring group activities where learners are discussing how to appropriately spend money.
- Appropriate use of different teaching and learning aids.

**8.6 .7 Lesson 7: Comparing the amount of money that does not exceed 1000Frw**

**a) Prerequisites /Introduction**

To perform well in this lesson, do the following:

- Plan how to help pupils with different impairments;
- Organize learning materials to be used by pupils;
- Guide pupils to work out different activities for comparing the money not greater than 100Frw.

**b) Teaching and learning resources**

- Different notes and coins not greater than 1000Frw.

**c) Teaching and learning activities:**

- Show pupils coins and notes and ask them to compare their values by considering what one can buy with such amount of money;
- Invite some pupils in front of others and guide them on how to compare amount of money using comparison symbols:  $<$ ,  $>$  or  $=$  ;
- Organize groups of pupils and give them activities to do (for example **Activity 8.10.1**);
- Move around in the classroom and provide probing questions for assistance where necessary;
- Invite some groups to present and guide the whole class to harmonize on how to compare amount of money.

- After this session, assign groups to do **Activity 8.10.2** and **Activity 8.10.3** to arrange amount of money in ascending or descending order.
- Invite some groups to present and guide the whole class to harmonize on how to arrange amount of money in ascending or descending order.

### **Synthesis/summarization**

- Guide pupils to summarize how to compare amount of money, and how to arrange them in a given order.

### **Assessment**

- Provide activities to be done by pupils and check their answers;
- Assign all pupils a homework to do.

## **8.6 .8 Lesson 8: Addition and subtraction of Rwandan currency whose sum does not exceed 1000Frw**

### **a) Objectives**

#### **Knowledge:**

Understand the meaning of the sum of money and where it is applicable

#### **Skills:**

- **Use and apply knowledge of money in real life;**
- Demonstrate addition of money using number sentences in the conventional manner;
- Emphasize addition of money using standard written method.

#### **Values**

- Count money quickly and accurately;
- Develop the culture of trustworthy in using Rwandan money
- Develop the habit of using money in the right way;

### **b) Prerequisites /Introduction**

To perform well in this lesson, do the following:

- Plan how to help pupils with different impairments;
- Organize learning materials to be used by pupils;
- Guide pupils to:

Work out different activities for adding money in different coins and notes.

### **c) Teaching resources and learning resources**

- Different coins and notes used in Rwandan francs up to 1000Frw;
- Different scenarios involving the need for adding money.

### **d) Teaching and learning activities:**

- Explain a scenario involving the need for adding or subtracting money

and ask some pupils to come in front of others to explain how to solve it and guide them to demonstrate the addition of money using the standard written method;

- Organize groups of pupils and give them activities to do (for example **Activity 8.11**);
- Move around in the classroom and provide probing questions for assistance where necessary;
- Invite some groups to present and guide the whole class to harmonize on how to add money.

### **Synthesis/summarization**

- Guide pupils to summarize when and how to add money: using the standard written method.

### **Assessment**

- Provide activities to be done by pupils and check their answers.
- Assign homework to be done by all pupils.

### **Note:**

Concerning **the lesson on word problems involving addition and subtraction of amounts of money**, the teacher will help pupils to solve a one –step problem:

Start by guiding pupils to solve some problems in groups or in a whole class discussion, provide problems to be solved into groups or in pairs and then give problems to be solved individually(**use Activity 8.13**).

## **8.6 .9 Lesson 9: Multiplication and division of an amount of money by a whole number**

### **a) Objectives**

#### **Knowledge:**

Understand the meaning of the multiplication or division of an amount of money **by a one digit number**

#### **Skills:**

- Demonstrate the multiplication of money by a whole number as a repeated addition;
- Find the product of money **by a one digit number** using a standard written method.
- Demonstrate the division of an amount of money by a whole number as a sharing equally an amount of money among a number of people.
- Calculate the quotient of money **by a one digit number** using a standard written method.

## Attitudes and Values

- Develop the capacity of quick critical thinking to find the product of money by a whole number.
- Develop the culture of kindness when counting money.
- Appreciate the importance of money in real life.

### b) Prerequisites /Introduction

To perform well in this lesson, do the following:

- Plan how to help pupils with different impairments;
- Guide pupils to:
  - Multiply a 2 digit number by one digit number;
  - Use a scenario where for example 3 pupils are given the same amount of money whose sum does not exceed 100 and ask pupils to find the total money for those 3 pupils.

### c) Teaching resources and learning resources

- Different coins and notes used in Rwandan francs up to 1000Frw;
- Different scenarios involving the need for finding the total amount of money for people who have equal amount of money.

### d) Teaching and learning activities:

**Step1:** Multiplication of amount of money by a number

- Explain a scenario involving the need for finding the total amount of money for people for example 4 pupils who have equal amount of 100;
- Ask them to find that total money and invite one pupil in front of others and guide him/her to demonstrate the solution involving multiplication of such money a number; they will see that it is equal two  $100\text{Frw} + 100\text{Frw} + 100\text{Frw} + 100\text{Frw} = \mathbf{100 Frw} \times \mathbf{4} = 400\text{Frw}$ .
- Organize groups of pupils and give them activities to do (for example **Activity 8.12 and Activity 8.14**);
- Move around to every group and provide probing questions for assistance where necessary;
- Invite some groups to present and guide the whole class to harmonize on how to find a product of money by a number.

**Step2:** Division of amount of money by a number

- Explain a scenario involving the need for finding the money for one pupil for example when 4 pupils share equally 1000Frw;
- Ask them to find the part for one pupil and invite one pupil in front of others and guide him/her to demonstrate how to find the answer by

dividing such money by 4; they will see that it is equal two  
**1000Frw: 4 = 250 Frw.**

- Organize groups of pupils and give them activities to do;
- Invite some groups to present and guide the whole class to harmonize on how to find a quotient of money by a number.
- Guide pupils to summarize how to divide an amount of money by a number: use the standard written method and copy the unity of money which is Frw.

### **Synthesis/summarization**

Guide pupils to summarize how to find a product of money by a number:  
**use the standard written method and copy the unity of money which is Frw.**

### **Assessment**

- Provide activities to be done by pupils and check their answers.
- Assign homework to all pupils.

### **Note**

Concerning **the lesson on word problems involving multiplication or division of amount of money by a number**, the teacher will help pupils to solve a one –step problem:

Start by guiding pupils to solve some problems in groups or in a whole class discussion, provide problems to be solved into groups or in pairs and then give problems to be solved individually(**use Activity 8.14**).

### **e) More notes the teacher should consider:**

- Monitoring all activities closely and catering for all learners without leaving any one behind.
- Explaining deeply how to spend money in a good way.
- Prepares enough teaching and learning aids that learners will use during games about buying and selling.
- Monitoring group activities where learners are discussing how to appropriately spend money.
- Appropriate use of different teaching and learning aids.

### **f) Extra exercises and their answers:**

1) Gisa has 500F and wishes to buy 1kg of sugar that costs 900F. How much money is he missing to buy it?

**He misses  $900F-500F = 400F$**

2) Ingabire had 200F and on her way she picked 500F. How much money did she have altogether?

**She had  $500F + 200F = 700F$**

3) Share equally 500F to 5 people.

**Everyone will get  $500F:5 = 100F$**

4) Fill in the missing:

a)  $1000F = 500F + 500F$

b)  $500F = 200F + 200F + 100F$

c)  $100F = 50F + 50F$ .

5) If one pen costs 90F. How much will 6 pens cost?

**6 pens will cost  $90F \times 6 = 540F$**

6) A mother gave 4 children 800F to share. How much did each get?

**Each got  $800F:4 = 200F$ .**

## **8.7. Answers for the end unit assessment 8**

**1) Answer by Yes or Not**

a) Rwandan currency is made of different coins only.

**No**

b) Rwandan currency is made of different notes only

**No**

c) Rwandan currency is made of different coins and different notes.

**Yes**

d) All Rwandan coins and notes have the coat of arm.

**Yes**

**2) Complete**

a)  $1000Frw = 500Frw + 500Frw$

b)  $100Frw = 50Frw + 20Frw + 20Frw + 10Frw$

c)  $50Frw = 20Frw + 10Frw + 20Frw$

**3) Underline the source of money for your parents**

Salary fishing art-craft farming commerce agriculture

**4) use  $>$ ,  $<$  or  $=$  to compare amount of money**

a) a note of 1000Frw = 2 notes of 500Frw

b)  $300Frw >$  two coins of 100Frw

**5) Order the following amount of money from the smallest to the highest**

a) 650Frw, 900Frw, 750Frw, 800Frw,

**650Frw, 750Frw, 800Frw, 900Frw**

b) 400Frw, 700Frw, 650Frw, 300Frw

**300Frw, 400Frw, 650Frw, 700Frw**

**6) Arrange the following amount of money from the highest to the smallest**

a) 450F 550F 350F 250F 650F

**650F, 550F, 450F, 350F, 250F**

b) 850F 250F 500F 950F 400F

**950F, 850F, 500F, 400F, 250F**

**7) Write the appropriate number of coins or notes:**

a) 1000Frw = **2**notes of 500Frw

b) 500Frw = **5** coins of 100Frw

c) 100Frw = **2**coins of 50Frw.

**8) Word problems**

a) Muhizi had 900Frw and he went to buy 1kg of sugar. If the price of the sugar is 850Frw per kg, how much money left?

**He is left with  $900F - 850F = 50F$**

b) Keza bought the bread at 500Frw, eggs of 200Frw and one pizza of 200Frw. How much did Keza pay?

**She paid  $500Frw + 200Frw + 200Frw = 900Frw$ .**

c) Share 750Frw equally among 5 cyclists. How much can each cyclist get?

**Each cyclist got  $750Frw : 5 = 150Frw$ .**

d) Masabo goes to school every day. He pays 400Frw per day. How much money does he pay in 2 days?

**He pays  $400Frw \times 2 = 800Frw$**

e) When I had 950Frw, I went to buy rice and I found that 1kg of rice cost 750Frw. How much money did I remain with?

**I remained with  $950Frw - 750Frw = 200Frw$ .**

# UNIT 9

## HOUR, MONTHS OF THE YEAR AND DAYS OF EACH MONTH

### 9.1 Key unit competence:

Reading, writing and drawing the time shown with clock faces showing hour o'clock and half past an hour, using a calendar to identify months of the year and days of each month.

### 9.2 Prerequisite

Pupils will easily learn this unit, if they have a good background on how to read the hour, and days of a week learnt in P1.

### 9.3 Cross-cutting issues to be addressed

- **Standardization Culture:** Pupils can discover a watch that is not well set on time and start to set it correctly.
- **Financial Education:** when children know to use time appropriately, they can also sensitize the population about the time management.
- **Gender balance:** provide equal opportunity to boys and girls in the lesson
- **Inclusive education:** promote education for all learners in the teaching and learning activities.
- **Peace and values education:** addressed when pupils are encouraged to work collaboratively and peacefully in their group.

### 9.4 Generic competences to be developed

**Cooperation:** developed when pupils work collaboratively in group to develop interpersonal relations and life skills;

**Communication:** developed when pupils discuss either in groups or in the whole class, present findings, debate etc.

**Creativity and innovation:** developed when pupils imagine a time, illustrate it on a clock face and tell it to colleagues; or when a pupil applies acquired skills in solving real life problems.

**Problem solving:** when pupils use acquired skills to solve problems from their real life situation.

**Lifelong learning:** when the learner is engaged in activities showing her/him to have the need for more learning with a curiosity of applying the knowledge learnt in a range of situations.

## 9.5. List of lessons for Unit 9

No	Lessons	Number of periods
0	Preliminary activities	1
1	Reading, telling and writing time shown by digital and analogue watches: The hour -o'clock	2
2	Reading, telling and writing time shown by digital and analogue watches: 30 minutes or half past an hour.	2
3	The calendar: Days of the week.	2
4	The calendar: Months of the year.	2
5	Weeks of the month and of the year.	2
6	School activities and their timetable.	2
7	Preparing a daily activity plan.	2
8	Preparing a weekly activity plan.	2
9	End unit assessment	1
	Total	18

## 9.6 Guidance on different lessons

### 9.6.1 Lesson 1: Reading, telling and writing an hour O'clock

#### a) Objectives

##### Knowledge:

Understand the time shown by a clock face or a digital watch.

##### Skills:

Read and tell the time shown by both clock face and digital watch.

##### Values

- Develop the spirit of time management
- Appreciate the value of time in daily situations
- Develop the spirit of orderliness and the respect time

#### b) Prerequisites /Introduction

To perform well in this lesson, do the following:

- Plan how to help pupils with different impairments;
- Guide pupils to work out different activities for telling the time in hours as it was learnt in P1.

### c) Teaching resources and learning resources

- Different real clock faces and digital watches;
- Toys for clock faces with minute hand and hour hand.
- Manila paper with drawings showing clock faces which indicate different times (hour o' clock).

### d) Teaching and learning activities:

- Invite pupils to observe clock faces indicating hours o'clock and explain instructions on activities to be done (use activity 9.1.1);
- Use different probing questions to guide them to discover how to read, to tell and how to write the time indicated by a watch showing hour o'clock: use a digital watch (with numbers only) and an analogue watch (with numerals, hour hand and minute hand);
- Form groups of pupils and give them watch showing hours o'clock and ask them to read, tell to each other and write the time indicated: use the activity 9.1.2 and other activities for discussion;
- Ask some groups to present the findings and guide the whole class to harmonize how to read, tell and write the time related to an hour o'clock.
- You can write a time on the chalk board and ask pupils to draw a clock face which shows that time. Pupils can also move the minutes and hour hands of a toy for clock face to indicate that time.

### Synthesis/summarization

Guide pupils to summarize how to read, tell and write the time related to an hour o'clock. For example: **three o'clock: the minute hand reaches 12 while the hour hand points the number 3.**

### Assessment

Provide activities to pupils from the pupil's book (from activity 9.1.3 to activity 9.1.5).

### 9.6.2 Lesson 2: Reading, telling and writing a half past or thirty minutes past an hour

- This lesson is taught like the previous lesson but for this you will use:
  - Toys for clock faces with minute hand and hour hand.
  - Manila paper with drawings showing clock faces which indicate different times related to **half past an hour or thirty minutes past an hour**. It will be guided by activity 9.1.6 and activity 9.1.7.

- **Synthesis/summarization**

Guide pupils to summarize how to read, tell and write the time related to **half past an hour or thirty minutes past an hour**. In this case, the minute hand reaches the number 6 and the short hand (hour hand) will then point between two numbers. The hour to be said is the running hour.

- **Assessment:** provide activities to be done individually and check answers. You can use application activity 9.1.2.

### **9.6.3 Lesson3: The calendar: Days of the week**

#### **a) Objectives**

##### **Knowledge:**

- Name and identify the days of the week.
- Identify public holidays and weekends on a calendar

##### **Skills:**

- Read and tell the date on the calendar;
- Show days for public holiday on a calendar.

##### **Values**

- Develop the spirit of time management
- Appreciate the value of time in daily situations
- Develop the spirit of orderliness and the respect time.

#### **b) Prerequisites /Introduction**

To perform well in this lesson, do the following:

- Plan how to help pupils with different impairments;
- Guide pupils to work out different activities for telling the days of a week .

#### **c) Teaching resources and learning resources**

- Calendar for current month;
- Manila paper with drawings showing days in tables where pupils can complete dates for the current week.

#### **d) Teaching and learning activities:**

- Invite pupils to observe a calendar, describe it by telling: days of weeks (use activity 9.2.1);
- Use different probing questions to guide them to discover how to read, to tell and how to make a calendar for the week.
- Form groups of pupils and give them activities to be done for discussion;

- Ask some groups to present the findings and guide the whole class to harmonize how to read, to tell and how to make a calendar for days of the week.

**e) Synthesis/summarization**

Guide pupils to summarize how to make a calendar indicating the days of weeks.

**f) Assessment**

Provide activities to be done by pupils.

**9.6.4 Lesson 4: Months of the year**

**a) Objectives**

**Knowledge:**

- Name and identify the months of the year and days of each month.
- Identify public holidays and weekends on a calendar

**Skills:**

- Read and tell 12 months of the year and number of days for each month.
- Read and tell the date on the calendar;
- Show days for public holiday on a calendar.

**Values**

- Develop the spirit of time management
- Appreciate the value of time in daily situations
- Develop the spirit of orderliness and the respect time.

**b) Prerequisites /Introduction**

To perform well in this lesson, do the following:

- Plan how to help pupils with different impairments;
- Guide pupils to work out different activities for telling the days of a week and months of a year.

**c) Teaching resources and learning resources**

- Calendars of different years;
- Manila paper with drawings showing days in tables where pupils can complete dates for a given year when a reference day with its date is given.

**d) Teaching and learning activities:**

- Invite pupils to observe a calendar, describe it by telling: months of the year, weeks of months and days of weeks (use **Activity 9.2.2** );

- Use different probing questions to guide them to discover how to read, to tell and how to make a calendar for the week, month and the year
- Form groups of pupils and give them activities to be done for discussion;
- Ask some groups to present the findings and guide the whole class to harmonize how to read, to tell and how to make a calendar for the year.

### **Synthesis/summarization**

Guide pupils to summarize on the number of days for each month of the year, how to make a calendar for the year: given the reference day and its date in the given month, put it on the calendar for its month and complete others accordingly.

### **Assessment**

Provide activities to be done by pupils **(use activity 9.2.3)**.

#### **e) More notes the teacher should consider:**

- Monitoring all activities closely and catering for all learners without leaving any one behind.
- Explaining deeply how to effectively manage time.
- Prepares enough teaching and learning aids that learners will use to teach learners how to read and tell time as shown by clock with hands on numbers.
- Monitoring group activities where learners are discussing how to plan for daily activities starting with the most important ones and making a weekly plan of activities.
- Appropriate use of different teaching and learning aids.

#### **f) Extra exercises and their answers:**

1) The year has twelve months. What are they?

January	July
February	August
March	September
April	October
May	November
June	December.

2) How many days does a week have?

A week has 7 days.

3) How many days does a year have?

A year has 365 or 366 days.

4) How many weeks does a month have?

A month has 4 weeks.

### **9.9.5 Lesson 5: Planning daily, weekly and monthly activities**

#### **a) Objectives**

##### **Knowledge:**

Understanding how to plan activities of a day, a week or a month.

##### **Skills:**

Plan activities for a day, plan activities of a week, plan activities of a month.

##### **Values**

- Develop the habit of being well organized in activities to be done;
- Develop the critical thinking in your activity plans;
- Appreciate the importance of planning activities.

#### **b) Prerequisites /Introduction**

To perform well in this lesson, do the following:

- Plan how to help pupils with different impairments;
- Organize learning materials to be used by pupils.
- Guide pupils to work out different activities for planning daily activities as it was learnt in P1.

#### **c) Teaching resources and learning resources**

- Manila paper on which there is daily activity plans for the school (see **Activity 9.3.1**).
- Hand outs with different activities to be done by pupils.

#### **d) Teaching and learning activities:**

##### **Step 1: School activities and their timetable**

- Ask pupils to say activities they do from morning to the evening and guide them to harmonize them;
- Invite one pupil in front of others and guide him/her to present activities he can do in one day and guide him/her to organize these activities according to activities for the day from morning to the evening;
- Organize groups of pupils and give them activities to do be done where they have to refer to planned activities (for example **Activity 9.3.1**)and do a plan for an ordinary P2 pupil;

- Move around in the classroom and provide probing questions for assistance where necessary;
- Invite some groups to present and guide the whole class to harmonize on how to plan activities for a day.

### **Synthesis/summarization**

- Guide pupils to summarize how to plan activities for a day.

### **Assessment**

- Provide individual activities to be done by every pupil (and check their answers);
- Assign all pupils a home work to do.

### **Step 2: Preparing a weekly activity plan**

In this step you can use Manila paper on which there is daily activity plans (see the one for Kagabo); and Hand outs with different activities to be done by pupils.

- Ask pupils to say activities they do from Monday, Tuesday until Sunday's activities and guide them to harmonize them;
- Invite one pupil in front of others and guide him/her to present activities he can do in the week and guide him/her to organize these activities according to activities;
- Organize groups of pupils and give them activities to do be done where they have to refer to planned activities (for example **activity 9.4.1**) and do a plan for an ordinary P2 pupil;
- Move around in the classroom and provide probing questions for assistance where necessary;
- Invite some groups to present and guide the whole class to harmonize on how to plan activities for a week.

### **Synthesis/summarization**

- Guide pupils to summarize how to plan activities for a week.

### **e) Assessment**

- Provide individual activities to be done by every pupil and check their answers;
- Assign all pupils a home work to do.

### **Note:**

After this activity refer to the activity **activity 9.4.2** and guide pupils to discuss the inconvenience of disobeying the timetable.

## 9.7. Answers for the end unit assessment 9

1) Complete

- a) One year has **12** months.
- b) The long hand of a clock shows **minutes**.
- c) The short hand of a clock shows **hours**.
- d) One day has **24** hours.
- e) One hour has **60** minutes.
- f) A day has two main parts: the first is **day**, the second is **night**.
- g) Each part of the day has **12** hours.
- h) one week has **7** days.

2) Draw

- a) A clockface with hands indicating “ten o’clock”.
- b) A clockface with numbers indicating “one o’clock”.

3) Complete the following table

Months	Days	Months.	Days.
January	31	July	<b>31</b>
<b>February</b>	28 or 29	<b>August</b>	31
March	<b>31</b>	September	<b>30</b>
<b>April</b>	30	<b>October</b>	31
May	<b>31</b>	November	<b>30</b>
<b>June</b>	30	<b>December</b>	31

# UNIT 10

## TYPES OF LINES AND ANGLES.

### 10.1 Key unit competence:

Identify and draw different types of lines, acute and obtuse angles.

### 10.2 Prerequisite

Pupils will learn effectively if they refer to types of lines learnt in P1.

### 10.3 Generic competences that a learner develops

- Critical Thinking and being cautious while doing exercises.
- Cooperation and interpersonal skills as he or she work with others in different activities.
- Problem-solving skills in relation to drawing different lines and angles.
- Appropriate communication skills when reading types of lines and angles.
- Lifelong learning skills as learners show curiosity to learn more in Mathematics.

### 10.4 Crosscutting issues to be addressed

**Inclusive education:** Catering for learners with special education needs. Giving to fast-learners extra activities contained in this book. Giving slow learners suitable activities for their level. Giving special treatment to learners with physical impairment, making those with hearing and visual impairment sit in front where possible the teacher uses the special teaching/learning aids.

**Gender:** Addressed when both boys and girls work together in groups and other activities peacefully without discrimination.

**Environment and Sustainability:** Addressed when learners don't destroy the environment while looking for counters and cleaning where they worked from.

### Peace and values education:

Encourage learners to live and work in harmony and share ideas in a peaceful way with respect of each other's views during group discussion.

## 10.5. List of lessons of unit 10

No	Lessons	Number of periods
1	<b>Preliminary activities</b>	<b>1</b>
2	Types of lines: Straight lines, closed and open lines, Curved lines and zigzag(broken) lines	2
3	Types of angles: Right angle, Acute angles and obtuse angle	1
5	Comparing angles	1
6	End unit assessment	1
	Total	6

## 10.6 Guidance on different lessons

### 10.6.1 Lesson 1: Types of Lines

#### a) Learning objectives:

##### Knowledge:

- Differentiating and drawing straight lines, closed lines, open lines, curved lines, and zigzag/broken lines.

##### Skills:

- Showing straight lines, closed lines, open lines, curved lines, and zigzag/broken lines that form various objects/materials located in and outside the classroom.
- Drawing straight lines, closed lines, open lines, curved lines and zigzag/broken lines

##### Attitudes and values:

- Develop a culture of keen observation in whatever they are doing.
- Showing the capability of working towards the objective.

#### b) Prerequisites/Introduction

Pupils will learn effectively in this lesson when

- They refer to types of lines and angles learnt in P2 (Unit 10)
- The teacher distributes enough Teaching and Learning resources that will be used in the lesson in drawing lines;
- The teacher prepares how to assist learners who may need special support during the lesson.

#### c) Teaching and Learning resources

Manila Paper, Rulers, meter ruler, T-square, different colored pencils.

## **d) Teaching and Learning Activities**

This lesson can be taught in 4 different steps: **straight lines, Closed lines, open lines and curved lines.**

- Invite pupils, show them lines and ask them to give their relationships (activity **Activity 10.1.1, Activity 10.1.4, Activity 10.1.6 and Activity 10.1.8**);
- Form groups of pupils and then ask them to describe and draw straight lines, Closed lines, open lines and curved lines and to give instruments or objects where those types of lines are observed in real life (activity 10.1.2, activity 10.1.3, activity 10.1.5, activity 10.1.7 and activity 10.1.9);
- Move around in the class for facilitating pupils where necessary and ask probing questions to guide them;
- Invite some groups to present their findings and then help them to harmonize by explaining the characteristics for each types of line;
- Give every pupil time to draw at least one of each of the types of lines learnt.

## **Synthesis/summarization**

Direct pupils to explain briefly the different types of lines and how to draw them.

## **Assessment**

Give pupils application activities on types of lines found in the pupils' book.

## **10.6.2 Lesson 2: Types of angles**

### **a) Objective**

#### **Knowledge**

Know different types of angles.

#### **Skills**

Tell the difference and draw different types of angles.

#### **Values**

Showing the concern of beautification and tessellation

### **b) Prerequisites/Introduction**

Different exercises to distinguish different types angles and how to draw angles.

Give pupils enough Teaching and Learning resources to use to draw angles  
Prepare how you to assist learners who may need special support during the lessons

### **c) Teaching and Learning resources**

Manila Paper, Rulers, Meter ruler, T-square, different colored pencils, gridded papers.

### **d) Teaching and Learning Activities**

- Guide pupils to discuss activity 10.2.1, activity 10.2.4 and activity 10.2.6, to draw a right angle, acute angle and an obtuse angle using a ruler on a gridded paper;
- Move around in the class for facilitating pupils where necessary and ask probing questions to guide them;
- Invite some groups to present their findings and then help them to harmonize by explaining the characteristics of a right angle, acute angle and an obtuse and how to draw them;
- Ask the pupils to observe carefully and describe the right angle, an acute angle and an obtuse angle.
- Give every pupil time to draw a right angle, obtuse angle and an acute angle and explain the difference among them.

### **Summary of topic taught**

Direct pupils to name briefly the different types of angles, how to draw them and explain the difference among them.

### **Assessment**

Give pupils application activities to be done from in the pupils' book on types of angles.

## **10.6.3 Lesson 3: Comparing angles**

### **a) Objective**

#### **Knowledge**

Know to explain the comparison of angles.

#### **Skills**

- Use the property of angle and compare them;
- Observe angles and compare them.

#### **Values**

Show the concern of beautification and arranging in order.

### **b) Prerequisites/Introduction**

Verify whether pupils are able to use greater than or less than when comparing angles as it was learnt in P1.

### **c) Teaching and Learning resources**

Manila Paper, Rulers, Meter ruler, T-square, different colored pencils.

#### d) Teaching and Learning Activities

- Refer to **Activity 10.2.8** and **guide pupils** to demonstrate how to compare right angle, obtuse angle and acute angle using different objects whose angles can be modified;
- Invite some pupils on the blackboard and guide them to compare angles: for example.



(They can say the angle A is the right angle it is greater than the angle B which is an acute angle).

- Assign groups hand-outs with activities to be done where there are angles to be compared.
- Guide all pupils to harmonize the how to compare those angles
- A right angle is greater than an acute angle
- An obtuse angle is greater than a right angle
- An obtuse angle is greater than an acute angle
- An acute angle is less than a right angle
- An acute angle is less than an obtuse angle.

#### Assessment

Provide activities to be done and mark them to verify whether your objectives were achieved.

#### e) More notes the teacher should consider:

- Monitoring all activities closely and catering for all learners without leaving any one behind.
- Explaining deeply how to effectively draw different types of lines and angles.
- Prepares enough teaching and learning aids that learners will use to teach learners how to draw different types lines and angles.
- Monitoring group activities where learners are discussing the differences between right angles, acute angles and obtuse angles on different objects and places.
- Appropriate use of different teaching and learning aids.

#### f) Extra exercises and their answers:

- 1) Draw the following lines;
  - a) Horizontal line

- b) Vertical line
- c) Oblique line
- d) Closed line
- e) Open line
- f) Curved line
- g) Broken/zigzag line

2) Draw the following angles.

- a) Right angle
- b) Acute angle
- c) Obtuse angle.

### 10.7. Answers to the end unit assessment 10

1)

- a) Oblique straight line towards the left.
- b) Horizontal straight line.
- c) Oblique straight line towards the right.
- d) Closed line
- e) Zigzag line
- f) Vertical straight line
- g) Curved line.

2) Answer by Yes or No

- a) An obtuse angle is greater than a right angle. **Yes**
- b) An obtuse angle is less than an acute angle. **No**
- c) A right angle is greater than acute angle. **Yes**

3) Draw

- a) A right angle
- b) A closed line
- c) An oblique straight towards the right
- d) An obtuse angle
- e) A vertical straight line
- f) An acute angle
- g) A horizontal straight line

### **11.1 Key unit competence**

Construct a grid and locate points on a grid

### **12.2 Prerequisite**

To do some activities of locating a point on a grid as it was learnt in P1.

### **11.3 Generic competences that a learner develops**

- Critical Thinking and being cautious while doing exercises.
- Cooperation and interpersonal skills as he or she work with others in different activities.
- Problem-solving skills in relation to locating the position of a point and putting a point on the grid with the help of cross bars and posts.
- Appropriate communication skills when locating the positions of points in a grid.
- Lifelong learning skills as learners show curiosity to learn more in Mathematics.

### **11.4 Crosscutting issues to be addressed**

**Inclusive education:** Catering for learners with special education needs. Giving to fast-learners extra activities contained in this book. Giving slow learners suitable activities for their level. Giving special treatment to learners with physical impairment, making those with hearing and visual impairment sit in front where possible the teacher uses the special teaching/learning aids.

**Gender:** Addressed when both boys and girls work together in groups and other activities peacefully without discrimination.

**Environment and Sustainability:** Addressed when learners don't destroy the environment while looking for counters and cleaning where they worked from.

#### **Peace and values education:**

Encourage learners to live and work in harmony and share ideas in a peaceful way with respect of each other's views during group discussion.

### 11.5 New Words/concepts /terms

**Posts:** Vertical lines of a grid.

**Crossing bars:** Horizontal lines of a grid.

**Locate:** to show the position of an object on a grid.

**Vertex:** A point where two lines intersect forming an angle of a figure.

### 11.6 Guidance on the preliminary activity 11

- The teacher guides pupils to do activities question1 and question2.
- The teacher invites all pupils for a whole class discussion where some pupils are sent to give answers on the black board and others give views on what should be done.
- Basing on the results, teacher harmonizes answers and arouses the curiosity of pupils on the content of this unit.

### 11.7 Guidance on how to support children with special educational needs

- Slow learners are provided with simple activities compared to the rest of the class as found in the teacher's book.
- Those with physical disabilities: First determine what the disabilities are and prepare Teaching and Learning resources and activities to suit the needs of each learner.
- Quick/Fast learners: provide them with extension activities so that they don't disrupt others.

### 11.8 List of lessons for unit 11

No	Lessons	Number of periods
0	Preliminary activity	1
1	Characteristics of a grid and construction of a grid	2
2	Putting points on a grid.	1
3	Locating the position of points on a grid.	1
4	End unit assessment	
	Total number of periods	6

## 11.9 Guidance on different lessons

### 11.9.1 Lesson 1: Characteristics of a grid and construction of a grid

#### a) Learning objectives:

##### Knowledge:

- Understanding a grid and its components.
- Identify components of a grid (columns, posts, crossing bars, intersecting point).

##### Skills:

Drawing a grid,

Differentiate posts from crossing bars.

##### Attitudes and values:

- Develop the spirit of observation and carefulness.
- Develop the culture of orderliness in daily life.

Having the culture of keen observation, think deeply and to explain the position of an object in space.

#### b) Teaching/learning aids:

Meter ruler, manila paper, pencils etc.

#### c) Teaching and Learning Activities

- Draw a grid and ask the pupils to look at it carefully and tell you the number of horizontal lines and vertical lines it is made of, how to number them from the first to the last (**Activity 11.1**).
- Guide pupils to highlight that horizontal lines are called **crossing bars** and vertical lines are called **posts**;
- Form groups and ask pupils to draw a grid and then they explain its properties (**Activity 11.2**);
- Ask each pupils to draw a grid and explain the number of horizontal and vertical lines it is made of.
- Invite pupils in a whole class discussion to discuss how to number posts and crossing bars of a grid.

#### Summary of topic taught

Guide pupils to summarize the properties of a grid: A grid is made with vertical lines (posts) and horizontal lines (crossing lines), Numbering of vertical lines is done from left to right side, Numbering horizontal lines is done from down to up.

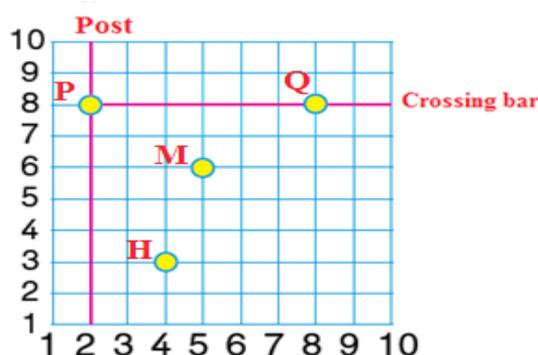
## Assessment

Give pupils activity on how to make a grid

### 11.9.2 Lesson 2: Putting a point on a grid

- After the previous lesson, the teacher refers to activity 11.3 and activity 11.4 and guide pupils to be able to put points on a grid and to explain the position of a point.

For example The point P is the intersecting point of the crossing bar number 2 and the post number 8 and it is written **P(2,8)**; Describe the point Q, M or H.



- Give instruction to pupils and ask them to put points on a grid: For example the point A is the intersecting point of the crossing bar number 2 and the post number 4.
- Provide different activities to pupils until they are able to put and describe a point on a grid.

### 11.9.3 Lesson 3: Locating a point on a grid

#### a) Objectives

##### Knowledge

To understand how to locate a point on a grid.

##### Skills

Locate a point on a grid.

##### Values

Having the culture of keen observation, think deeply and to explain the position of an object in space.

#### b) Prerequisites/Introduction

Different activities of putting a point on a grid as it was learnt in the previous lesson.

### c) Teaching and Learning resources

Manila paper, rulers, meter, T-square, different pencils, paper and boxes.

### d) Teaching and Learning Activities

Form groups of pupils and assign them the **Activity 11.5** where they identify the position of a point by indicating the number of post and the number of crossing bars which form that point;

- Invite pupils to a whole class discussion where some groups present their answers by explaining why such a location of a point;

### Summary

Guide pupils to summarize the way a point is located on a grid: When locating a point on a grid, we start by the number of the post and then the number of the crossing bar which form that point. **Example:** The point A is located at the intersection of post number 3 and the crossing bar number 3 and we write A (3,3).

- Guide each pupil to draw a grid and then ask them to locate different points on the grid they have drawn.

### Assessment

Give pupils the **Activity 11.6** and mark their works.

### e) More notes the teacher should consider:

- Monitoring all activities closely and catering for all learners without leaving any one behind.
- Explaining deeply how to construct a grid.
- Prepares enough teaching and learning aids that he or she will use to teach learners how to construct a grid and putting points in a grid.
- Monitoring group activities and gives learners opportunities to explain how to construct and put points in a grid.
- Appropriate use of different teaching and learning aids.

### f) Extra exercises and their answers:

Draw a grid with a given number of posts and a number of crossing bars. Indicate points to be located in the grid.

### 11.10 Answers for the end unit assessment 11

1) a. Construct a grid with 10 posts and 10 crossing bars.

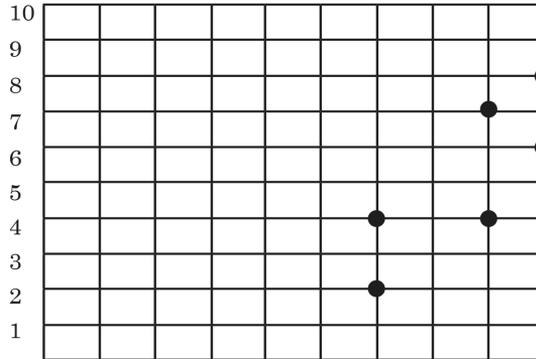
#### b) Put the points on the grid at:

- a) Post number 3 and the crossing bar number 7.
- b) Post 10 and the crossing bar 8
- c) The crossing bar 5 and the post 9.

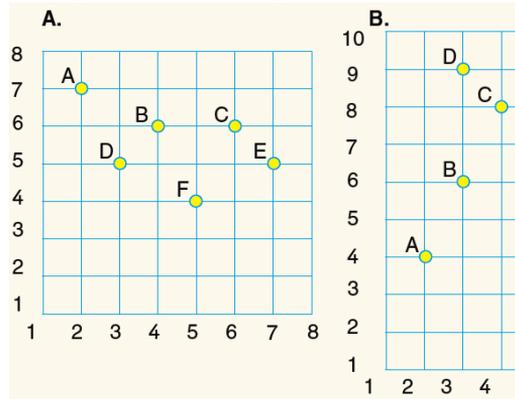
- d) Crossing bar 7 and the post 8
- e) Crossing bar number 4 and the post number 6
- f) Crossing bar number 6 and the post number 10.

**Answer:**

f. Urubariro rwa 6 n'inkingi ya 10



2) Locate the position of points in the grid



**A)**

- A.** Post number 2 and the crossing bar number 7.
- B.** Post 4 and the crossing bar 6
- C.** The crossing bar 6 and the post 6.
- D.** Crossing bar 5 and the post 3
- E.** Crossing bar number 5 and the post number 7.
- D.** Crossing bar number 4 and the post number 5.

**B)**

- A.** Crossing bar 4 and the post 2
- B.** Crossing bar 6 and the post 3
- C.** The crossing bar 8 and the post
- D.** Crossing bar 9 and the post 3

# UNIT 12

# SQUARE, RECTANGLE AND TRIANGLE.

## 12.1 Key unit competence:

Identifying a square, a rectangle and a triangle from other geometrical shapes and calculating their perimeter.

## 12.2 Prerequisites

Pupils will refer to properties of a square and rectangle learnt in P1

## 12.3 Teaching/learning aids:

Various shapes, materials in shapes of square, rectangle, triangle, ruler, grid.

## 12.4 Generic competences that a learner develops

- Critical Thinking and being cautious while doing exercises.
- Cooperation and interpersonal skills as he or she work with others in different activities.
- Problem-solving skills in relation to drawing the geometric figures of a square, rectangle and triangle as well as calculating the perimeter of gardens with shapes of a square, rectangle or triangle.
- Appropriate communication skills when explaining the characteristics of a square, rectangle and triangle.
- Lifelong learning skills as learners show curiosity to learn more in Mathematics.

## 12.5 Crosscutting issues to be addressed

**Inclusive education:** Cater for learners with special education needs. Give to fast-learners extra activities contained in this book. Give slow learners suitable activities for their level. Give special treatment to learners with physical impairment, making those with hearing and visual impairment sit in front where possible the teacher uses the special teaching/learning aids.

**Gender:** Addressed when both boys and girls work together in groups and other activities peacefully without discrimination.

**Environment and Sustainability:** Addressed when learners don't destroy the environment while looking for counters and cleaning where they worked from.

### **Peace and values education:**

Encourage learners to live and work in harmony and share ideas in a peaceful way with respect of each other's views during group discussion.

### **12.6 Key terms/concepts**

**Isosceles Triangle:** Triangle with two equal sides

**Equilateral triangle:** Triangle whose all sides are equal

**Right-angled Triangle:** Triangle whose two sides make a right angle

**Any triangle:** Triangle for which all sides are different in length

### **12.7 Guidance on how to support learners with special educational needs**

- Slow learners are provided with simple activities compared to the rest of the class as found in the teacher's book.
- Those with physical disabilities: First determine what the disabilities are and prepare Teaching and Learning resources and activities to suit the needs of each learner.
- Quick/Fast learners: provide them with activities found in the teacher's book so that they don't disrupt others.

### **12.8 List of lessons for unit 12**

No	Lessons	Number of periods
1	Properties of a square	1
	Drawing a square	2
2	Measuring and calculating the perimeter of a square	4
3	Properties of a rectangle	2
	Drawing a rectangle	2
4	Measuring and calculating the perimeter of a rectangle	4
5	Properties of a triangle	2
	Drawing a triangle	2
6	Measuring and finding the perimeter of a triangle	4
7	End unit assessment	1
	Total number of periods	24

## 12.9 Guidance on different lessons

### 12.9.1 Lesson 1: Properties of a square

#### a) Learning objective

##### Knowledge

To know more about the properties of a square.

##### Skills

Describe a square, draw a square and select a square from other figures

##### Values

Having the culture of keen observation, think deeply and to beautify the environment using patterns of shape.

#### b) Prerequisites

Introduce the lesson by different activities on the different characteristics of a square learnt in P1.

#### c) Teaching and Learning resources

Manila paper, rulers, metre ruler, T-square, different pencils, gridded paper and boxes.

#### d) Teaching and Learning Activities

- Use a T-square and a ruler or a gridded paper and a ruler to draw a square and then ask the pupils to look at it carefully and tell its characteristics (**Activity 12.1.1**).
- Ask pupils to go to the blackboard and measure the sides of the square you drew. Ask another pupil to use a T-square to measure the angles of the square you drew and guide others to notify that it is a square;
- Guide every pupil to draw a square, measure the sides of the square and all the angles making sure that all the sides are equal and ensuring that all the angles are right angles.
- Form groups of pupils and assign them to do activity **Activity 12.1.2** and **Activity 12.1.3**;
- Invite some groups to present their findings and guide the whole class to harmonize the properties of a square.

#### Summary

Guide pupils to summarize the properties of a square i.e. sides and angles: The Square is a figure with **4 equal sides** and **4 right angles**.

#### Assessment

- Verify that every child is able to draw a square using a ruler and a gridded paper.

- Give pupils activities to do about the properties of a square
- Ask learners to identify a square from other geometric figures basing on properties.

## 12.9.2 Lesson 2: Finding the perimeter of a square

### a) Objectives

#### Knowledge

To understand how to find the perimeter of a square

#### Skills

To Determine and calculate the perimeter of a square.

#### Values

Having the culture of keen observation, think deeply and to beautify the environment using tessellation

### b) Prerequisites /Introduction

Give pupils different activities on how to find the perimeter of a square as it was learnt in P2.

### c) Teaching and Learning resources

Manila paper, rulers, meter ruler, T-square, different pencils, paper and boxes

### d) Teaching and Learning activities

- Draw a square and ask pupils to measure the total length of all its sides(**Activity 12.1.4**),
- Ask them to discover other way of finding how they should get that total length called also a perimeter of that square;
- Form groups pupils and guide them to do **Activity 12.1.5**
- Invite some groups to present and guide the whole class to harmonize their findings

### Summarization

Guide pupils to briefly summarize how they can find the perimeter of a square:

Perimeter = Side + side + side + side; The perimeter of a square equals four times of its side.

Or Perimeter = Side  $\times$  4

### Assessment:

Give pupils activities on how to find the perimeter of a square found in the pupils book: **Activity 12.1.6**.

### 12.9.3 Lesson 3: Properties of a rectangle

#### a) Learning objective

##### Knowledge

To know more about the properties of a rectangle.

##### Skills

Describe a rectangle, Draw a rectangle, select a rectangle from other figures

##### Values

Having the culture of keen observation, think deeply and to beautify the environment using tessellation.

#### b) Prerequisites

Introduce the lesson by different activities on the different characteristics of a rectangle learnt in P1.

#### c) Teaching and Learning resources

Manila paper, rulers, metre ruler, T-square, different pencils, gridded paper and boxes.

#### d) Teaching and Learning Activities

- Use a T-square and a ruler or a gridded paper and a ruler to draw a rectangle and then ask the pupils to look at it carefully and tell its characteristics (**Activity 12.2.1**).
- Ask pupils to go to the blackboard and measure the sides of the rectangle you drew insisting on parallel sides. Ask another pupil to use a T-square to measure the angles and compare parallel sides of the rectangle you drew and guide others to notify that it is a rectangle;
- Guide every pupil to draw a rectangle using his/her gridded paper and a ruler, measure the sides of the rectangle and all the angles making sure that parallel sides are equal and ensuring that all the angles are right angles.
- Form groups of pupils and assign them to do **Activity 12.2.2** and **Activity 12.2.3**;
- Invite some groups to present their findings and guide the whole class to harmonize the characteristics of a rectangle.

#### Summary

Guide pupils to summarize the characteristics of a rectangle about sides and angles:

A rectangle is a figure with 4 sides;

Two parallel sides are equal;

It has 4 **right angles**;

The short sides are called **widths (W)**, the longer sides are called the **lengths (L)**.

### **Assessment**

Give pupils activities to do about the properties of a rectangle and mark their works.

Ask learners to identify a rectangle from other geometric figures basing on its properties

## **12.9.4 Topic 4: Finding the perimeter of a rectangle**

### **a) Objectives**

#### **Knowledge**

To understand how to find the perimeter of a rectangle

#### **Skills**

Finding the perimeter of a rectangle.

#### **Values**

Having the culture of keen observation, think deeply and to beautify the environment using tessellation

### **b) Prerequisites /Introduction**

Give pupils different activities on how to find the perimeter of a rectangle as it was learnt in P1.

### **c) Teaching and Learning resources**

Manila paper, rulers, meter ruler, T-square, different pencils, gridded paper and boxes

### **d) Teaching and Learning activities**

- Draw a rectangle and ask pupils to measure the total length of all its sides (**Activity 12.2.4**),
- Ask them to discover other way of finding how they should get that total length called also a perimeter of that rectangle;
- Form groups of pupils and guide them to do **Activity 12.2.5**;
- Invite some groups to present and guide the whole class to harmonize their findings

### **Summarization**

Guide pupils to briefly summarize how they can find the perimeter of a rectangle:

Perimeter = Side + side + side + side; Perimeter = **(Length + Width) x 2**.

Or **Perimeter = (L+W) x 2**

**Assessment:**

Give pupils activities on how to find the perimeter of a square found in the pupils book(**Activity 12.2.6**).

**12.9.5 Lesson 5: Properties of a triangle**

**a) Objectives**

**Knowledge**

To know more about the properties of a triangle.

**Skills**

Describe a rectangle, draw a triangle, select a triangle from other figures.

**Values**

Having the culture of keen observation, think deeply and to beautify the environment using shape patterns.

**b) Prerequisites**

Introduce the lesson by different activities on the different properties of a triangle.

**c) Teaching and Learning resources**

Manila paper, rulers, metre ruler, T-square, different pencils, gridded paper and boxes.

**d) Teaching and Learning Activities**

- Use a ruler to draw a triangle and then ask the pupils to look at it carefully and tell its characteristics (**Activity 12.3.1**).
- Ask pupils to go to the blackboard and count the number of sides and measure their lengths.
- Ask another pupil to verify and count the number of angles and guide others to notify that it is a triangle;
- Guide every pupil to draw a triangle, measure the sides of the triangle making sure that the figure has 3 sides and 3 angles.
- Form groups of pupils and assign them to do **Activity 12.3.2 and Activity 12.3.3**;
- Invite some groups to present their findings and guide the whole class to harmonize the properties of a triangle.

**Summary**

- Guide pupils to summarize the properties of a triangle about sides and the number of angles.

- Guide pupils to notify that triangles have different types: 3 sides can have the same length( case of an equilateral triangle), a triangle can have a right angle, or that all 3 sides can have different lengths (to be seen in P3).

### **Assessment**

Give pupils activities to do about the properties of a triangle and mark their works.

Guide learners to identify a triangle from other geometric figures basing on its properties.

## **12.9.6 Lesson 6: To find the perimeter of a triangle**

### **a) Objectives**

#### **Knowledge**

To understand how to find the perimeter of a triangle

#### **Skills**

To draw and find the perimeter of a triangle.

#### **Values**

Having the culture of keen observation, think deeply and to beautify the environment using tessellation.

### **b) Prerequisites /Introduction**

Give pupils different activities on how to find the perimeter of a triangle as it was leant in P1.

### **c) Teaching and Learning resources**

Manila paper, rulers, meter ruler, T-square, different pencils, gridded paper and boxes

### **d) Teaching and Learning activities**

- Draw a triangle and ask pupils to measure the total length of all its sides(**Activity 12.3.4**),
- Ask them to discover other way of finding how they should get that total length called also a perimeter of that triangle;
- Form groups of pupils and guide them to do **Activity 12.3.5**;
- Invite some groups to present and guide the whole class to harmonize their findings.

### **Summarization**

Guide pupils to briefly summarize how they find the perimeter of a triangle:

The perimeter of a triangle = First side + second side + third side

The perimeter of an equilateral triangle equals three times of the side, this means

$$\text{Perimeter} = \text{side} \times 3$$

**Assessment:**

Give pupils activities on how to find the perimeter of a square found in the pupils book.

**e) More notes the teacher should consider:**

- Monitoring all activities closely and catering for all learners without leaving any one behind.
- Explaining deeply how to effectively draw a square, rectangle and triangle.
- Prepares enough teaching and learning aids that learners will use to teach learners how to measure and calculate the perimeter of a square, rectangle and triangle.
- Monitoring group activities giving learners tasks to identify a square, rectangle and triangle from other geometric figures.
- Appropriate use of different teaching and learning aids.
- Supports learners with learning difficulties giving them activities that suit their ability.
- Observes gender in all teaching and learning activities.
- Supplements learners' ideas as they calculate the perimeter of a square, rectangle and triangle.
- Gives learners opportunities to discuss the best method to find the perimeter of a square, rectangle and triangle.

**f) Extra exercises and their answers.**

- a) Draw a square of sides 8cm.
- b) Draw a rectangle of length 12cm and width 8cm.
- c) Find the perimeter of a square with sides 15cm.

$$\begin{aligned}\text{Perimeter of a square} &= \text{side} \times 4 \\ &= 15\text{cm} \times 4 \\ &= 60\text{cm}\end{aligned}$$

- d) Find the perimeter of a rectangle with length 25cm and width 21cm.

$$\begin{aligned}\text{Perimeter of a rectangle} &= (L + W) \times 2 \\ &= (25\text{cm} + 21\text{cm}) \times 2 \\ &= 72\text{cm}\end{aligned}$$

- e) Find the perimeter of an equilateral triangle with sides 22cm.

Perimeter of an equilateral triangle =  $22\text{cm} \times 3 = 66\text{cm}$

### 12.3. Answers for the end of unit assessment 12

1) Give the name for this figure:



- a) Triangle.
- b) Square.**
- c) Rectangle.**

2) Answer by **YES** or **NO**

- a) A square has 4 equal sides. **Yes**
- b) The short sides of a rectangle are called length (L). **No**
- c) A rectangle has 4 right angles. **Yes**
- d) A square has 4 acute angles. **Yes**
- e) A rectangle has 3 sides, for which 2 parallel and equal. **No**
- f) The long sides of a rectangle are called Width. **No**
- g) A triangle has 4 sides and 3 angles. **No**

3) Find the perimeter of:

- a) A square with the side of 12cm.  
**Perimeter = side X 4 = 12cm x 4 = 24cm.**
- b) a rectangle whose length is 12cm and the width of 8cm.  
**P = (L + W) x 2 = (12cm + 8cm) x 2 = 40 cm.**
- c) A triangle which has: 7cm, 8cm and 9cm of sides.  
**Perimeter = 7cm + 8cm + 9cm = 24cm**

4) Write **1** on a square, write **2** on a rectangle and write **3** on a triangle.

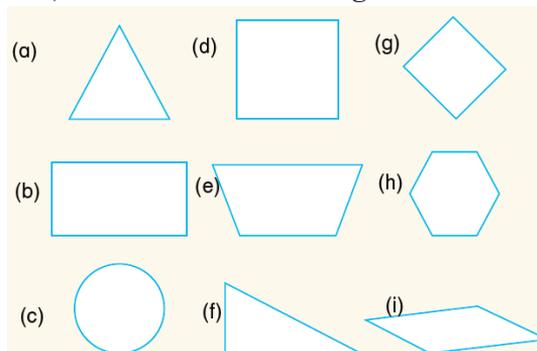


Figure (d) is a square, figure (b) is a rectangle, and figures (a) and (f) are triangles.

5) Find the perimeter of a land with the form of:

a) A square of 80m of side.

$$\text{Perimeter} = \text{side} \times 4 = 80\text{cm} \times 4 = 320\text{cm}$$

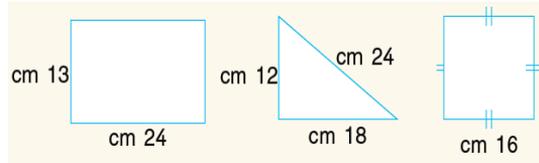
b) (b) a rectangle with 54m of length and 40m of width.

$$\text{Perimeter of a rectangular land} = 2(L+W) = 2(54 + 40) = 188\text{cm}$$

c) A triangle with 25m, 27m and 30m of sides.

$$\text{Perimeter of a triangular land} = 25\text{m} + 27\text{m} + 30\text{m} = 82\text{m}$$

6) Find the perimeter for the following figures:



a)  $\text{Perimeter} = (13\text{cm} + 24\text{cm}) \times 2 = 68\text{cm}$

b)  $\text{Perimeter} = 12\text{cm} + 24\text{cm} + 18\text{cm} = 54\text{cm}$

c)  $\text{Perimeter} = 16\text{cm} \times 4 = 64\text{ cm.}$

# UNIT 13

## MISSING NUMBERS IN ADDITION, SUBTRACTION MULTIPLICATION AND DIVISION

### 13.1 Key unit competence

Finding the missing number in addition, subtraction, multiplication and division of numbers

### 13.2 Prerequisites

Activities on finding different terms of a sum, a difference, a product or a quotient.

### 13.3 Generic competences that a learner develops from the lessons

- Critical Thinking and being cautious while doing exercises.
- Cooperation and interpersonal skills as he or she work with others in different activities.
- Problem-solving skills in relation to finding the missing numbers in addition, subtraction, multiplication and division.
- Appropriate communication skills when reading the missing numbers identified to fill the number pattern.
- Lifelong learning skills as learners show curiosity to learn more in Mathematics.

### 13.4 Crosscutting issues to be addressed in the lessons

**Inclusive education:** Catering for learners with special education needs. Giving to fast-learners extra activities contained in this book. Giving slow learners suitable activities for their level. Giving special treatment to learners with physical impairment, making those with hearing and visual impairment sit in front where possible the teacher uses the special teaching/learning aids.

**Gender:** Addressed when both boys and girls work together in groups and other activities peacefully without discrimination.

**Environment and Sustainability:** Addressed when learners don't destroy the environment while looking for counters and cleaning where they worked from.

## Peace and values education:

Encourage learners to live and work in harmony and share ideas in a peaceful way with respect of each other's views during group discussion.

### 13.5 List of lessons of the unit 13

No	Lessons	Number of periods
1	Finding the missing number in a number sentence by quick addition or subtraction	1
2	Finding the missing number in a number sentence by quick multiplication or division	1
3	Finding the common difference in a number pattern	2
4	Identifying the missing number in a number pattern by Subtraction	2
5	End unit assessment	
	Total	6

### 13.6 General guidance on different lessons

#### 13.6.1 Lesson 1: To find the missing number in addition and subtraction

##### a) Objectives

##### Knowledge

Understanding the rules applied to find the missing number in a number sentence with addition and subtraction.

##### Skills

Find the missing number by quick addition or subtraction

##### Values

Thinking critically and quickly.

##### b) Prerequisites/Introduction

Different activities on how to find one term of the sum or a difference learnt in unit 3.

##### c) Teaching and Learning resources

Table of place value, abacus, multiplication tables and number cards in different colors.

##### d) Teaching and Learning Activities

- Guide pupils to find the missing number in a number sentence with addition or subtraction (see **Activity 13.1.1, Activity 13.1.2, Activity 13.1.3 until activity 13.1.6**);

- Invite learners to discover the rule applied when finding the missing number in the expression with addition or subtraction;
- Form groups and guide pupils to refer to the worked example to do **Activity 13.1.7**;
- Invite some group to present answers by explaining how they worked to find the missing numbers and guide pupils to conclude;

### Summary

Guide pupils to summarize the rules to follow in finding the missing number:

- To find the missing number in addition, you subtract the given number from the sum and the difference is the missing number in addition.
- To find the missing number in subtraction:
  - When the missing number is a minuend, find it by adding the difference and the subtrahend.
  - When the missing number is a subtrahend, you subtract the difference from the minuend.

### Assessment

- Give pupils the **application activity** on how to find the missing number in addition and subtraction.
- Make small pieces of paper with exercises on finding the missing number, put them in a box and ask each pupil to pick one paper randomly, do the exercise on the piece of paper and explain how they did it.

## 13.9.2 Lesson 2: To find the missing number in multiplication and division

### a) Objectives

#### Knowledge

Understanding the rules applied to find the missing number in a number sentence with multiplication and division.

#### Skills

Find the missing number by quick multiplication or division

#### Values

Thinking critically and quickly.

### b) Prerequisites/Introduction

Different activities on how to find the missing factor of a product as it was learnt in unit 3.

### c) Teaching and Learning resources

Table of place value, abacus, multiplication tables and number cards in different colors.

### d) Teaching and Learning Activities

- Guide pupils to find the missing number in a number sentence with multiplication or division (see **Activity 13.2.1**);
- Invite learners to discover the rule applied when finding the missing number in the expression with multiplication or division;
- Form groups and ask pupils to do **Activity 13.2.1**;

Invite some group to present answers by explaining how they worked to find the missing numbers and guide pupils to conclude;

### Summary

Guide pupils to summarize the rules to follow in finding the missing number:

- To find the missing number in multiplication, you divide the product by multiplicand.
- To find the missing number in division:
  - You multiply the quotient by the divisor in case the missing number is the dividend.
  - You divide the dividend by the quotient in case the missing number is the divisor.

### Assessment

- Give pupils the **application activity** on how to find the missing number in multiplication or division.
- Make small pieces of paper with exercises on finding the missing number, put them in a box and ask each pupil to pick one paper randomly, do the exercise on the piece of paper and explain how they did it.

## 13.9.3 Lesson 3: Number pattern

### a) Objectives

#### Knowledge

To explain a number pattern and the common difference of a number pattern

#### Skills

To find a common difference of a number pattern

To complete some terms of a number pattern.

## Values

Thinking critically and quickly

### b) Prerequisite/Introduction

Different activities on how to find the multiplication table by a repeated addition of a common number.

### c) Teaching and Learning resources

Multiplication table, abacus, number cards, manila paper.

### d) Teaching and Learning Activities

- write a number and guide pupils to do activity of finding a list of sums when this number is added repeatedly with a common number. For example: First number is 2 , you add repeatedly 3:  $2+3=5$ ,  $5+3=8$ ,  $8+3=11$ ,  $11+3=14$ , ...

The list of numbers obtained is: 2, 5, 8, 11, 14, ...

- Ask pupils to give other following numbers on this previous list;
- Guide pupils to discover that the number 3 to be added is the common difference between two consecutive numbers of the list;
- Give other numbers and the common difference and ask pupils to find the following terms of the number pattern,
- Give them patterns and ask pupils to find the common difference.
- Tell pupils to notice that the limited list of these numbers is called a **number pattern**, and that the difference between two consecutive numbers of a number pattern is called a **common difference**.
- Form groups and ask pupils to do activities of finding the common difference of a number patter (**Activity 13.3.1**);
- Invite the whole class discussion and harmonize groups' findings.

### Summary

Guide pupils to summarize the rules to follow when finding a common difference of a number pattern:

- 1) When numbers are arranged from the smallest to the biggest:
  - To find the common difference, find the difference of two consecutive numbers: the bigger- the smaller. This is the **additive common difference**.
- 2) When numbers are arranged from the biggest to the smallest:
  - To find the common difference, find the difference of two consecutive numbers: the bigger- the smaller. This is the **subtractive common difference**.

## Assessment

Give pupils activity to be done individually and mark their work.

### 13.9.4 Lesson 4: Finding the missing number in a number pattern

#### a) Objectives

##### Knowledge

To explain how to find the missing number of a number pattern

##### Skills

To find a missing number in any a number pattern

##### Values

Thinking critically and quickly

#### b) Prerequisite/Introduction

Different activities on how to find the common difference and terms of a number pattern.

#### c) Teaching and Learning resources

Multiplication table, abacus, number cards, manila paper.

#### d) Teaching and Learning Activities

- Guide pupils to use the common difference and complete other terms of that number pattern (**Activity 13.3.2**);
- Form groups and ask pupils to do activities of finding the missing number in a number patter by use of its common difference (**Activity 13.3.3**);
- Invite the whole class discussion and harmonize groups' findings.

#### Summary

- Guide pupils to summarize the rules to follow when finding a missing number of a number pattern: You first calculate the common difference between numbers, You make addition in order to find the missing terms of an ascending number pattern, then You make subtraction in order to find the missing terms of a descending number pattern .

## Assessment

Give pupils activity to be done and mark their work.

#### e) More notes the teacher should consider:

- Monitoring all activities closely and catering for all learners without leaving any one behind.
- Explaining deeply how to effectively identify or find the missing numbers in addition, subtraction, multiplication and division.

- Prepares enough teaching and learning aids that learners will use to teach learners how to find the missing numbers in addition, subtraction, multiplication and division.
- Monitoring group activities giving learners tasks to identify the missing numbers in addition, subtraction, multiplication and division.
- Appropriate use of different teaching and learning aids.

**f) Extra activities and their answers.**

1) Find the common difference that was used in the following number pattern.

- a) 45,75,105,135.
- b) The common difference =  $75-45 = +30$
- c) 100,75,50,25
- d) The common difference is  $-(100-75) = -25$
- e) 20,40,60,80
- f)  $=40-20 = +20$
- g) 45, 36, 27, 18.

Common difference =  $-(45-36) = -9$

2) Fill in the missing number in the pattern.

- a) 45, 90,135,**180**,225,270.
- b) 0,15,30,**45**,60,75,90.
- c) 108,**100**,92,84,76,68.
- d) 47,60,73,86,**99**,112.

**13.10 Answers for the end unit assessment 13**

1) Complete the missing number

- a) **49**+ 950 = 999
- b) 653 + **132**= 785
- c) **778** – 357 = 421
- d) 935 – **311**= 624
- e) **8**× 6 = 48
- f) 5 × **5**= 25

2) Find the common difference for this pattern

- a) 25, 30, 35, 40, 45.                      **30-25=+5**
- b) 100,150, 200, 250, 300.                **150-100=+50**
- c) 95, 87, 79, 71, 63.                      **95-87=+8**
- d) 125, 100, 75, 50, 25.                    **125-100= +25**

3) Find and complete the missing number.

a.	$\begin{array}{r} 406 \\ + 492 \\ \hline 898 \end{array}$	b.	$\begin{array}{r} 989 \\ + 566 \\ \hline 423 \end{array}$	c.	$\begin{array}{r} 61 \\ \times 6 \\ \hline 366 \end{array}$
----	---	----	---	----	---

4) Find the missing number

- |    |                        |    |                              |
|----|------------------------|----|------------------------------|
| a. | 48, 54, 60, 66, 72, 78 | d. | 900, 800, 700, 600, 500      |
| b. | 81, 72, 63, 54, 45, 36 | e. | 375, 400, 425, 450, 475, 500 |
| c. | 95, 105, 115, 125, 135 | f. | 675, 690, 705, 720, 735, 750 |
|    |                        | g. | 840, 820, 800, 780, 760, 740 |

# UNIT 14

# PICTOGRAPHS /SIMPLE GRAPHS

## 14.1 Key unit competence:

Describing and explaining the information provided by a given pictograph/ simple graphs.

## 14.2 Prerequisites:

This unit is new, the teacher has to use objects available in the school environment and show that pupils are organizing objects of the same types on one vertical line.

## 14.3 Generic competences to be developed

- Critical Thinking and being cautious while doing exercises.
- Cooperation and interpersonal skills as he or she work with others in different activities.
- Problem-solving skills as he uses pictographs to show the number of objects, groups of objects and representing the number of objects with a pictograph.
- Appropriate communication skills when describing and interpreting graphs.
- Lifelong learning skills as learners show curiosity to learn more in Mathematics.

## 14.4 Crosscutting issues to be addressed

**Inclusive education:** Catering for learners with special education needs. Giving to fast-learners extra activities contained in this book. Giving slow learners suitable activities for their level. Giving special treatment to learners with physical impairment, making those with hearing and visual impairment sit in front where possible the teacher uses the special teaching/learning aids.

**Gender:** Addressed when both boys and girls work together in groups and other activities peacefully without discrimination.

**Environment and Sustainability:** Addressed when learners don't destroy the environment while looking for counters and cleaning where they worked from.

## Peace and values education:

Encourage learners to live and work in harmony and share ideas in a peaceful way with respect of each other's views during group discussion.

### 14.5. List of lessons for unit 14

No	Lessons	Number of periods
1	Making groups of objects and showing them on a pictograph	1
2	Describing and Interpreting pictographs used to show number of objects.	2
3	Drawing a pictograph with the information given.	2
4	End unit assessment	1
	Total number of periods	6

### 14.6 Guidance on different lessons

#### 14.6.1 Lesson 1: Reading or grouping the number of objects on a pictograph

##### a) Objectives

##### Knowledge

To explain how objects are put on a pictograph

##### Skills

To read and differentiate objects represented on a pictograph.

##### Values

Thinking critically and quickly

##### b) Prerequisite/Introduction

Activities for describing and interpreting various pictographs showing the number of objects.

##### c) Teaching and Learning resources

Different types of counters with different colors, gridded manila paper, etc.

##### d) Teaching and Learning Activities

- Guide pupils to do activities on how to name different groups of objects and tell the number of each group of objects on a pictograph (**activity 14.1**);
- Based on an example, guide pupils to understand how objects are arranged on a pictograph

**Vertically:** objects of the same type are arranged in a one column from the first to the last such that one can count them easily;

**Horizontally:** one can count the number of types of objects);

- Form groups and ask pupils to do activities of describing a certain pictograph
- Invite the whole class for discussion and harmonize groups' findings.

### Summary

- Guide pupils to summarize how objects are arranged on a pictograph and how to get information from it:
  - Each column has a same type of objects,
  - different columns have different types of objects;
  - the number of each type is counted vertically in each column,
  - the types of objects are counted horizontally and their number equals to the number of columns.

### Assessment

Give pupils an activity to be done and mark their work.

## 14.6.2 Lesson 2: Describing and Interpreting pictographs used to show number of objects.

### a) Objectives

#### Knowledge

To know how to put given objects on a pictograph

#### Skills

Organizing objects on a pictograph.

#### Values

Thinking critically and quickly and Being analytical.

### b) Prerequisites/Introduction

Activities related to the interpretation of a pictograph learnt in P2 and in the previous lesson;

### c) Teaching and Learning resources

Manila paper, different counters with different colors.

### d) Teaching and Learning Activities

- Guide pupils to recall how objects are arranged on a pictograph and how to get information from it;
- Form groups of pupils and refer to **activity 14.2** where you give each group different counters (objects) where the number of each type is known and ask pupils to: organize each group of object apart and then portray those groups of objects using a pictograph on a squared manila paper put on the table or the floor;

- Move around to each group to provide support with probing questions where necessary to bring them on the track;
- Guide the whole class to move from the work for each group to another to see how they worked and help them to harmonize it.

### Summary

Guide pupils to summarize the rules followed in making a pictograph (see the previous lesson)

### Assessment

- Make small pieces of paper with pictographs, putting them in a box and asking each pupil to pick one paper randomly, explaining the number/amount of things that appear in the pictograph.

## 14.6.4 Lesson 4: Making a pictograph with the given information or objects

### a) Objectives

#### Knowledge

To know how to put given objects on a pictograph

#### Skills

Organize objects to be put on a pictograph, Draw a pictograph with organized objects.

#### Values

Thinking critically and quickly and Being analytical.

### b) Prerequisites/Introduction

Activities related to the interpretation of a pictograph learnt in the previous lessons;

### c) Teaching and Learning resources

Manila paper, different counters with different colors.

### d) Teaching and Learning Activities

- Guide pupils to recall how objects are arranged on a pictograph;
- Form groups of pupils and assign them **Activity 14.3** where you give each group different counters (objects) where the number of each type is known and ask pupils to: organize each group of objects apart and then portray those groups of objects using a pictograph drawn on a **manila paper**;
- Move around to each group to provide support with probing questions where necessary to bring them on the track;
- Invite each group to show and explain their work and guide the whole class to harmonize it.

## Summary

- **Guide pupils to summarize the rules followed in making a pictograph (see the previous lessons):**
  - Each column has same type of objects,
  - different columns have different types of objects;
  - the number of each type is counted vertically in each column,
  - the types of objects are counted horizontally and their number equals to the number of columns.

## Assessment

Give pupils to be done in pairs and mark their work.

### Note:

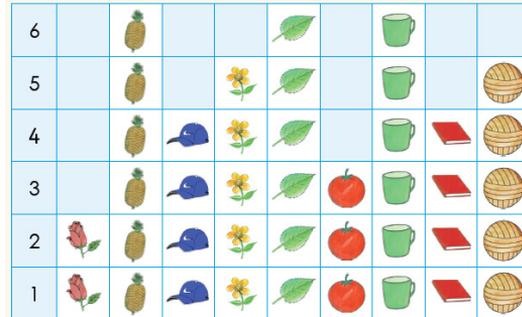
- If you do not have counters of the types found in activity from 14.1 to 14.3, you can give them other counters or guide pupils how to use counters' names for example book 1, book2, book3, and book4 in activity 14.3.
- The question 2 for activity 14.3 shows how you can formulate questions depending on objects available at school.

### e) More notes the teacher should consider:

- Monitoring all activities closely and catering for all learners without leaving any one behind.
  - Explaining deeply how to draw a pictograph to represent number of objects.
  - Prepares enough teaching and learning aids that he or she will use to teach learners how to construct a grid and putting points in a grid.
  - Monitoring group activities and gives learners opportunities to group objects and represent them with pictures.
- f) Extension activities and their answers: Draw a pictograph and indicate 6 pencils, 8 cups, 4 buckets, 7 balls and 2 dolls. (The teacher gives this activity to fast-learners who have finished before others).

## 14.7 Answers for the end unit assessment14

1) study the following pictograph and answer to questions



- How many flowers do we need to add to get 4?  
**Answer: 2 flowers are missing.**
  - What number matches to the pictures of pineapples?  
**Answer: It is 6.**
  - How many birds are missing make 6 birds?  
**Answer: Missing 2 hats.**
  - How many tomatoes are on the pictograph?  
**Answer: 3 tomatoes in the pictograph.**
- 2) Draw a pictograph with the following pictures: 1 notebook, 5 balls, 3 cups, 2 flowers, and 6 leaves.

# UNIT 15

# END OF YEAR ASSESSMENT

- 1) Write in figure or in words
  - a) Four hundred ninety-five. **595**
  - b) 979: **Nine hundred and seventy nine.**
  - c) Five hundred seventy-nine. **579**
  - d) 793: **Seven Hundred ninety three.**
- 2) Group the number in hundreds, Tens and ones.
  - a) 395: **3 Hundreds 9 Tens 5 Ones**
  - b) 921: **9 Hundreds 2Tens 1 Ones**
- 3) Write the number whose place values are the following:
  - a) 6H 9O 4T = **694**(b) 9O 9H 7T = **979** (c) 3O 5T 9H = **953**
- 4) Use  $<$ ,  $>$  or  $=$  to compare numbers
  - a.  $324 < 342$
  - b.  $325 = 325$
  - c.  $970 > 907$
  - d.  $561 > 165$
- 5) Arrange numbers from the smallest to the biggest number.
  - a) 51, 125, 215, 152. **Ans. 125,152,215,251**(b) 309, 930, 390, 903.  
**Ans.309 ,390,903,930**
- 6) Arrange numbers from the biggest to the smallest number.
  - a) 571, 175, 517,157 **Ans: 571, 517,175,157**
  - b) 923, 293, 932, 239 **Ans: 932,923,293,239**
- 7) Addition
  - a) 579
  - b) 901
  - c) 912
  - d) 934
- 8) Subtraction
  - a) 343
  - b) 8
  - c) 57

d) 46

9) Multiplication.

a) 546

b) 288

c) 279

d) 124

e) 86

10) Division

a) 498

b) 264

c) 195

d) 162

11) Complete by 10 or **100**

a)  $45 \times 10 = 450$

b)  $99 \times 10 = 990$

c)  $7 \times 100 = 700$

d)  $9 \times 100 = 900$

12) Complete the missing numbers

a) 945, 900, 855, **765, 720.**

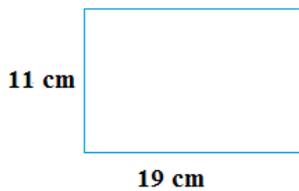
b) 900, 700, 600, **500, 400.**

13) Complete the following multiplication tables

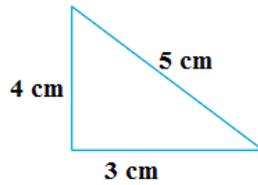
	1	2	3	4	5	6	7	8	9	10
2 x	2	4	6	8	10	12	14	16	18	20
	1	2	3	4	5	6	7	8	9	10
3 x	3	6	9	12	15	18	21	24	27	30
	1	2	3	4	5	6	7	8	9	10
4 x	4	8	12	16	20	24	28	32	36	40
	1	2	3	4	5	6	7	8	9	10
5 x	5	10	15	20	25	30	35	40	45	50
	1	2	3	4	5	6	7	8	9	10
6 x	6	12	18	24	30	36	42	48	54	60

14) Find the perimeter of the following geometric figures

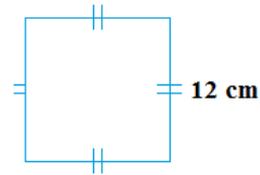
a)



b)



c)



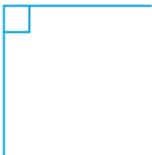
a) Perimeter =  $(19 + 11) \times 2 = 60$  cm

b) Perimeter =  $5\text{cm} + 4\text{cm} + 3\text{cm} = 12\text{cm}$

c) Perimeter =  $12\text{cm} \times 4 = 48\text{cm}$

15) Name the following angles

a)



b)



c)



d)



a) Right angle.

b) Acute angle.

c) Obtuse angle.

d) Right angle.

16) Work out the following

a)  $150\text{ dm} - 50\text{ dm} = 10\text{ m}$

b)  $42\text{ dm} \times 4 = 168\text{ dm}$

c)  $75\text{ dm} + 250\text{ dm} = 325\text{ dm}$

d)  $121\text{ l} \times 4 = 484\text{ l}$

e)  $455\text{ kg} + 544\text{ kg} = 999\text{ kg}$

f)  $715\text{ kg} - 673\text{ kg} = 42\text{ kg}$

g)  $245\text{ l} + 655\text{ l} = 900\text{ l}$

h)  $4\text{ m} = 40\text{ dm} = 400\text{ cm}$

i)  $2\text{ m } 8\text{ cm} = 208\text{ cm}$

j)  $200\text{ cm} = 20\text{ dm} = 2\text{ m}$

k)  $100\text{ cm} = 1\text{ m} = 10\text{ dm}$

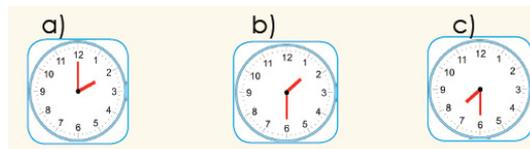
l)  $1000\text{ Frw} = 500\text{ Frw} + 500\text{ Frw}$

m)  $500\text{ Frw} = 100\text{ Frw} + 200\text{ Frw} + 100\text{ Frw} + 100\text{ Frw}$

- n)  $100 \text{ Frw} = 50 \text{ Frw} + 50 \text{ Frw}$   
 o)  $50 \text{ Frw} = 20 \text{ Frw} + 20 \text{ Frw} + 10 \text{ Frw}$   
 17) Use  $>$ ,  $<$  = to compare measurements  
 a)  $4\text{m} > 4\text{dm}$   
 b)  $5 \text{ m } 6\text{cm} = 506\text{cm}$   
 c)  $15 \text{ dm } 6\text{cm} = 156\text{cm}$   
 18) study the calendar and answer to questions:

Monday	Tuesday	Wednesday	Thursday	Friday	Sunday	Sunday
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31				

- a) How many days does this month have?  
**31 days**  
 b) How many Mondays does this month have?  
**5 Mondays**  
 c) How many Tuesdays does this month have?  
**5 Tuesdays**  
 d) How many weekends does this month have?  
**4 weekends.**  
 e) What is the last day of this month?  
**Tuesday.**  
 19) Read and tell the time?



- a) It is two O'clock  
 b) It is a half past One.  
 c) It is a half past seven.  
 20) **Word problems**  
 a) The total number of pupils of our school is 985. If 512 of them are girls, find the number of boys.  
**Boys =  $985 - 512 = 473$  boys.**

- b) Last year Karisa planted 432 trees. This year he planted 515 trees. Calculate the total number of trees planted by Karisa in two years.

**Total =  $432 + 515 = 947$  trees.**

- c) Kayiranga has 1000 Frw. If he buys 1 kg of sugar at 800 Frw, how much money will he remain with?

**Answer: He remains with  $1000 - 800 = 200$  Frw.**

- d) Butera has 500 Frw. He needs to buy a book costing 900 Frw. How much more money does he need to buy the book?

**He needs  $900 \text{ Frw} - 500 \text{ Frw} = 400 \text{ Frw}$ .**

- e) Last year Uwamahoro bought 492 hens. In this year, he bought 508 more hens. Find the total number of hens bought by Uwamahoro in two years.

**Total =  $492 + 508 = 998$  hens**

- f) There are 5 rows of chairs in the church. If each row has 101 chairs, find the number of chairs for the church.

**Number of chairs =  $101 \times 5 = 505$  chairs.**

- g) Gato paid 800 Frw to buy sugar and 100 Frw for the bread. How much money did he pay?

**He paid  $800 \text{ Frw} + 100 \text{ Frw} = 900 \text{ Frw}$ .**

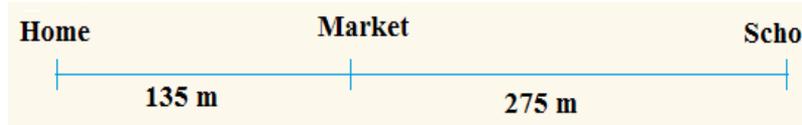
- h) I bought 225 kg of rice from the market. When I reach the village I sold 95 kg from it. Find the quantity of rice I remained with.

**You remained with  $225 \text{ kg} - 95 \text{ kg} = 130 \text{ kg}$ .**

- i) (i) We have a tank containing 550 l of water. If we use 350 l to wash clothes, how much water we can remain with?

**You can remain with  $550 \text{ l} - 350 \text{ l} = 200 \text{ l}$**

- j) Study the picture below showing my way from home to school.



- 1) Find the distance from home to school.

**$135 \text{ m} + 275 \text{ m} = 410 \text{ m}$**

- 2) Find the distance from home to the market.

**135 m**

- 3) Find the length of my way from the market to school.

**Answer = 275 m**