# MATHEMATICS

## TEACHER'S GUIDE

## YEAR

# 2

## PRIMARY

## FOREWORD

Dear teacher,

Rwanda Basic 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 lcearn 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 student-teacher'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. Nelson MBARUSHIMANA**
**Director General, REB**

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**MURUNGI Joan,**

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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 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.
- **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 heading title**
- **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.

  **Note:** At the end of this book, there is a glossary. This is a collection of key terms of the book. They were explained to indicate as they are basic words of concepts to be developed in units.

## 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:

| Generic competences | Ways of developing generic competences |
|---|---|
| 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 |
|---|---|
| **Environment and Sustainability:** 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. | 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 environment and sustainability. |
| **Financial Education:** 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. | 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. |
| **Gender:** 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. | 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. |

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| **Inclusive Education:** 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. | 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. |
| **Peace and Values Education:** 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. | • Through a given lesson, a teacher should:<br>• Set a learning objective which is addressing positive attitudes and values,<br>• Encourage pupils to develop the culture of tolerance during discussion and to be able to instil it in colleagues and cohabitants;<br>• Encourage pupils to respect ideas for others. |
| **StandardizationCulture:** 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. | 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. |

### 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 organize 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 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.

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| **Remedial activities** | After evaluation, slow learners are provided with lower order thinking activities related to the concepts learnt to facilitate them in their learning.<br><br>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 range 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:

**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.

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.

**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.

| The role of the teacher in active learning | The role of pupils in active learning |
|---|---|
| The teacher engages pupils through active learning methods such as inquiry methods, group discussions, research, investigative activities, group and individual work activities.<br><br>He/she encourages individual, peer and group evaluation of the work done in the classroom and uses appropriate competence-based assessment approaches and methods. | A pupil engaged in active learning:<br><br>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);<br><br>Actively participates and takes responsibility for his/her own learning; |
| 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.<br><br>The teacher supports and facilitates the learning process by valuing pupils' contributions in the class activities. | Develops knowledge and skills in active ways;<br><br>Carries out simple research/ investigation by consulting print/ online documents and resourceful people, and presents their findings;<br><br>Ensures the effective contribution of each group member in assigned tasks through clear explanation and arguments, critical thinking, responsibility and confidence in public speaking<br><br>Draws conclusions based on the findings from the learning activities. |

**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).

**Main elements to be emphasized during CLIL lessons**

**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 teaching 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 s*elect 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 e*xplicitly 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.

**Techniques for explaining concepts and content:**

- **Use visualization techniques:** graphs, hand-on-manipulatives, body language, gestures or computer simulation programmes can help students better understand the concepts.
- **Use an active discovery technique**: instead of giving lengthy explanations in the foreign language about the new concepts, try involving your students in hand-on manipulative activities which can include listening, speaking, reading, writing, watching, cutting, gluing, experimenting, selecting, drawing, etc.
- **Allow students a small time to discuss** in groups or work on content concepts in their mother tongue at the beginning stages when they carry out a task, and they are required to interact or negotiate with their peers.
- **Review the key vocabulary and key content concepts**: you can either display them, use brief quizzes in the form of games or use songs and chants which involve the concept to provide quick and engaging ways of reminding the students of the key concepts and words.
- **Regularly check understanding and give feedback**: observe the students' responses systematically and use the spot-check activities during the lesson.

**Learning strategies**

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.

Teaching Mathematics using a second language may be a challenge for pupils and teachers but there are a number of strategies that support the teacher in Primary Education, such as **holistic, constructive and experiential learning.**

The 21st century pedagogies also often enhance **active, experimental, digital and cooperative learning,** as well as learning through **discovery and task-based learning.**

- **Holistic learning** refers to learning that integrates all subject areas and aims at supporting the child in his social, psychological, physical and cognitive development. This is done in the interest "of more vital and meaningful learning". For example when teaching the addition of numbers, the teacher can use different contexts: putting countable objects together, adding money in a bank, adding the number of animals in a farm, number of people in the market, etc.
- **Constructive learning** is often presented as a discovery and construction of mental schema by learners interacting with their environment on multiple levels.

**E.g.** take 27 bottle tops and ask learners to form 9 groups of them where all groups will have a same number of bottle tops. Ask them to give the number of bottle tops for each group and explain if what they did is the representation of 27÷9 or 27x9.

- **Experiential learning** is a tactile approach, which involves physical objects as resources. Its focus is on promoting authentic experience. The level of authenticity is increased if the experience can be shared with an expert.

**E.g.** If students are learning the perimeter of a rectangle, they may explore the total length of a rectangular field located at their school.

- **Active learning** involves learning through the process of use and discovery, doing things and finding out things for themselves using a range of media, solving problems, and planning own work and learning, rather than just listening or reading.
- **Digital learning** involves the confident and critical manipulation of multiple modalities in diverse media devices. E.g. A guided research on the internet on how to draw a right angle ruler and protractor or a ruler and a pair of compass.
- **Cooperative learning** encourages pupils to work together (in pairs, small groups, class, with another class, school, with several schools). Teachers should monitor how children act and react in group settings, can talk effectively to one another, etc.

**E.g.** Students collaborate in making a book together on local fauna by colouring 3 animals each in the book. Students exchange their books with students in other classes or schools

- **Discovery learning** is a learning experience that allows children to develop their own understanding and knowledge of concepts and/or

relationships rather than following a pre-set process or outcome.

**Example:** Engaging children in collecting information about the place they live in by, for example, taking photos of the places they want to include in their project.

- **Task-based learning** (TBL) or activity based learning is learning that develops around tasks that students have to complete. The language they will use is determined by what they need to do the task. TBL is generally organized in: pre-task, task, planning how to do the task and report by analyzing and practicing. **Example**: when the teacher needs to teach obtuse angle and acute angles, he/she can give learners protractors and a collection of sheets of paper on which angles are drawn, Learners are asked to group angles in 3 groups: angles with values equal to the right angle, angles whose values are greater than a right angle and angles that are greater than a right angle. Then, learners can be asked to guess the name to be given to the 2 types of angles.

## PART II: SAMPLE LESSON

School Name: ..... Primary School Teacher's name: …

| Term | **Date** | **Subject** | **Class** | **Unit 1** | **Lesson N°** | **Duration** | **Class size** |
|---|---|---|---|---|---|---|---|
| 1 | 26 /09/ 2022 | Mathematics | P2 | Counting objects in groups from 1up to 200. | 1 out of 24 | 40 minutes | 48 learners |
| **Type of Special Educational Needs to be catered for in this lesson and number of learners in each category** | | | | 2 slow learners, 3 learners with physical impairment and 2 very talented learners. | | | |

| | |
|---|---|
| **Unit title** | **Numbers from 0 up to 200** |
| **Key Unit Competence:** | To be able to count, read, write, order, compare, add, multiply and divide whole numbers from 0 up to 200. |
| **Title of the lesson** | Counting groups of objects from 1 up to 200. |
| **Instructional Objective** | By the end of this lesson, using sticks learners will be able to count object up to 200 in order without mistakes. |
| **Plan for this Class (location: in / outside)** | Outside and inside class. |
| **Learning Materials (for all learners)** | Different objects to be counted. (stones, bottle tops, beads, beans, etc) |

| References | Mathematics P2 Pupil's book (page 7) and Mathematics syllabus for Lower primary. |
|---|---|

| Steps and Timing | *Description of teaching and learning activity* | | Competences and Cross-Cutting Issues to be addressed |
|---|---|---|---|
| | Teacher's activities | **Learner's activities** | |
| **Introduction or Review**<br><br>**(5 minutes)** | 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. | Puts counters together in groups.<br><br>Observes and gives ideas on the names of objects in every group.<br><br>Go into their respective groups | **Generic Competences**<br><br>Critical thinking and being cautious. Following and doing as the given instructions.<br><br>**Cross cutting issues addressed.**<br><br>**Gender:** Addressed when both boys and girls follow and do as instructed.<br><br>**Environment and Sustainability:** Addressed when learners don't destroy the environment while looking for counters.<br><br>**Peace and values education:**<br><br>Addressed when all learners share ideas in a peaceful way with respect of each other's views. |
| **Development of the lesson (30 minutes)** | Puts learners in groups.<br><br>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. | **Activity1:**<br><br>Counting the objects in groups.<br><br>Every group of learners presents to the teacher a group of 200 counters. | **Generic Competences**<br><br>Critical and logical thinking.<br><br>Being cautious while doing exercises.<br><br>Problem-solving skills in relation to counting. |

| | | | |
|---|---|---|---|
| | **Activity1:**<br>Gives each group counters and asks learners to count and tell their number.<br>Monitors groups to check if they are following the given instructions. For example:<br>50,75,100.<br><br>**Activity 2:**<br>Asks learners to group the given counters according to the numbers given.<br>Each group must have a different number.<br>Monitors groups to check if they are doing the activities as instructed. | 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.<br><br>**Activity 2:**<br>Learners form groups of counters equivalent to the numbers given to them by the teacher. For example: 50,75,100.<br>Listen attentively to instructions and ask questions where they don't understand before starting the activity. | Appropriate communication while counting loudly.<br>Lifelong learning skills as learners show curiosity to learn more in Mathematics.<br><br>**Gender** addressed when both girls and boys working together in groups or when each accepts the role of presenting the findings of a group.<br><br>**Inclusive** education addressed in classroom by encouraging all learners to be engaged on the work and discussion.<br><br>**Peace and values education:**<br>Addressed when all learners share ideas in a peaceful way with respect of each other's views during group discussion |
| | **Activity 3:**<br>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. | **Activity 3:**<br>Counting in tens<br>Holding a bundle of 100 counters, keep adding 10 counters as they tell the new number of counters. | |

| | | | |
|---|---|---|---|
| **Conclusion**<br><br>**5 minutes** | Provides learners with exercises to group counters not more than 200 according to the given instructions of each group.<br><br>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.<br><br>Asks learners to continue counting different things at their homes. | Every pick 40 counters put them together then count and make a group of 179 counters.<br><br>**Homework:**<br><br>Each of you should count the number of plates you have at your home and be ready to share their number tomorrow. | |
| **Teacher's self-evaluation.** | 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. | | |

## PART III: UNIT DEVELOPMENT

# UNIT 1 NUMBERS FROM 0 UP TO 200

## 1.1 Key unit competence:

Counting, reading, writing, ordering, comparing, adding and subtracting, multiplying and dividing whole numbers 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, ordering, comparing, adding and subtracting, multiplying and dividing whole numbers 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

| UNIT 1: NUMBERS UP TO 200 (40 periods) | | | | Reinforcement and Extension |
|---|---|---|---|---|
| | **Lesson title** | **Learning objectives** | **Number of periods** | |
| 1 | Introductory activity | Arouse the curiosity of learners on the content of this unit. | 1 | |
| 2 | Counting groups of objects up to 200 | Understand and discover the concept of numbers up to 200. | 2 | |

| | | | | |
|---|---|---|---|---|
| 3 | Place value of each digit for numbers up to 200 | Group numbers up to 200 into ones, tens and hundreds. | 1 | 1 |
| 4 | Reading and writing numbers up to 200 in words. | Read and write in words the numbers up to 200. | 1 | 1 |
| 5 | Remediation | | 1 | |
| 6 | Comparing numbers that do not exceed 200. | Compare numbers that do not exceed 200. | 1 | |
| 7 | Arranging numbers that do not exceed 200 in ascending and descending order. | Arrange numbers that do not exceed 200 in ascending and descending order. | 1 | |
| 8 | Addition of Numbers whose sum does not exceed 200 without carrying. | Add numbers whose sum does not exceed 200 without carrying. | 1 | |
| 9 | Addition of Numbers whose sum does not exceed 200 with carrying. | Add numbers whose sum does not exceed 200 with carrying. | 1 | 1 |
| 10 | Word problems involving addition of numbers whose sum does not exceed 200. | Solve word problems involving addition of numbers whose sum does not exceed 200. | 1 | 1 |
| 11 | Remediation | | 1 | |
| 12 | Subtraction of numbers that do not exceed 200 without borrowing. | Subtract numbers that do not exceed 200 without borrowing. | 2 | |
| 13 | Subtraction of numbers that do not exceed 200 with borrowing. | Subtract numbers that do not exceed 200 with borrowing. | 2 | |
| 14 | Applying subtraction n in real life situation | Solve word problems involving subtraction of numbers whose difference does not exceed 200. | 2 | 1 |
| 15 | Remediation | | 1 | |
| 16 | Multiplication of numbers by 2 and multiples of 2 that do not exceed 20. | Multiply numbers by 2 and give multiples of 2 that do not exceed 20. | 1 | |

| | | | | |
|---|---|---|---|---|
| 17 | Multiplication of 2 digit numbers by 2 without carrying. | Multiply 2 digit numbers by 2 without carrying. | 1 | 1 |
| 18 | Word problems involving multiplication of 2 digit numbers by 2 without carrying. | Solve word problems involving multiplication of 2 digit numbers by 2 without carrying. | 1 | |
| 29 | Multiplication of numbers by 3 and multiples of 3 that do not exceed 30 | Multiply whole numbers by 3 and give multiples of 3 that do not exceed 30. | 1 | |
| 20 | Word problems involving multiplication by 3. | Solve word problems involving multiplication by 3. | 1 | 1 |
| 21 | Remediation | | 1 | |
| 22 | Division of 2 digit numbers or 3 digit numbers by 2 without remainder. | Divide 2 or 3 digit numbers by 2 without remainder. | 1 | |
| 23 | Word problems involving division of a number by 2 | Solve word problems involving division of a number by 2 | 2 | |
| 24 | Division without a reminder of a 2 or 3 digit numbers by 3. | Divide without a reminder of a 2 or 3 digit numbers by 3. | 1 | 1 |
| 25 | Word problems involving division of a number by 3 | Solve word problems involving division of a number by 3 | 1 | 1 |
| 27 | End unit assessment 1 | Performing well in counting, reading, writing, ordering, comparing, adding and subtracting, multiplying and dividing whole numbers from 0 up to 200. | 1 | |

## 1.5 Guidance on different lessons

### Lesson 1: Introductory activity

a) **Learning objective:** Arouse the curiosity of learners on the content of this unit

b) **Teaching and learning aids:** pupil's book, counters (or beans and bottle tops), pens and notebooks.

c) **Teaching and learning activities:**

- This lesson is delivered through a conversation between the teacher and pupils.

- Ask pupils to look at the picture of the **introductory activity 1**.
- Ask different prompting questions to pupils in order to arouse their curiosity on the content of this unit. Use questions related to the numbers:
  - How many children do you see in the pictures?
  - What are children in the first picture doing?
  - What are children in the second picture doing?
  - How can you count more than 100 counters? Can you write their number?
- As it is at the beginning of the unit, value all answers from pupils because they may be unable to give the correct answer. All answers are valid.
- Lead pupils to give predictions on what they need to learn on numbers up to 200.

**Lesson 2: Counting, reading and writing numbers up to 200 in figures**

**a) Learning objectives:** Count objects, understand and discover the concept of numbers from 1 to 200.

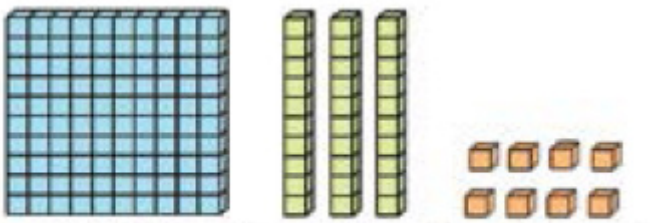
**b) Teaching and learning aids:**

- 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 colours.

**c) 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 the base ten tools (flats, rods and units).



| HUNDRED | TENS | ONES |
|---|---|---|

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

- Lead pupils to read and write a 3-digit number from 101 to 200 (use from **activity 1.1.1).**
- Ask 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.
- Form groups of pupils and assign them to work on some questions from **activity 1.1.2** to **activity 1.1.5** (one by one).
- Move to each group and help 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.
- Invite groups to a whole class discussion to present answers and harmonize them.

Let pupils experience how to write numbers from 101 to 200 in figures and how to read them.

- Assign pupils to work in pairs the **application activity 1.1**.
- Mark their work and provide activities to be done by pupils individually at school and others to be done at home.
- At the end of the lesson, let them summarize what they have learnt. They can do it in their local language and you help them to summarize it.

**Rule to follow when reading number in words:**

- When you read / write a `number, you write out the number in words as well as in digits.
- Start with the digit at the left, which has the largest place value.
- **Put the word and** after the first digit in every group of 3 numbers (hundreds) that contain tens or units:

**Example: 155**: one hundred and fifty-five. **101**: One hundred and one.

- use the dash between tens, from twenty to ninety, and units.

**Examples**: **25**: Twenty-five. **172**: One hundred and seventy-two. **169**: One hundred and sixty-nine.

**d) 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.
   a) 159: One hundred and fifty-nine:
   b) 187: One hundred and eighty- seven.
   c) 199: One hundred ninety-nine:

d) 178: One hundred and seventy-eight
e) 135: One hundred and thirty-five:
f) 169: One hundred and sixty-nine.

**e) 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.

**Lesson 3: Place value of each digit for numbers from o up to 2000**

**a) Learning objectives:**

- Group numbers up to 200 into ones, tens and hundreds.
- Identify the value of each digit of a number.

**b) Teaching resources and learning resources:**

- Abacus, base ten tools, the table of place values or bundle of sticks;
- Number cards with different numbers between 100 and 200 in different colours;
- Different types of counters.

**c) Teaching and learning activities:**

- Use the abacus, base ten tools, or bundle of sticks to represent different numbers.
- Ask pupils to represent the other numbers and then say the value of each: bide, bundle, or base ten item (block, flat or unit). Use activity 1.21 and activity 1.2.2.
- 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 1.2.3;
- Provide to pupils the number cards with different numbers between 100 and 200. Ask each pupil to try to complete a number in his place value table referring to the example found in activity 1.2.3;
- Form groups of pupils and assign them to try questions of activity 1.2.3.
- Move around in the class for facilitating pupils and guide learners where necessary;
- Invite some groups to present their findings and then help them to harmonize.
- Assign each pupil to work individually on questions of application activity 1.2.
- 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).
- Assign all pupils activity to be done as a home work.

**d) Extended activity**

Write down the numbers that were grouped into hundreds (H), tens (T) and ones (O).

a) 2Ones 0Tens 1Hundreds =
b) 1Tens 1Hundreds 2 Ones =
c) 2Ones 1Hundreds 1Tens =
d) 1Hundreds 5Ones 4Tens =

**Lesson 4: Writing numbers in words**

**a) Learning objective:**

Write the number up 200 in words.

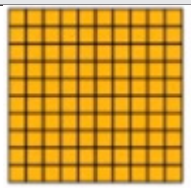
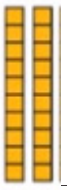
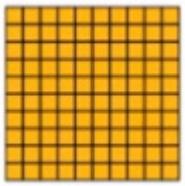
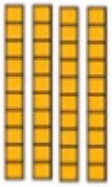
**b) Teaching resources and learning resources:**

- Abacus, base ten tools, the table of place values or bundle of sticks;
- Number cards with different numbers between 100 and 200 in different colours;

**c) Teaching and learning activities:**

- Use base ten tools or bundle of sticks to represent different numbers and guide learners how to reduce to write the number in words.

**Example:** 126 and 143

| Number in figure | Hundreds | Tens | Ones | Number in words |
|---|---|---|---|---|
| **156 =** 1 hundred 5 tens 6 ones |  |  |  | One hundred and twenty-six |
| **143 =** 1 hundred 4 tens 3 ones |  |  |  | One hundred and forty-three |

- Guide pupils to try to write other numbers from 0 to 100 in words. Use activity 1.3.1.
- Form groups of pupils and assign them to read the number and try to write it in words. Use **activity 1.2.3 (**from **b** to **e)**
- Move around in the class for facilitating pupils and where necessary;
- Invite some groups to present their findings and then help them to harmonize.
- Ask a learner to read the number of **activity 1.3.2** and invite another to write it in figure.
- Assign each pupil to work individually on questions of **application activity 1.3**.

- mark their work, provide feedback and remediate where necessary.
- Guide pupils to summarize how to write number in words.

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

When you read / write a `number, you write out the number in words as well as in digits.

- Start with the digit at the left, which has the largest place value.
- Put the word and after the first digit in every group of 3 numbers (hundreds) that contain tens or units:

**Example:** 165: one hundred and sixty-five. 108: one hundred and eight.

- use the dash between tens, from twenty to ninety, and units.

**Examples:** 29: Twenty-nine. 132: One hundred and thirty-two. 179: One hundred and seventy-nine.

- Assign all pupils activity to be done as a home work.

**d) Extended activity**

Write down the following numbers in words:

| | | | | |
|---|---|---|---|---|
| **a) 135** | **d) 128** | **g) 145** | **j) 167** | **m) 139** |
| **b) 178** | **e) 193** | **h) 113** | **k) 184** | **n) 23** |
| **c) 169** | **f) 127** | **i) 198** | **l) 147** | **o) 192** |

**Lesson 5: Comparing numbers up to 200**

**a) Learning objectives:** Compare numbers that do not exceed 200

**b) Teaching and learning aids:**

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

**c) Teaching and learning activity:**

- Guide pupils to recall how to compare the number of objects which are in two groups: objects which are many, which are few, etc.
- Guide pupils to use base ten tools or abacus to represent two numbers and then refer to their representations and compare the two numbers by using: … is greater than… or is less than… or is equal to …. Use **activity 1.3.1.**
- Draw a table of place value on the chalk board and 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; Guide them to be able to find that **156 is greater than 126** or **126 is less than 156**

- Lead pupils do find how to use comparison symbols to compare those numbers. For example: 126 < 156 or 156 > 126.
- Form pairs of pupils and assign them to try to answer to questions for **activity 1.3.1.**
- Move around in the class for facilitating pupils where necessary; assign other activities to those who finish first;
- Invite some pairs to present their findings and then help them to harmonize;
- 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).
- Provide application activities to be done by pupils and check their answers. Use the **application activity 1.3**.
- Assign all pupils to answer to some questions of **activity 1.3.2**. Others can be done as a home work to be done.

**d) Extra activities and their answers:**

1) Invite pupils to work on the **activity 1.3.3.**
2) Use the symbols **<, >, =** to compare the following pairs of numbers:
   a) 145 **<** 154
   b) 142 **>** 124
   c) 125 **=** 125
   d) 154 **>** 142.

**Lesson 6: Arranging numbers in increasing and decreasing order**

**a) Learning objectives:** arranging numbers that do not exceed 200.

**b) Teaching and 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) Teaching and learning activities:**

- Guide learners to recall how to compare the number of objects which are in many groups: which are bigger, which are smaller, etc.
- Form 4 groups of counters with the following numbers ( 20, 22, 15 and 30). Hen ask pupils to say which one has few number of counters, which is the next with few number of counters, etc until they cover all groups. Tell them that the way of arranging groups from the one with the small number of counters is called ascending order: 15, 20, 22, 30.

- Guide learners to draw a table of place value on the chalk board and in their notebooks, then use numbers given in **activity 1.4.1** and guide learners to complete them in a table of place values and help them to discover how to arrange the numbers from the smallest to the biggest.
- Form pairs and assign them to arrange numbers given in the **activity 1.4.2**.
- Move around in the class for facilitating learners where necessary; assign other activities to those who finish first;
- Invite some groups to present their findings and then help them to harmonize;
- Retake the groups of counters and ask them to arrange those groups from the one with more counters. Lead pupils to discover that it is: 30, 22, 20,15.
- Guide learners to draw a table of place value on the chalk board and in their notebooks, then use numbers given in **activity 1.4.3** and guide learners to complete them in a table of place values and help them to discover how to arrange the numbers from the smallest to the biggest.
- Form pairs and assign them to arrange numbers given in the **activity 1.4.4**.
- Move around in the class for facilitating learners where necessary; assign other activities to those who finish first;
- Invite some groups to present their findings and then help them to harmonize;
- Guide learners to summarize how to arrange numbers using a table of place values: Insist on the comparison from hundreds (H), tens (T) and ones (O).
- Provide application activities to be done by learners and check their answers. Use **application activity 1.4.**
- Assign all learners homework to be done.

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

1) Arrange these numbers in ascending order (from the smallest to the biggest).
   a) 105, 199, 140, 150. Answer: 105, 140, 150, 199.
   b) 112,131, 121, 113. Answer: 113, 131, 112, 21.
3) Arrange these numbers in descending order (from the biggest to the smallest).
   a) 138, 180, 107, 190, 118.
      Answer: 190, 180, 138, 118, 117.
   b) 151, 116, 156, 115.
      Answer: 156, 151, 116, 115.

**Lesson 7: Addition of numbers whose sum does not exceed 200**

a) **Learning objectives:** Add without carrying the numbers whose sum does not exceed 200.

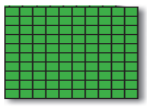
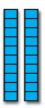
b) **Teaching and learning aids:**

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

**c) Teaching and learning activities:**

- **T**ry to emphasize the addition using pictorial representation of real objects and the use of standard written method and mental arithmetic,
- 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 1.5.1).**
- 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 base ten tools as follow:

123 + 32 = 155

| | H | T | O |
|---|---|---|---|
| |  |  |  |
| | 1 | 2 | 3 |
| + | |  |  |
| | | 3 | 2 |
| | 1 | 5 | 5 |

```
  1 2 3
+   3 2
-------
  1 5 5
```

- Guide pupils on how to add numbers by using standard written method of vertical addition. See example below.

123 + 32 = 155

| | H | T | O |
|---|---|---|---|
| | 1 | 2 | 3 |
| + | | 3 | 2 |
| | 1 | 5 | 5 |

```
  1 2 3
+   3 2
-------
  1 5 5
```

- Form pairs of pupils and assign them to do work on some questions of **activity 1.5.3** and **activity 1.5.4**.

- 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 pupils an application activity to be done individually, mark it and act accordingly.
- Guide pupils to summarize how to add numbers without. Insist on the use of the standard written method which looks like the use of the table of values.
- Assign pupils a home work. (Use **application activity 1.5.1**).

**d) 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) 106 + 62 = 168
c) 98 + 101 = 199
d) 84 + 108 = 192

**Lesson 8: Addition with carrying**

**a) Learning objectives:** Add with carrying the numbers whose sum does not exceed 200.

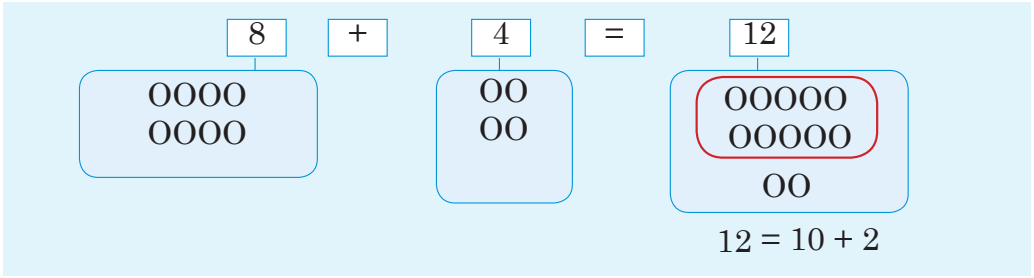
**b) Teaching and learning aids:**

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

**c) Teaching and learning activities:**

- **T**ry to emphasize the addition using pictorial representation of real objects and the use of standard written method and mental arithmetic,
- 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.

Use for example 8 + 4 =




- Guide pupils on how to add numbers by using standard written method of vertical addition. See example below use **example of activity 1.5.5**.
- Form pairs of pupils and assign them to do work on some questions of **activity 1.5.5** .
- 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 *with carrying*.
- Assign pupils to work on some questions of an **application activity 1.5.2** to be done individually, mark it and act accordingly.
- Guide pupils to summarize how to add numbers. Insist on the use of the standard written method which looks like the use of the table of values.
- Assign pupils a home work. (Use some questions of **application activity 1.5.2**).

**d) Extra activities and their answers:**

Add:

| | | |
|---|---|---|
| **a) 105 + 58 =** | **e) 137 + 26 =** | **i) 89 + 27 =** |
| **b) 77 + 96 =** | **f) 88 + 45 =** | **j) 65 + 108 =** |
| **c) 85 + 46 =** | **g) 149 + 36 =** | **k) 34 + 98 =** |
| **d) 85 + 46 =** | **h) 73 + 49 =** | **l) 98 + 86 =** |

**Lesson 9: Word problems involving the addition of numbers whose sum does not exceed 200**

**a) Learning objectives:** Solve word problems involving addition of numbers whose sum does not exceed 200.

**b) Teaching and learning aids:**

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

**c) Teaching and learning activities:**

- Guide pupils to read the word problem given as example. Use groups of counters with numbers equal to those given in the given word problem, they then add counters depending on the mathematical operation needed in the word problem, and tell the sum. You can use the drawing on the board that help learners understand that the operation to be used is the addition of 123 pupils and 54 pupils.
- Guide them to add vertically 124 and 54 to find the total number of new pupils.
- Guide pupils highlight the steps for solving a word problem: read and u*nderstand the problem, identify facts (given and requested), draw visual representations and solve the problem using the addition.*
- *Assign pupils in pairs to work on 3 questions of* **activity 1.6**.
- 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.*
- Help learners to identify essential words from the problem that tell them it is the addition: **total, altogether, the sum**, etc.
- Assign them the problem to be done individually for assessment. Use **application activity 1.6**. – Mark their answer and provide feedback.
- assign the homework to learners. Use the remaining questions for **application activity 1.6.**

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

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

1) Uwera has 102 ripe mangoes and 90 raw mangoes. Find the total mangoes she has altogether.

   **Answer:** The total mangoes Uwera has = 102 + 90 = 192 mangoes.

2) Rugira planted 100 trees in his fence last year. Find the number of trees he will be having next year if this year he also planted 96 trees.

**Answer**: The total number of trees = 100+96 = 196 trees.

**Lesson 10: Subtraction of numbers within 200**

**a) Learning objectives: Subtract without borrowing numbers that do not exceed 200.**

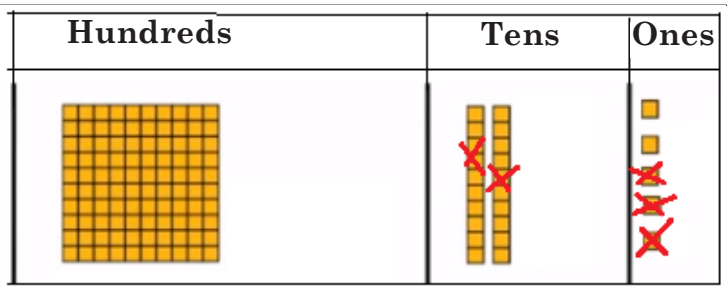
**b) Teaching and learning aids:**

A variety of counters: stones, bottle tops, beans, beads, balloons, maize seeds,

tomatoes, books, pens, pencils, chalk, and number cards..

**c) 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**)
- 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. Use **activity 1.7.2**.




We take away 2 tens and 2 ones.

We have:
125 – 23 = 102

- Guide pupils to write and read aloud a mathematical sentence on subtraction of 2 numbers less than 500. Use the standard written method to subtract numbers.(Use example of **activity 1.7.3).**

174 - 23 =

| Hundreds (H) | Tens (T) | Ones (O) |
|---|---|---|
| 1 | 7 | 4 |
| – ↓ | 2 | 3 |
| 1 | 5 | 1 |

Then, 174 – 23 = 151.

- Form pairs of pupils and assign them to work on questions of **activity 1.7.3**
- 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 pupils to work individually on some questions of the **application activity 1.7** and verify their answers.
- Provide homework to pupils. Use some questions from **application activity 1.7.1.**

**Lesson 11: Subtraction with borrowing**

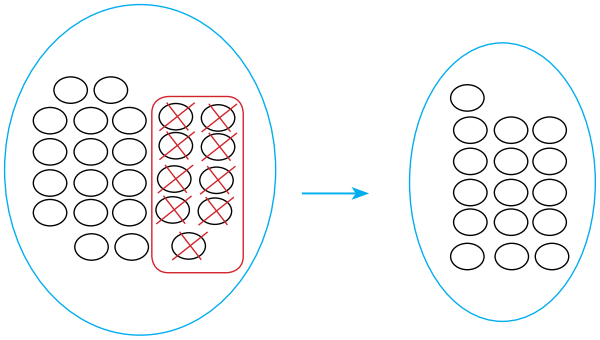
**a) Learning objectives:** Subtract without borrowing numbers that do not exceed 200.

**b) Teaching and learning aids:**

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

**c) 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 1.7.4**)
- 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. Use **activity 1.7.4**.



$25 - 9 = 16$

- Guide pupils to write and read aloud a mathematical sentence on subtraction of 2 numbers less than 500. Use the standard written method to subtract numbers. (Use example of **activity 1.7.5).**

112 - 45 = ?

| Hundreds (H) | Tens (T) | Ones (O) |
|---|---|---|
| 0 | 10 + 0 | |
| ~~1~~ | ~~1~~ | 10 + 2 |
| – ↓ | 4 | 5 |
| 0 | 6 | 7 |

Therefore, 112 - 45 = **67**

- Form pairs of pupils and assign them to work on questions of **activity 1.7.4 and activity 1.7.5.**
- 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 *with 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 pupils to work individually on some questions of the **application activity 1.7.2** and verify their answers.
- Provide homework to pupils. Use some questions from **application activity 1.7.2**

**d) 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.

**Lesson 12: Applying subtraction in real life situation**

**a) Learning objectives:** Solve word problems involving subtraction of numbers whose difference does not exceed 200.

**b) Teaching and learning aids:**

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

**c) Teaching and learning activities:**

- Guide pupils to read the word problem given as example. Use groups of counters with numbers equal to those given in the given word problem, they then take away counters depending on the mathematical operation needed in the word problem, and tell the difference. You can use the drawing on the board that help learners understand that the operation to be used is the subtraction. The meeting of parents was made by male and females. Their total was 197 parents and 88 were female. Find the number of male parents.
- Guide them to subtract vertically 88 from 197 to find the male parents.
- Guide pupils highlight the steps for solving a word problem: read and u*nderstand the problem, identify facts (given and requested), draw visual representations and solve the problem using the addition.*
- *Assign pupils in pairs to work on 3 questions of* **activity 1.8**.
- 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 using a table of place values. Guide them to discover that this method is the same as

*subtracting vertically or the standard written method.*

- Help learners to identify essential words from the problem that tell them it is the subtraction: **difference, remain, number of others** etc.
- Assign them the problem to be done individually for assessment. Use **application activity 1.8**. – Mark their answer and provide feedback.
- assign the homework to learners. Use the remaining questions for **application activity 1.8.**

**d) 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. H e sells 12 cows. Find the difference of Mugabo's cows.

Answer: The sum of Mugabo's cattle = 156 - 12 = 144 cows.

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.

**Lesson 13: Multiplication of numbers by 2 and multiples of 2**

**a) Learning objectives:** Multiply numbers by 2 and give multiples of 2 that do not exceed 20.

**b) Teaching and learning aids:**

Multiply numbers by 2 and give multiples of 2 that do not exceed 20.

**c) Teaching resources and learning resources**

- At least 20 counters per group;
- Exercise books

**d) Teaching and learning activities:**

- Form pairs of pupils and assign them to do the **activity 1.9.1** and activity **1.9.2** where they have to: form at least 10 groups of 2 counters, draw a multiplication table of 2;
- Ask each pair 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 **activity1.9.3** 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.
- Guide pupils to find multiples of 2.
- Provide application activities to be done by pupils and check their answers. Use some questions for the **application activity 1.9**. Mark their answers and remediate accordingly
- Give learners a home work. Use some questions for the **application activity 1.9.**

**Lesson 14: Multiplication of a two digit number by 2**

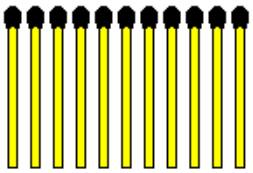
**a) Learning objectives:** Multiply 2 digit numbers by 2 without carrying.

**b) Teaching resources and learning resources:**

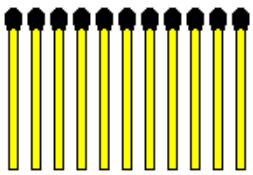
- The table of place values;
- Different types of counters.

**c) Teaching and learning activities:**

- Invite learners to count sticks of 2 groups of 10 matchsticks:



**GROUP 1**



**GROUP 2**

- Ask them to give the ways they can find the answer: Some will say: we count all matchsticks, we take 10 +10, other will say we can take 10x2 as they leant multiplication in P1.
- Use example of **activity 1.10** to show how to multiply a 2digit number by 2 and that the answer is the same as when the other methods are used.
- Form of pairs and assign them to work on questions of the **activity 1.10** where they have to: draw a table of place values, complete numbers in the table, refer 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*.

**Note:** The multiplication by two is the same as repeated addition of twos.

- 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.
- Provide application activities to be done by pupils and check their answers: Use the **application activity 1.10.**
- Assign homework to all pupils.

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

Fill in the missing numbers:

| | | | | | |
|---|---|---|---|---|---|
| a) | 3 x … = 15. | Answer: 5 | g) | … x 3 = 12 | Answer: 4 |
| b) | … x 2 = 16 | Answer: 8 | h) | 2 x …= 20 | Answer: 10 |
| c) | 30 = … x 3 | Answer: 10 | i) | 14 = … x 2 | Answer: 7 |
| d) | 18 = 3 x … | Answer: 6 | j) | …= 4 x 2 | Answer: 8 |
| e) | …x 3 = 27 | Answer: 9 | k) | 21 = 3 x … | Answer: 7 |
| f) | 8 x 3 =… | Answer: 24 | l) | 9 = … x 3 | Answer: 3 |

**Lesson 15: Multiplication of a number by 2 and multiples of 2**

**a) Learning objectives:** Multiply numbers by 3 and give multiples of 3 that do not exceed 30.

**b) Teaching and learning aids:**

Multiply numbers by 3 and give multiples of 3 that do not exceed 30.

**c) Teaching resources and learning resources**

- At least 30 counters per group;
- Exercise books

**d) Teaching and learning activities:**

- Form pairs of pupils and assign them to do the **activity 1.12.1** where they have to: form at least 10 groups of 3 counters, draw a multiplication table of 3;
- Ask each pair to combine 2 groups, 3 groups, 4 groups, … 9 groups and 10 groups of 3 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 3 and the meaning of multiples of 3.
- Assign the same groups to do application **activity1.12.2** 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 3.
- Guide pupils to find multiples of 3.
- Provide application activities to be done by pupils and check their answers. Use some questions for the **application activity 1.12**. Mark their answers and remediate accordingly
- Give learners a home work. Use some questions for the **application activity 1.12.**

**Lesson 16: Multiply a two-digits number by 2**

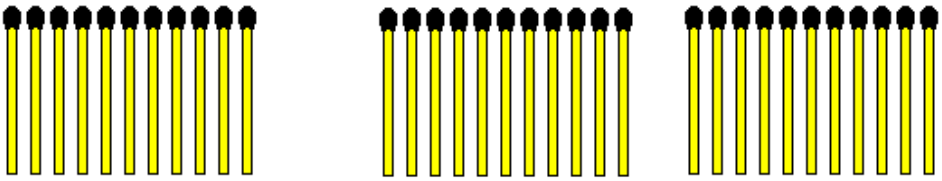
**a) Learning objectives:** Multiply 2 digit numbers by 3 without carrying.

**b) Teaching resources and learning resources:**

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

**c) Teaching and learning activities:**

- Invite learners to count sticks of 2 groups of 10 matchsticks:



**GROUP 1** **GROUP 2** **GROUP 3**

- Ask them to give the ways they can find the answer: Some will say: we count all matchsticks, we take 10 +10+10, other will say we can take 10x3 as they leant multiplication in P1.
- Use example of **activity 1.13.1** and the example of activity 1.13.2 to show how to multiply a 2digit number by 3 and that the answer is the same as when the other methods are used.

**10 x 3 = ____**

| Tens (T) | Ones (O) |
|---|---|
| 1 | 0 |
| x | 3 |
| 3 | 0 |

**31 x 3 = ___**

$$\begin{array}{r} 3\ 1 \\ \times\ 3 \\ \hline 9\ 3 \end{array}$$

- Form of pairs and assign them to work on questions of the **activity 1.13. 1** and **activity 1.13.2** where they have to: draw a table of place values, complete numbers in the table, refer to the example and multiply by 3 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 3.
- Guide them to discover another similar method of *multiplying vertically or the standard written method*.

**Note:** The multiplication by 3 is the same as repeated addition of threes.

Guide pupils to summarize how to multiply a 2digit number by 3. Insist on the use of the standards written method which looks like the use of the table of values.

- Provide application activities to be done by pupils and check their answers: Use the **application activity 1.13.**
- Assign homework to all pupils.

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

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

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

**Lesson 17: Word problems involving multiplication of numbers by 2**

**a) Learning objectives:** Solve word problems involving multiplication of numbers by 2 and 3.

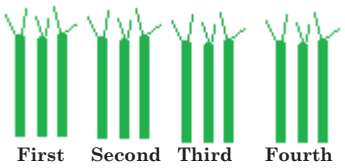
**b) Teaching and learning aids:**

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

**c) Teaching and learning activities:**

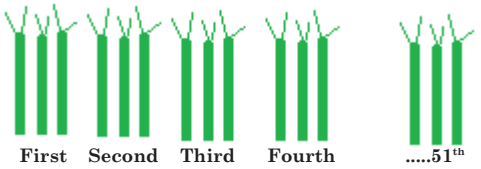
- Use the example of **Activity 1.14** to help pupils understand the problem related to the multiplication and how to solve it.

They have to illustrate at least 4 pupils where everyone plants 3 trees and ask learners to write the number of trees.




**Answer:** 3 pupils plant 3 x 4 =9 trees

Then ask them how many trees are planted by 51 pupils.




$$\begin{array}{r} 51 \\ \times\ 3 \\ \hline 153 \end{array}$$

**The answer:** 51 pupils plant 51 x 3 = 153 trees.

- Form pairs and assign them to work on other problems of **activity 1.14.**
- 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 solve a word problem involving the multiplication of a 2 digit number by 3.
- Refer to the example of activity 1.14.1 and guide them to understand the problem, identify facts (givens and question), draw visual representations related and solve the problem.
- Let learners discover all words from the problem that indicate the multiplication*: every, each group, per day, per hour, double, multiplied by, product, same number of, times, twice, double, triple, etc.*
- Assign pupils to work individually on the problems of the **application activity 1.14**. Mark their work and remediate accordingly.

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

Use counters to solve the word problems below:

1) Makuza's hens lay 22 eggs *per day*. Find the number of eggs they lay in 3 days.

**Answer**: The eggs laid in 3 days = 22 eggs x 3 = 66 eggs.

2) 2. There are two classes in a school. If *each* class has 60 pupils. How many pupils are in that school?

**Answer** = 60 pupils x 2 = 120 pupils.

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 x 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 x 3= 102 cabbages.

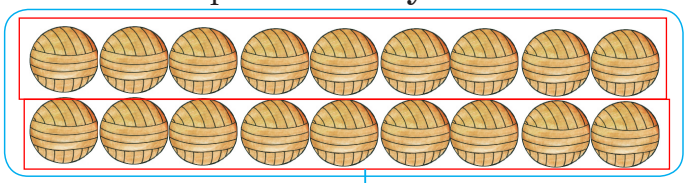
## Lesson 18: Multiplication of numbers by 3 and the multiples of 3

**a) Learning objectives:** Divide without remainder the 2 or 3 digit numbers by 2

**b) Teaching and learning aids:** A variety of counters: stones, bottle tops, beans, beads, balloons, maize seeds, tomatoes, books, pens, pencils, chalk, and number cards.

**c) Teaching and learning activities:**

- Use counters or bottle tops to illustrate the division of a number by 2. Use example of **activity 1.15.1.**



20 ÷2 = 10

There are 20 balls. When we put them in 2 groups, there are 10 balls in each group.

We write 20÷ 2 =10.

- Let learners do the same and try other questions of activity 1.15.1. Supervise their work and advise where necessary.
- Show learners how they can divide by 2:
- Using the multiplication table or using the long division (standard written method)

$$20 \div 2 =$$

$$\begin{array}{r|l} & 10 \\ \hline 2 & 20 \\ & -2 \\ & \hline & 00 \\ & -\ 0 \\ & \hline & 00 \end{array}$$

**Explanation:**

| Tens (T) | Ones (O) |
|---|---|
| 2 ÷ 2 = 1 | 0 ÷ 2 = 0 |

20 ÷ 2= 10

Let them observe that they get the same answer as when they use groups as seen before.

- Form groups of pupils and assign them to work on the **activity 1.15.2.**
- Invite the groups to present and harmonize their answers.
- Guide the whole group to extend the division using the example of **activity 1.15.3**.
- Then, assign learners to work on other questions of **activity 1.15.3**
- 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 pupils to work individually on some questions of the **application activity 1.15** and move around to each group to verify their performance;
- Guide pupils to summarize how to divide. Insist on the use of the standards written method.
- Assign homework to all pupils (Use the remained questions of the **application activity 1.15).**

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

Divide the following by long division.

a) 186÷ 2 = 93

b) 84÷2 = 42

**Lesson 19:Multiply a two-digit number by 3**

**a) Learning objectives:** Solve word problems multiplying atwo;digit number by 3

**b) Teaching and learning aids:**

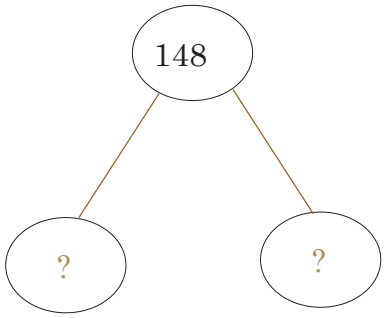
A variety of counters: stones, bottle tops, beans, beads, balloons, maize seeds, tomatoes, books, pens, pencils, chalk, and number cards.

**c) Teaching and learning activities:**

- Get 24 stones, multiply them by 2 learners and they then count and tell the number of stones each learner has.
- Concerning **the lesson multipling atwo digit number by 3**, t help pupils to solve a one –step problem: Guide them to u*nderstand the problem, identify facts (givens and question), 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 the example of

**activity 1.16**: 2 schools multiply by 148 books

- Guide learners to understand that this looks like forming 2 groups from 148 books.




- Guide learners to discover that the number of books for each school is 148 ÷ 2 = 74 books obtained by doing the long division.
- Then, assign learners to work on other questions of **activity 1.16.**
- 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 solve a word problem involving the division. Guide them to discover main words that lead to the division: each group has, equal share, how many in each, quotient, share something equally, half, per, etc.
- Let learners discover that it is necessary to use *long division or the standard written method*.
- Assign pupils to work individually on the **application activity 1.15** and move around to each group to verify their performance;
- Guide pupils to summarize how to divide. Insist on the use of the standards written method.
- Assign homework to all pupils.

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

Read and find the answer:

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.

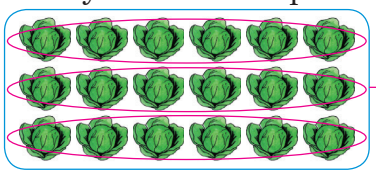
**Lesson 20: Word problems involving multiplication by 3**

**a) Learning objectives: Multiply numbers by 3**

**b) Teaching and learning aids:** A variety of counters: stones, bottle tops, beans, beads, balloons, maize seeds, tomatoes, books, pens, pencils, chalk, and number cards.

**c) Teaching and learning activities:**

- Use counters or bottle tops to illustrate the multiplication of a number by 3. Use example of **activity 1.17.1.**



18 ÷ 3 = 6

There are 18 cabbages. When we put them in 3 groups, there are 6 cabbages cabbages in each group.

We write 18 x 3 = 54.

- Let learners do the same and try other questions of activity 1.17.1. Supervise their work and advise where necessary.
- Show learners how they can multiply by 3:

Using the multiplication table (standard written method).

- Let them observe that they get the same answer as when they use groups as seen before.
- Form groups of pupils and assign them to work on the **activity 1.17.2.**
- Invite the groups to present and harmonize their answers.
- Guide the whole group to extend the multiplication using the example of **activity 1.17.3**.

Example: 126x 3 = ?

```
    4 2
3 ) 126
  – 12
    006
    – 6
      0
```

1 ÷ 3 It is impossible we take two digits (12)

12 ÷ 3 = 4

copy down 6

6 ÷ 3 = 2

use multiplication here

- Then, assign learners to work on other questions of **activity 1.17.3**
- Move around in the class for facilitating pupils where necessary; ask probing questions guiding them to know that they multiply 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 multiply. Guide them to discover when they consider 2 digits of a multiplier and that this method is the same as the one called *vertical division or the standard written method.*
- Assign pupils to work individually on some questions of the **application activity 1.17** and move around to each group to verify their performance;
- Guide pupils to summarize how to divide. Insist on the use of the standards written method.
- Assign homework to all pupils (Use the remained questions of the **application activity 1.17).**

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

Multiply the following

a) 126x 3 = 378

b) 99x 3 =297

c) 195x 3=585

**Lesson 21: Division without remainder of a two- or three digit number by 2**

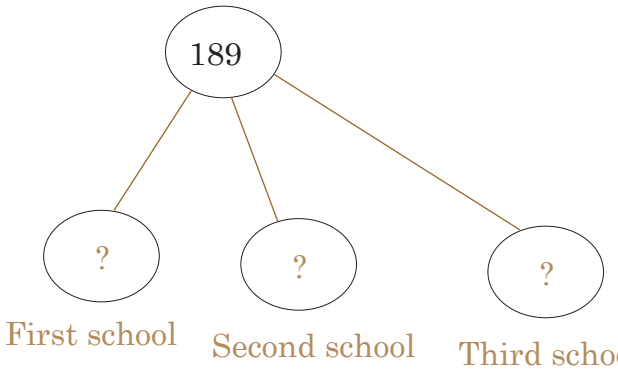
**a) Learning objectives:** Solve word problems involving division of a number by 2

**b) Teaching and learning aids:**

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

**c) Teaching and learning activities:**

- Get 24 stones, share them equally to 3 learners and they then count and tell the number of stones each learner has.
- Concerning **the lesson on word problems involving division without remainder**, help pupils to solve a one –step problem: Guide them to u*nderstand the problem, identify facts (givens and question), 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 the example of **activity 1.18**: Three schools share equally 189 laptops.
- Guide learners to understand that this looks like forming 3 groups from 189 laptops.




- Guide learners to discover that the number of laptops for each school is 192 ÷ 3 = 64 laptops obtained by doing the long division.
- Then, assign learners to work on other questions of **activity 1.18.**
- 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 solve a word problem involving the division. Guide them to discover main words that lead to the division: each group has, equal share, how many in each, quotient, share something equally, half, per, etc.
- Let learners discover that it is necessary to use *long division or the standard written method*.
- Assign pupils to work individually on the **application activity 1.18** and move around to each group to verify their performance;
- Guide pupils to summarize how to divide. Insist on the use of the standards written method.
- Assign homework to all pupils.

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

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.

## ANSWERS FOR THE END OF UNIT ASSESSMENT 1

1) Write in words or in figures

a) 187: One hundred and eighty-seven**.**

b) One hundred and ninety-seven**: 197**

2) Write the expanded number.

a) 1 Hundred 5Tens 7Ones = **157**

b) 1Hundreds 7Tens 5 Ones = **175**

3) Tell the place value for the digit underlined.

a) 1̲86 **Hundreds**

b) 14̲7 **Tens**

c) 1̲34 **Hundreds**

d) 12̲5 **one**s

4) Use <, > and = to compare these numbers

a) 195 > 159 b. 141 < 171 c. 186 = 186

5) Arrange the following numbers in the ascending order

179, 189, 198, 187, 178, 197 —— 178, 179, 187, 197, 198

6) Arrange the following numbers in the descending order

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

7) Add

a) 143 + 53 = *196*

b) 87 + 108= *195*

c) 75 + 118 = *193*

d) d. 166 + 33 = *199*

8) Subtract the following

a) 195 – 172 = 23 b) 167 – 136 = 31

c) 151 – 109 = 42 d) 132 – 78 = 54

9) 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 |

10) multiply

a) 4 3 x 2 = 8 6

b) 2 3 x 3 = 6 9

c) 3 4 x 2 = 6 8

d) 3 2 x 3 = 9 6

11) Fill in the missing numbers

÷ 2

| 0 | 2 | 4 | 6 | 8 | 10 | 12 | 14 | 16 | 18 | 20 |
|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |

÷ 3

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

12) Work out the following division:

a) 86÷2 = 43

b) 159 ÷3= 53

c) 180÷ 2 = 90

d) 126÷ 3 =42

13) Read and find the answer

a) Both have cows = 97 + 98 =195 cows

b) The bananas that remained = 159-98 = 61 bananas

c) The number of biscuits = 64x2 = 128 biscuits.

d) Each child will get cows = 196÷2 = 99 cows

# UNIT 2 NUMBERS UP TO 500

## 2.1 Key unit competence:

Counting, reading, writing, ordering, 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, ordering, 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

| **UNIT 2: NUMBERS UP TO 500 (40 Periods)** | | | | **Reinforcement and Extension** |
|---|---|---|---|---|
| | **Lesson title** | **Learning objectives** | **Number of periods** | |
| 0 | Introductory activity | Arouse the curiosity of learners on the content of this unit in counting, reading and writing numbers. | 1 | |
| 1 | Counting groups of objects up to 500. | Understand and discover the concept of numbers up to 500. | 1 | |

| | | | | |
|---|---|---|---|---|
| 2 | Place value of numbers | Write numbers up to 500 into ones, tens and hundreds. | 1 | 1 |
| 3 | Expanding numbers up to 500 | Expand numbers not more than 500. | 1 | 1 |
| 4 | Reading and writing numbers up to 500 in words. | Read and write in words the numbers up to 500. | 1 | |
| 5 | Remediation | | 1 | |
| 6 | Comparing numbers that do not exceed 500. | Compare numbers that do not exceed 500. | 1 | |
| 7 | Arranging numbers that do not exceed 500 in ascending and descending order. | Arrange numbers that do not exceed 500 in ascending and descending order. | 1 | |
| 8 | Addition of numbers whose sum does not exceed 500 without carrying. | Add numbers whose sum does not exceed 500 without carrying. | 1 | |
| 9 | Addition of numbers whose sum does not exceed 500 with carrying. | Add numbers whose sum does not exceed 500 with carrying. | 1 | 1 |
| 10 | Word problems involving addition of numbers whose sum does not exceed 500. | Solve word problems involving addition of numbers whose sum does not exceed 500. | 1 | 1 |
| 11 | Remediation | | 1 | |
| 12 | Subtraction of numbers that do not exceed 500 without borrowing. | Subtract numbers that do not exceed 500 without borrowing. | 2 | 1 |
| 13 | Subtraction of numbers that do not exceed 500 with borrowing. | Subtract numbers that do not exceed 500 with borrowing. | 2 | 1 |
| 14 | Word problems involving subtraction of numbers whose difference does not exceed 500. | Solve word problems involving subtraction of numbers whose difference does not exceed 500. | 1 | |

| | | | | |
|---|---|---|---|---|
| 15 | Remediation | | 1 | |
| 16 | Multiplication of whole numbers by 4 and multiples of 4 that do not exceed 40 | Multiply whole numbers by 4 and give multiples of 4 that do not exceed 40. | 1 | |
| 17 | Multiplication of 2 digit numbers or 3 digit numbers by 4 without carrying. | Multiply 2 digit numbers or 3 digit numbers by 4 without carrying. | 1 | 1 |
| 18 | Word problems involving multiplication of 2 digit numbers or 3digit numbers by 4 without carrying. | Solve word problems involving multiplication of 2 digit numbers or 3 digit numbers by 4 without carrying. | 1 | |
| 19 | Division of 2 digit numbers or 3 digit numbers by 4 without remainder. | Divide 2 digit or 3 digit numbers by 4 without remainder. | 1 | 1 |
| 20 | Word problems involving division of 2 digit numbers or 3digit numbers by 4 without remainder. | Solve word problems involving division of 2 digit or 3 digit numbers by 4 without remainder. | 1 | |
| 21 | Remediation | | 1 | |
| 22 | Multiplication of whole numbers by 5 and multiples of 5 that do not exceed 50 | Multiply whole numbers by 5 and give multiples of 5 that do not exceed 50. | 1 | |
| 23 | Multiplication of 2digit numbers or 3digit numbers by 5 without carrying. | Multiply 2 or 3 digit numbers by 5 without carrying. | 1 | 1 |
| 24 | Word problems involving multiplication of 2 digit numbers or 3digit numbers by 5 without carrying. | Solve word problems involving multiplication of 2 digit numbers or 3 digit numbers by 5 without carrying. | 1 | |
| 25 | Division of 2 digit numbers or 3digit numbers by 5 without remainder. | Divide 2 or 3 digit numbers by 5 without remainder. | 1 | 1 |

| | | | | |
|---|---|---|---|---|
| 26 | Word problems involving division of 2digit numbers or 3digit numbers by 5 without remainder. | Solve word problems involving division of 2 or 3 digit numbers by 5 without remainder. | 1 | |
| 27 | End unit assessment 2 | Perform well in counting, reading, writing, ordering, comparing, adding and subtracting, multiplying and dividing whole numbers from 0 up to 500. | 1 | |

**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 different lessons

### Lesson 1: Introductory activity

**a) Learning objective:** Arouse the curiosity of learners on the content of this unit

**b) Teaching and learning aids:** pupil's book, counters (or beans and bottle tops), pens and notebooks.

**c) Teaching and learning activities:**

- This lesson is delivered through a conversation between the teacher and pupils.
- Ask pupils to look at the picture of the **introductory activity 2**.
- Ask different prompting questions to pupils in order to arouse their curiosity on the content of this unit. Use questions related to the numbers:
  - What do you see?
  - How many children do you see on the picture?
  - How many cards do they have?
  - Can you read the numbers written on the cards?
  - What do you expect to learn in this unit?
- As it is at the beginning of the unit, value all answers from pupils because they may be unable to give the correct answer. All answers are possible.
- Lead pupils to give predictions on what they need to learn on numbers up to 500.

### Lesson 2: Counting, reading and writing in numbers up 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:** Understand and discover the concept of numbers from 1 to 500.

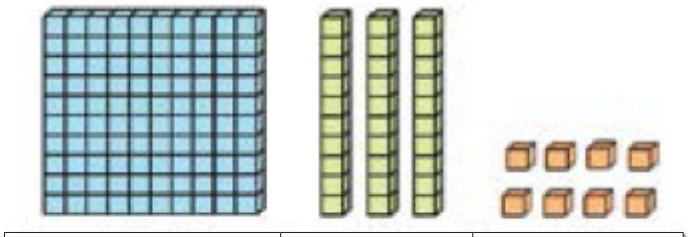
**b) Teaching and learning aids:**

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) 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. Then, guide them to make numbers and write them in figures.

They can also use the base ten tools.



| HUNDRED | TENS | ONES |
|---|---|---|
| 1 | 3 | 8 |


- Using different prompting questions, help pupils to understand and discover how to read and write the numbers from 201 to 500.
- Lead pupils to write and read a 3-digit number from 201 to 500 (use from **activity 2.1.1** to **activity 2.1.3**).
- Call learners to work in pairs and answer to questions of **activity 2.1.4** to **activity 2.1.6**).
- Move around in the class guiding pupils where necessary.
- Call some groups to present their findings and then help them to harmonize by explaining how to read and write numbers.
- Help pupils with different problems to write well the 3-digit numbers by giving them more time on writing activity.
- Provide activities to be done by pupils at home.

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

1) Represent the following numbers on the abacus or use the base ten tools.

   a) 324

   b) 275

2. Read and write the following numbers in 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.

**f) Home work:**

Everyone counts the number of shops on his/her your way home and be ready to share when you come back.

### Lesson 3: Place value of numbers up to 500

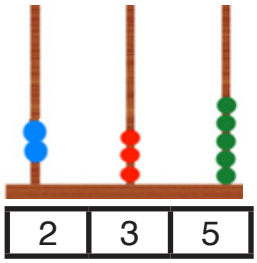
**a) Learning objectives:** Write numbers from 1 to 500 into ones, tens and hundreds.

**b) 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, soya beans and number cards, base ten tools 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.

**c) Teaching and learning activities:**

- Guide learners to represent a number on the abacus. Use the example of activity 2.2.1. Draw a place value table and ask pupils to write the number of beads in the table of place value.




| Hundreds (H) | Tens (T) | Ones (O) |
|---|---|---|
| 2 | 3 | 5 |

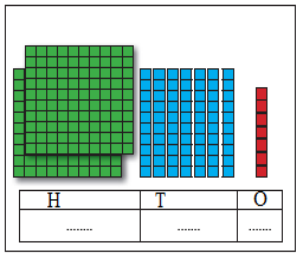
- Lead learners to keep in their mind that for example in the number 235, 2 stands for **hundreds** or 200, 3 stands for **tens** or 30 and 5 stands for ones. 235 = 2 hundreds 3 tens 5 ones.
- Ask pupils to draw a table of place value in their notebooks,
- Ask them to compare their table and the table which is in the pupil's book on **activity 2.2.1**;

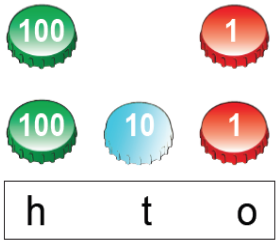
- Provide to pupils numbers cards with different numbers between 200 and 500 and ask each one to try to complete each number in his table as they are given in the **activity 2.2.1;**
- Form groups of pupils and assign them to do **activity 2.2.2** and **activity 2.2.3**.
- Move around in the class guiding pupils where necessary;
- Call some groups to present their findings and then help them to harmonize;
- Assign each pupil to Write down the number that was divided into hundreds (H), tens (T) and ones (O).
- Guide pupils to summarize how to draw a table of place value, how to complete a number in such a table and how to divide that number into hundreds (H), tens (T) and ones (O).
- Provide given activities to be done by pupils and check their answers. Use the **given activity 2.2.**
- Assign all pupils homework to be done.

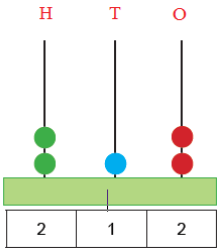
**d) Extra exercises and their answers:**

1) Write the following numbers into ones, tens and hundreds.
   a) 495= 4 hundred 9 tens 5 ones
   b) 342= 3 hundred 4 tens 2 ones
   c) 235= 2 hundred 3 tens 5 ones
   d) 39= 3 tens 9 ones.

2) Write the number represented below:




**Lesson 4: Expanding numbers up to 500**

**a) Learning objectives:** Expand numbers using place values up to hundreds.

**b) Teaching and learning aids:**

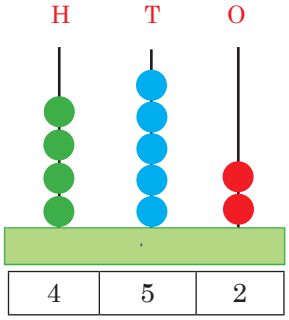
Abacus and a variety of counters: bottle tops, stones, beans etc. The table of place values

**c) Teaching and learning activities:**

- Group learners into pairs, give each pair a number to be represented

using the abacus or base ten tools.

- Ask learners to write the number in Hundreds, Tens and Ones.
- Consider for example the number 452




Ask learners questions:

How many Hundreds do you have? Which number do they represent? **Answer**: 4 Hundreds = 400

How many Tens do you have? Which number do they represent? **Answer**: 5 Tens = 50

How many Ones do you have? 2 Ones = 2

452 = 400 + 50 + 2 in e**xpanded form**.

- Assign pairs to write a 3-digit number from 201 to 500 in expanded form. Use from **activity 2.3.1** to **activity 2.3.2).**
- Move around in the class guiding pupils where necessary;
- Call some groups to present their findings and then help them to harmonize;
- Ask learners individually practice how to write the 3-digit numbers from 201 to 500 written on the chalkboard and then write them in expanded form as many times in their notebook using a pen or a pencil (Use **The given activity 2 .3**).

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

Write the following in expanded form:

1) 325 = 300 + 20 + 5.
2) 281 = 200 + 80 + 1.
3) 456 = 400 + 50 + 6.

What number is expanded to get?

1) 400 + 60 + 9 = 469.
2) 300 + 30 + 3 = 333.
3) 200+ 50 + 8 = 258

**Lesson 5: Writing numbers in words**

**a) Learning objectives:** Read and write in words the numbers up to 500.

**b) Teaching and learning aids:**

- A variety of counters: stones, bottle tops, beans, beads, balloons, maize seeds, tomatoes, books, chalk, soya beans and number cards.
- The table of place values
- Number cards with different numbers between 200 and 500 in different colours.

**c) Teaching and learning activities:**

- Ask every learner to take the counters that he or she brought and put similar ones together and ask them to make a collection of 300 similar counters.
- Ask learners to count them in tens and in hundreds. Let them make 2 groups of hundreds and ask them to write their numbers in figures and in words: 200: Two hundred.
- Lead learners to read and write a 3-digit number from 201 to 500 (use from **activity 2.4.1).**

Ask learners to write the 3-digit numbers in the expanded form. After the expanded form, take the number for example 382 = 3 x100 + 8 x10 +2x1 and ask a learner to read it in word. - Then ask another to write the number in words: Three hundred and eighty-two. Use from **activity 2.4.1**

- Help learners with difficulties to write well the 3-digit numbers by giving them more time on writing activity. You must use all possible ways to make all learners successful in reading and writing the given 3-digit numbers.
- Assign pairs to work on other questions of **activity 2.4.1** and **activity 2.4.2**.
- Move around in the class guiding pupils where necessary;
- Call some groups to present their findings and then help them to harmonize;
- Provide activities to be done individually by learners at school and others to be done at home.
- All set activities should provide to every learner the opportunities to show and apply the new concept learnt in a range of situations.

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

1. Read and write in words the following objects:

a) 224 books b) 375 stones c) 486 counters.

2. Read and write the following numbers in words or figures.

a) Three hundred and fifty-nine: 359.
b) 487: Four hundred and eighty- seven.
c) Two hundred and ninety-nine: 299.
d) 478: Four hundred and seventy-eight
e) Three hundred and thirty-five: 335.
f) 306: Three hundred and six

**Lesson 6: Comparing numbers up to 500**

**a) Learning objectives:** Compare numbers that do not exceed 500.

**b) Teaching and 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) Teaching and learning activities:**

- Guide learners to recall how to compare the number of objects, which are in two groups: Say which objects are many, which objects are few.
- Guide learners to draw a table of place value on the chalkboard and in their notebooks, and then use numbers given in **activity 2.5.1** and guide learners to complete them in a table of place values. Help learners discover how to compare two numbers considering as if they represent the number of objects;


- Lead learners how to use comparison symbols to compare those numbers and assign them to work on other question of **activity 2.5.1**.
- Form groups and assign them to try questions of **activity 2.5.2** and **activity 2.5.3**;
- Move around in the class guiding learners where necessary; assign other activities to those who finish first;
- Call some groups to present their findings and then help them to harmonize;
- **given activity 2. 5**. Check their answers and remediate accordingly.

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

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

a) 45 < 254

b) 442 > 424

c) 425 = 425

d) 454 > 442

**Lesson 7: Arranging numbers within 500 in increasing or decreasing order.[from the smallest to the biggest]**

**a) Learning objectives:** arranging numbers that do not exceed 500.

**b) Teaching and learning aids:**

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

**c) Teaching and learning activities:**

- Guide learners to recall how to compare the number of objects which are in many groups: which group has more objects, which group has little number of objects, etc.
- Guide learners to draw a table of place value on the chalk board and in their notebooks, then use numbers given in **activity 2.6.1** and guide learners to complete them in a table of place values. Guide them to discover how to arrange more numbers from the smallest number to the biggest number.
- Form pairs and assign them to answer to some questions of **activity 2.6.2** and **activity 2.6.3**;
- Move around in the class guiding learners where necessary; assign other activities to those who finish first;
- Call some pairs to present their findings and then help them to harmonize;
- Tell them that arranging from the smallest number to the biggest number is also called **arranging numbers in increasing order**.
- Give learners the given activity. Use some questions of **activity 2. 6.3**.
- Guide learners to summarize how to arrange numbers using a table of place values: Insist on the comparison from Hundreds (H), tens (T) and ones (O).

**Note:** After this lesson, guide pupils to discover how to arrange numbers in decreasing order (use activity 2.6.4.

- Lead learners to understand that arranging numbers in a decreasing order means to arrange numbers from the biggest number to the smallest number.
- Provide given activities to be done by learners and check their answers. Use questions of **the** given **activity 2.6**.
- Assign all learners homework to be done.

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

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.

Arrange these numbers in descending order.

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

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

b) 351, 416, 256, 315

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

**Lesson 8: Addition of numbers whose sum does not exceed 500**

**a) Learning objectives:**

Add without carrying numbers whose sum does not exceed 500.

**b) Teaching and 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) Teaching and learning activities:**

- Using real objects, ask 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 2.7.1** to **activity 2.7.2)**
- Using pictures of groups of objects in the pupil's book, ask pupils to use representations of 2 groups of similar objects and ask pupils to put together all objects from 2 groups by circling and then count them in order to get the sum.
- Instead of counting, refer to the example of activity 2.7.4 and lead learners to find that they can find the sum by adding vertically the numbers instead of counting objects.

**Example:** 223 + 274 = 497

| Hundreds (H) | Tens (T) | Ones (O) |
|---|---|---|
| 2 | 2 | 3 |
| + 2 | 7 | 4 |
| 4 | 9 | 7 |

- Add downwards;
- Start from the place of ones on your right.

- Form pairs of pupils and assign them to do the **activity 2.7.4** 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 guiding pupils where necessary;
- Call some groups to presents 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*.
- Guide pupils to summarize how to add numbers without carrying. Insist on the use of the standards written method, which looks like the use of the table of values.
- Assign pupils to work in pair the **application activity 2. 7.1.** Verify their answers and address difficulties.
- Assign homework to all pupils.

## Lesson 9: Addition with carrying

**a) Learning objectives:** Add numbers with carrying where the sum does not exceed 500.

**b) Teaching and 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) Teaching and learning activities:**

- Using an example of how to add numbers, guide pupils to be able to add numbers by carrying. Use the example given in the **activity 2.7.7**:

**Example:** 268 + 154 = 422

| Hundreds (H) | Tens (T) | Ones (O) |
|---|---|---|
| 1 | 1 | |
| 2 | 6 | 8 |
| + 1 | 5 | 4 |
| 4 | 2 | 2 |

- Form pairs of pupils and assign them to work on other questions of the **activity 2.7.7** 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 guiding pupils where necessary;
- Call 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.*
- Guide pupils to summarize how to add numbers with carrying. Let learners say when they carry: when the sum of two digits is more or equal to 10, we write the ones and we carry the tens to the next place value.
- Assign pupils to work in pair the **given activity 2. 7.2.** Verify their answers and address challenges.
- Assign homework to all pupils.

**d) xtra 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

**Lesson 10: Word problems involving the addition of numbers**

**a) Learning objectives:**

Solve word problems involving addition of numbers whose sum does not exceed 500.

**b) Teaching and learning aids:**

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

**c) Teaching and learning activities**

- Guide pupils to read the word problem given as example. Use groups of counters with numbers equal to those given in the given word problem ,then they add counters depending on the mathematical operation needed in the word problem, and tell the sum. Referring to the example of **activity 2.8**, you can use the drawing on the board that help learners understand that the operation to be used is the addition of 225 marks

and 215 marks.

- Guide them to add vertically 225 and 215 to find the total number of marks.
- Guide pupils highlight the steps for solving a word problem: read and u*nderstand the problem, identify facts (given and requested), draw visual representations and solve the problem using the addition.*
- *Assign pupils in pairs to work on questions of* **activity 2.8**.
- Move around in the class guiding pupils where necessary;
- Call 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.*
- Help learners to identify essential words from the problem that tell them it is the addition: **total, altogether, the sum**, etc.
- Assign them the problem to be done individually for assessment. Use **given activity 2.8**. – Mark their answer and provide feedback.
- assign the homework to learners. Use the remaining questions for **the given activity 2.8.**

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

Use the table of ones, tens and hundreds 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) 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.

**Lesson 11: Subtraction without borrowing**

**a) Learning objectives: Subtract without borrowing numbers that do not exceed 500.**

**b) Teaching and learning aids:**

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

**c) Teaching and learning activities:**

- Ask pupils to make a group counters and then take away some of them

and asks learner to count, tell and write the number of the remaining counters (**activity 2.9.1).**

- Use pictures of groups of objects in the pupil's book, ask pupils to draw a group of counters and ask learners to take away some of them by crossing them and then count, tell and write number of the remaining counters.
- Help learners to write and read aloud a mathematical sentence on subtraction of 2 numbers less than 500 **(activity 2.9.2** and **activity 2.9.3)** and try to write the answer.
- Call learners to subtract numbers vertically using the example of the **activity 2.9.4.**
- Form groups of learners and assign them to work on other questions of the **activity 2.9.4** 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 guiding pupils where necessary;
- Call 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 **2.9.5** 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. Refer to **the given activity 2. 9.1.**
- Guide learners to summarize how to subtract numbers without borrowing. Insist on the use of the standards written method which looks like the use of the table of values.
- Assign learners to work in pair, work out **the given activity 2.9.1** and verify their answers.
- Provide application activities to be done by learners and check their answers.

**d) 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**.**

**Lesson 12: Subtraction with borrowing numbers within the range of 500**

**a) Learning objectives:** Subtract with borrowing numbers that do not exceed 500.

**b) Teaching and learning aids:**

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

**c) Teaching and learning activities:**

- Ask pupils to make a group counters and then take away some of them and ask learner to count, tell and write the number of the remaining counters**.** The number of counters has to reflect to numbers that involve borrowing.
- Use pictures of groups of objects in the pupil's book, ask pupils to draw a group of counters and ask learners to take away some of them by crossing them and then count, tell and write number of the remaining counters.
- Help learners to write and read aloud a mathematical sentence on subtraction of 2 numbers less than 500. Use example of **activity 2.9.6** and try to help learners to subtract by borrowing.
- Call learners to subtract numbers vertically using the example of the **activity 2.9.6.**
- Form groups of learners and assign them to work on other questions of the **activity 2.9.6** 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 guiding pupils where necessary;
- Call some groups to present their findings and then help them to harmonize by explaining how to subtract numbers *with 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.*
- Ask some groups to present answers and then guide the whole class to harmonize by explaining how to subtract a number from another.
- Guide learners to summarize how to subtract numbers with borrowing. Insist on the use of the standards written method which looks like the use of the table of values.
- Provide given activities to be done by learners and check their answers. Refer to **given activity 2. 9.2.**

**Lesson 13: Word problems involving subtraction of numbers**

**a) Learning objectives:** Solve word problems involving subtraction of numbers whose difference does not exceed 500.

**b) Teaching and learning aids:**

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

**c) Teaching and learning activities:**

- Guide pupils to read the word problem given as example. Use groups of counters with numbers equal to those given in the given word problem, then they take away counters depending on the mathematical operation needed in the word problem, and tell the difference. You can use the drawing on the board that help learners understand that the operation to be used is the subtraction. From example of **activity 2.10**, the school has 378 pupils. 132 pupils are in P6. Learners can discuss and conclude that the number of pupils who are in other classes than P6 is obtained by applying the subtraction.
- Guide them to subtract vertically 132 from 378 to find the number of pupils who are in other classes.
- Guide pupils highlight the steps for solving a word problem: read and u*nderstand the problem, identify facts (given and requested), draw visual representations and solve the problem using the subtraction.*
- *Assign pupils in pairs to work on questions of* **activity 2.10**.
- Move around in the class guiding pupils where necessary;
- Call some groups to present their findings and then help them to harmonize by explaining how to subtract numbers using a table of place values. Guide them to discover that this method is the same as *subtracting vertically or the standard written method.*
- Help learners to identify essential words from the problem that tell them it is the subtraction: **difference, remain, number of others** etc.
- Assign them the problem to be done individually for assessment. Use **the given activity 12.10**.
- Mark their answer and provide feedback.
- Assign the homework to learners. Use the remaining questions for **the given activity 2.10.**

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

1) 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.

2) Murambi cell has 467 houses. 256 of the houses are roofed with tiles. The rest are roofed with iron sheets. Find the number of houses roofed with iron sheets.

**Answer**: Houses roofed with Iron sheets = 467-256=211.

**Lesson 14: Multiplication tables of 4**

**a) Learning objectives:** Multiply whole numbers by 4 and give multiples of 4 that do not exceed 40.

**b) Teaching and 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) Teaching activities:**

- Learners in pairs are given real objects or counters less than or equal to 40 and they are requested to make groups of 4 objects/counters each group. Ask them to count and tell the number of groups they make and the number of corresponding objects/ counters they contain.

  **Example**: 2 groups of 4 counters have 8 counters; Then, 2 x 4 = 8.
- Using pictures of groups of objects in the pupil's book, ask learners to make groups of 4 objects / counters each.
- Ask 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 learners to use the following vocabularies " **times and number of groups"** Refer to **activity 2.11.1.**
  - 1 group of 4 objects or 1 times 4 = 1x 4 = 4
  - 2 groups of 4 objects each or 2 times 4 = 2 x 4 = 8
  - 3 groups of 4 objects each or 3 times 4= 3 x 4 = 12
- Form groups of learners 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 guiding learners where necessary;
- Call 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 the **activity 2. 11. 2** 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.

- Provide given activities to be done by learners and check their answers. Use the **given activity 2. 11.**

**d) Extra exercises and their answers**

Fill in the missing numbers:

a) 4 x __ = 36. Answer: 9
b) 16 = 4 x ___ Answer: 4
c) __ x 4 = 12 Answer: 3
d) __ x 4 = 32 Answer: 8
e) 4 x __= 20 Answer: 5
f) 28 = __ x 4 Answer: 7
g) ___= 4 x 10 Answer: 40

**Lesson 15: Multiplication a two-digit number by 4**

**a) Learning objectives:** Multiply without carrying a 2-digit or 3-digit number by 4.

**b) Teaching and 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) Teaching and learning activities**

- Refer to the examples given in the **activity 2.12.1 to activity 2.12.2** and guide pupils to discover how to multiply a two digit number by 4 without carrying;

| Example: | Tens (T) | Ones (O) |
|---|---|---|
| 2 1 | 2 | 1 |
| × 4 | × | 4 |
| 84 | 8 | 4 |

Guide learners to understand how they multiply by startng by ones and then by tens.

- Form groups or pairs of pupils and assign them to try questions of **activity 2.12.1 and activity 2.12.2** where they have to: draw a table of place values, complete numbers in the table, refer to the example and multiply by 4 to get the product.
- Move around in the class guiding 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.
- Call 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.*

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

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

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

a) 31 x 4 = Answer: 124
b) 51 x 4 = Answer:204
c) 122 x 4 = Answer:488

**Lesson 16: Word problems involving Multiplication of numbers by 4**

**a) Learning objectives:** Solve word problems involving multiplication of 2 or 3 digit numbers by 4

**b) Teaching and learning aids:**

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

**c) Teaching and learning activities:**

- Use counters to facilitate pupils to work out word problems involving multiplication by 4 ;
- Guide pupils to solve some problems in a whole class discussion help pupils to solve a one –step: Refer to the example of **activity 2.13** and guide them to u*nderstand the problem, identify facts (given and questions), draw visual representations related to equal shares and solve the problem using the division.*
- *lead learners to detect key words of the problem that are related to the multiplication of 4: four times, every, each group of 4, per day, per hour, multiplied by 4, product by 4, same number of, etc.*
- Provide problems to be solved into groups or in pairs and then monitor to provide support where necessary.
- Move around in the class guiding pupils where necessary; ask probing questions guiding them to know that they multiply starting by the right.
- Call some groups to present their findings and then help them to harmonize by explaining how to solve a word problem involving the multiplication of a 2 digit number by 4.

- Assign pupils to work individually on the problems of the **given activity 2.13**. Mark their work and remediate accordingly.

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

Solve the word problems below:

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 x 4= 368 breads.

**Lesson 17: Division of a two or three-digit number by 4 without a remainder**

**a) Learning objectives:** Divide 2 or 3 digit numbers by 4 without remainder.

**b) Teaching and learning aids:**

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

**c) Teaching and learning activities:**

- 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; Call them to write the can write the number sentence for that operation. Work together on 2 questions of **activity 2.14.1** and let pairs work on the remaining questions.
- Call pupils to pay attention and guide pupils on the board on how to do a long division. Refer to example of **activity 2.14.2** and **activity 2.14.3**.
- Form groups or pairs of pupils and assign them to work on questions of the **activity 2.14.2 an activity 2.14.3** where they have to: complete the division table, refer to the example and divide a number by 4.
- Move around in the class guiding 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**.**
- Call 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 *long division or the standard written method*.
- Guide pupils to summarize how to divide. Insist on the use of the standards written method.
- Provide other question for division to instil in pupils the use of mental calculation.

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

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

Calculate the following by long division:

a) 488÷4 = 122
b) 208÷ 4 = 52
c) 444÷ 4 =111

**Lesson 18: Word problems involving the division of a number by 4**

**a) Learning objectives:** Solve word problems involving the division of a number by 4

**b) Teaching and learning aids:**

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

**c) Teaching and learning activities:**

- Using counters, guide pupils to work out word problems involving division by 4 ;

  Starts by counters or other objects to be shared equally among 4 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 the solved problem of **activity 2.15** and guide them to u*nderstand the problem, identify facts (given and questions), draw visual representations related to equal shares and solve the problem using the division.*
- Call pupils to work in pairs on other questions of **activity 2.15**.
- Move around in the class guiding pupils where necessary; ask probing questions guiding them to know that the operation is the division and how to divide starting by the left side and that they can take 2 digits when necessary**.**
- Call some groups to present their findings and then help them to harmonize by explaining how to divide.
- Guide pupils to summarize how to solve a problem. Insist on the use of the standards written method.
- Provide problems to be solved individually (refer to **the given activity 2.15**).

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

Solve the word problem below:

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

**Lesson 19: Multiplication of numbers by 5**

**a) Learning objectives:** Multiply whole numbers by 5 and give multiples of 5 that do not exceed 50.

**b) Teaching and 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) Teaching activities:**

- Learners in pairs are given real objects or counters less than or equal to 50 and they are requested to make groups of 5 objects/counters each group. Ask them to count and tell the number of groups they make and the number of corresponding objects/ counters they contain.

**Example**: 2 groups of 5 counters have 10 counters; Then, 2 x 5 = 10.

- Using pictures of groups of objects in the pupil's book, ask learners to make groups of 5 objects / counters each.
- Ask pupils, one by one, to count objects in each group of objects; 1 group of 5 objects, 2 groups of 5 objects each , 3 groups of 5 objects each and then he/she leads learners to use the following vocabularies " **times and number of groups"** Refer to **activity 2.17.1.**
  - 1 group of 5 objects or 1 times 5 = 1x 5 = 5
  - 2 groups of 5 objects each or 2 times 5 = 2 x 5 = 10
  - 3 groups of 5 objects each or 3 times 5= 3 x 5 = 15
- Form groups of learners and ask each group to combine 2 groups, 3 groups, 4 groups, … 9 groups and 10 groups of 5 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 guiding learners where necessary;
- Call some groups to present their findings and then help them to harmonize by explaining how to find the multiplication table of 5 and the meaning of multiples of 5.
- Assign the same groups to do the **activity 2.17. 2** 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.
- Provide given activities to be done by learners and check their answers. Use the **given activity 2. 17.**

**d) Extra exercises and their answers**

Fill in the missing numbers:

a) … x 5 = 15 Answer: 3
b) 30 = … x 5 Answer: 6
c) 8 x 5 =… Answer: 40
d) 45 = 5 x … Answer: 9
e) 50 = … x 5 Answer: 10

**Lesson 20: Multiply a two-digit numbers by 5**

**a) Learning objectives:** Multiply 2 digit numbers or 3 digit numbers by 5 without carrying.

**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) Teaching and learning activities:**

- Refer to the example given in the **activity 2.17.1 and 2.17.2,** guide pupils to discover how to multiply a two digit number by 5 without carrying;
- Form groups of pupils and assign them to work on other questions of **activity 2.17.1 and 2.17.2** where they have to: draw a table of place values, complete numbers in the table, refer to the example and multiply by 5 to get the product.
- Move around in the class guiding 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.
- Call 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*.
- Guide pupils to summarize how to multiply a 2 digit number by 5. Insist on the use of the standards written method, which looks like the use of the table of values.
- Provide given activities to be done by pupils and check their answers. Use questions for **the given activity 2.17**.
- Assign homework to all pupils.

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

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

a) 81 x 5 = Answer:405

b) 91 x 5 = Answer:455

**Lesson 21: Word problems involving Multiplication of numbers by 5**

**a) Learning objectives:** Solve word problems involving multiplication of 2 or 3 digit numbers by 5.

**b) Teaching and learning aids:**

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

**c) Teaching and learning activities:**

- Use counters and guide pupils to work out word problems involving multiplication by 5.
- Starts by counters or other objects to be given equally to 5 pupils and ask them to find the total number of objects to be gotten by on pupil.
- Call 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 the solved example of **activity 2.18** and guide them to u*nderstand 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. Use questions from **activity 2.18.**
- Move around in the class guiding 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.
- Call some groups to present their findings and then help them to harmonize by explaining how to solve a word problem involving the multiplication of a 2 digit number by a single digit. Guide them to discover that after finding that the required operation is the multiplication, they apply *the standard written method*.
- Assign pupils to work individually on the question of the **given activity 2.18**.
- Mark their work and remediate accordingly.
- Assign homework to all pupils.

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

Solve the word problems below:

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 x 5 =355 eggs.

**Lesson 22: Division of a two or three-digit number by 5 without a remainder.**

**a) Learning objectives:** Divide 2 or 3 digit numbers by 5 without remainder.

**b) Teaching and learning aids:**

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

**c) Teaching and learning activities:**

- Guide learners to revise the multiples of 5.
- Guide pupils to count the numbers of counters equal to the dividend and share them equally in 5 groups until they get the number of counters for each group; Tell them to write the can write the number sentence for that operation. Work together on 2 questions of **activity 2.19.1** and let pairs work on the remaining questions.
- Call pupils to pay attention and guide pupils on the board on how to do a long division. Refer to example of activity 2.19.2. s
- Form groups or pairs of pupils and assign them to work on questions of the **activity 2.19.2** where they have to: complete the division table, refer to the example and divide a number by 5.
- Move around in the class guiding 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**.**
- Call 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 *long division or the standard written method*.
- Guide pupils to summarize how to divide. Insist on the use of the standards written method.
- Provide other question for division to instil in pupils the use of mental calculation.
- Provide given activities to be done by pupils and check their answers. Use the **given activity 2.19**.
- Assign homework to all pupils.

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

Use counters to calculate the following by long division.

a) 350÷5 =70
b) 255÷5=51
c) 455÷5 = 91

## Lesson 23: Word problems involving the division of a 2 or 3 digit number by 5 without remainder

**a) Learning objectives:** Solve word problems involving division without a remainder of a 2 or 3 digit number by 5.

**b) Teaching and learning aids:**

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

**c) Teaching and learning activities:**

- Use counters and facilitate pupils to work out word problems involving the division by 5 ;
- Guide pupils to solve some problems in a whole class discussion: help pupils to solve a one –step problem: Refer to the solved problem of **activity 2.20** and guide them to u*nderstand the problem, identify facts (given 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. Use problems of **activity 2.20.**
- Move around in the class guiding 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**.**
- Call some groups to present their findings and then help them to harmonize by explaining how to solve the problem. Guide them to discover when they have to divide and how they do it. Insist on the use of the standards written method.
- Provide other word problems to be solved individually. Use questions for the given activity 2.20.
- Mark their work and provide more supports where necessary.

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

Solve the word problems below:

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

## ANSWERS FOR THE END OF 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 the following numbers

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

6) Arrange the following numbers in increasing order[from the smallest to the biggest]

439, 349, 493, 394,387 and 479

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

7) Arrange the following numbers in decreasing order[from the biggest to the smallest]

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:

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

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

11) Carry out the product:

| a) 9 2 | b) 8 2 | c) 8 1 | d) 9 1 | e) 6 1 | f) 8 0 | g) 7 0 | h) 90 |
|---|---|---|---|---|---|---|---|
| x 4 | x 5 | x 4 | x 5 | x 4 | x 5 | x 4 | x5 |
| 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) Try the following division by using long division method.

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) Read and find the answer

a) Our Village planted 256 trees. The neighbouring Village has plants 239 trees. Find the total number of trees in 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.s

Number of girls = **489 – 297 = 192 girls.**

c) Head Mistress gives 4 books to every pupil. How many books does she give to 72 pupils?

The total number of books she gave = **72 x 4 = 288 books.**

d) Share 596 books equally among 4 classrooms. How many books can each classroom get?

Each classroom gets = 596÷4 = 149 books.

# UNIT 3 NUMBERS UP TO 1000

## 3.1 Key unit competence:

Counting, reading, writing, ordering, 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 List of lessons

| **UNIT 3 NUMBERS UP TO 1000 (40 Periods)** | | | | **Reinforcement and Extension** |
|---|---|---|---|---|
| | **Lesson title** | **Learning objectives** | **Number of periods** | |
| 1 | Introductory activity | Arouse the curiosity of learners on the content of this unit in counting, reading and writing numbers. | 1 | |
| 2 | Counting and writing numbers from 0 up to 1000 | Count and write numbers from 0 up to 1000 | 1 | |

| | | | | |
|---|---|---|---|---|
| 3 | Reading and writing numbers up to 1000 | Read and write numbers up to 1000 | 1 | 1 |
| 4 | Place value of each digit of numbers up to 999 | Decompose a 3 digit number less than 1000 in hundreds, tens and ones | 1 | 1 |
| 5 | Expanding numbers up to 1000 | Expand the number less than 1000 | 1 | |
| | Remediation | | 1 | |
| 6 | Writing numbers from 0 to 1000 in words. | Write in words the numbers from 0 to 1000. | 1 | |
| 7 | Comparing numbers that do not exceed 1000. | Compare numbers that do not exceed 1000. | 1 | 1 |
| 8 | Arranging numbers that do not exceed 1000 in ascending or descending order | Arrange numbers that do not exceed 1000 in ascending order. | 1 | |
| 9 | Addition of Numbers whose sum does not exceed 1000 without carrying. | Add numbers whose sum does not exceed 1000 without carrying. | 1 | |
| 10 | Addition of Numbers whose sum does not exceed 1000 with carrying. | Add numbers whose sum does not exceed 1000 with carrying. | 1 | 1 |
| | Remediation | | 1 | |
| 11 | Word problems involving addition of numbers whose sum does not exceed 1000. | Solve word problems involving addition of numbers whose sum does not exceed 1000. | 1 | |
| 12 | Subtraction of numbers that do not exceed 1000 without borrowing. | Subtract numbers that do not exceed 1000 without borrowing. | 1 | 1 |
| 13 | Subtraction of numbers that do not exceed 1000 with borrowing. | Subtract numbers that do not exceed 1000 with borrowing. | 2 | 1 |
| 14 | Word problems involving subtraction of numbers whose difference does not exceed 1000. | Solve word problems involving subtraction of numbers whose difference does not exceed 1000. | 1 | |

| | | | | |
|---|---|---|---|---|
| | Remediation | | 1 | |
| 15 | Multiplication of whole numbers by 6 and multiples of 6 that do not exceed 60 | Multiply whole numbers by 6 and give multiples of 6 that do not exceed 60. | 2 | |
| 16 | Multiplication of 2 digit numbers by 6 without carrying. | Multiply 2digit numbers by 6 without carrying. | 2 | 1 |
| 17 | Word problems involving multiplication of 2 digit numbers by 6 without carrying. | Solve word problems involving multiplication of 2 by 6 without carrying. | 1 | 1 |
| | Remediation | | 1 | |
| 18 | Division of 2 digit numbers by 6 without remainder. | Divide 2 digit numbers by 6 without remainder. | 1 | |
| 19 | Division of 3 digit numbers by 6 without remainder. | Divide 3 digit numbers by 6 without remainder. | 2 | 1 |
| 20 | Word problems involving division of 2 digit numbers or 3digit numbers by 6 without remainder. | Solve word problems involving division 2 or 3 digit numbers by 6 without remainder. | 1 | 1 |
| 26 | Multiplication of whole numbers by 10 and 100 with the product not exceeding 999. | Multiply of whole numbers by 10 and 100 with the product not exceeding 999. | 1 | |
| 21 | End unit assessment 3 | Performing well in counting, reading, writing, ordering, comparing, adding and subtracting, multiplying and dividing whole numbers from 0 up to 1000. | 1 | |

### 3.5 Guidance on different lessons for unit 3

#### Lesson 1: Introductory activity

This lesson is delivered through a conversation between the teacher and pupils. Use the picture and ask different questions to pupils in order to arouse their curiosity on the content of this unit. Refer to questions given in the student's book.

As it is at the beginning of the unit, you have to value all answers from pupils. All answers are valid because the aim of the introductory activity is to get from pupils the predictions on the content of unit to be learnt.

**Lesson 1: Count, read and write numbers from o up to1000.**

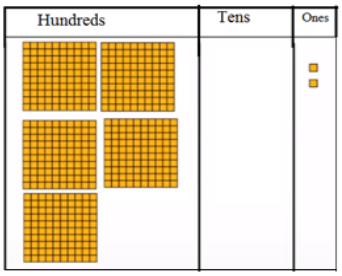
**a) Learning objectives:** Understand and discover the concept of numbers from 0 to 1000.

**b) Teaching and learning aids:**

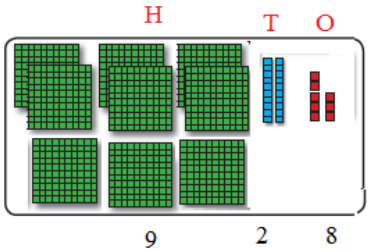
A variety of counters: stones, bottle tops, beans, beads, balloons, maize seeds, tomatoes, books, pieces of chalk, soya beans and number cards.

**c) Teaching and learning activities:**

- Ask every pupil 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 and say the number represented.
- They can also use blocks or rods:




The represented number is 502




The represented number is 928

- Use different prompting questions to help 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 3.1.1)
- Use different prompting questions and guide to read and write the numbers from 501 to 999 (use from activity 3.1.1 to activity 3.1. 2);
- Ask pupils to individually practice the reading and the writing of 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;

- Help pupils with difficulties to write well the 3-digit numbers by giving them more time on writing activity.
- Provide activities to be done by pupils at home. Use questions from the given **activity 3.1**

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

1) In groups, form groups of the following objects: 775 small 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: N**ine hundred sixty nine.**

**Lesson 2: Reading and Writing numbers up to 1000**

**a) Learning objectives:** Read and write in numbers up to 1000.

**b) Teaching and 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 500 and 1000 in different colors.

**c) 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.
- Use abacus or the base ten tool and represent a number. Ask learners to write and read say the number represented.
- Lead learners on how to read and write a 3-digit number from 501 to 999 (use from **activity 3.2.1)**
- Ask learners to work in pairs and practice how to write the 3-digit numbers from 501 to 999 written on the chalkboard or on a number card and then write them in words many times in their notebook using a pen or a pencil (Use **activity 3.2.2 and 3.2.3**).
- Call learners in a class discussion to make correction of all questions.
- Harmonize answers and highlight how to read a number.

**Follow the following when reading number in words:**

When you read a `number, you read the number in words as well as in digits:

- Start with the digit at the left, which has the largest place value.
- Add the word and after hundred

**Example:** 772: Seven hundred and seventy-two.

869: Eight hundred and sixty-nine.

- Provide activities to be done by learners individually at school and others to be done at home. Use the **given activity 3.2**.
- Mark their work and provide feedback.

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

Read and write the following numbers in figures.

a) Five hundred and fifty-nine: 559.
b) 787: Seven hundred and eighty- seven.
c) Nine hundred ninety-nine: 999.
d) 778: Seven hundred and seventy-eight
e) Six hundred and thirty-five: 635.
f) 806: Eight hundred six.

**Lesson 4: Place value of each digit for numbers from 0 up to 999**

**a) Learning objectives:** Identify the value and place values of digits in a numbers that do not exceed 999.

**b) 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, 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 colours;

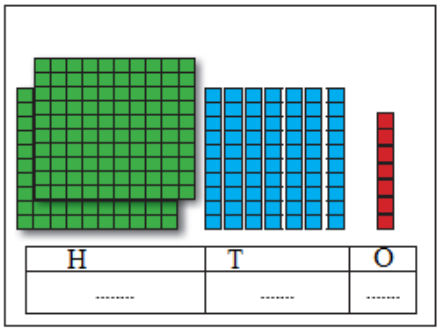
Different types of counters.

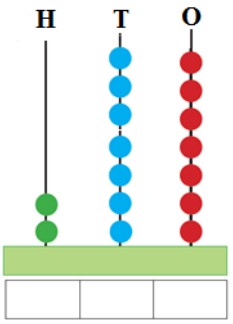
**c) Teaching and learning activities:**

- Ask pupils to draw a table of place value in their notebooks,
- Represent a number using the abacus or he base ten tools and ask learners to write the number in figures and in the table of place values.
- Lead learners to identify the digits that represent hundreds, the one representing tens and the digit that represent ones. Refer to the example of **activity 3.4.1**.
- Provide to pupils the numbers cards with different numbers between 500 and 1000 and ask each one to try to complete each number in his/her

table referring to the example found in **activity 3.4.1;**

- Form groups or pairs of pupils and assign them to work on questions for **activity 3.4.1** and **activity 3.4.2**
- Move around in the class guiding pupils where necessary;
- Call 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).
- 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).
- Use different materials such as counters, rods or local abacus and explain how to decompose a number into hundreds, tens and ones:




- Provide application activities to be done by pupils (use the given activity 3.4) and check their answers ;
- Assign all pupils homework to be done.

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

Decompose the following numbers into ones, tens and hundreds.

a) 795= 7hundreds 9tens 5ones
b) 642= 6hundreds 4tens 2ones
c) 935= 9hundreds 3tens 5ones
d) 894= 8 hundreds 9tens 4ones.

**Lesson 5: Writing numbers in expanded form**

**a) Learning objectives:** Expand numbers using place values not bigger than hundreds.

**b) Teaching and learning aids:**

Abacus and a variety of counters examples: bottle tops, stones , beans etc

**c) Teaching and learning activities**

- Put learners into pairs, give each pair a number to be represented using the abacus or base ten tools.
- Ask learners to write the number in Hundreds, Tens and Ones. Give each group a number such as 673.

Ask learners to count them in Hundreds, Tens and Ones separately.

Ask learners questions like:

How many Hundreds do you have? 6 Hundreds = 600

How many Tens do you have? 7 Tens = 70

How many Ones do you have? 3 Ones = 3

673 = 600 + 70 + 3 in **Expanded form**.

- Lead learners how to write a 3-digit number from 501 to 999 in expanded form. Use example of **activity 3.5.1**
- Assign pairs to work on questions of **activity 3.5.1 and activity 3.5.2.**
- Move around in the class for guiding pupils where necessary;
- Call some groups to present their findings and then help them to harmonize;
- Guide pupils to summarize how to expand a number.
- Ask learners to individually practice how to write the 3-digit numbers from 501 to 999 written on the chalkboard and then write them in expanded form as many times in their notebook using a pen or a pencil (use **the given activity 3.5**)
- Mark them and provide feedback. Help pupils with difficulties to write well the 3-digit numbers by giving them more time on writing activity.
- Provides activities to be done by learners individually at school and others to be done at home.

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

1) Write the following in expanded form:
   a) 925 = 900 + 20 + 5.
   b) 681 = 600 + 80 + 1.
   c) 856 = 800 + 50 + 6.

4) What is the expanded number?
   a) 600 + 60 + 9 = 669.
   b) 700 + 30 + 3 = 733.
   c) 800+ 50 + 8 = 858.

**Lesson 6: Writing the numbers up to 1000 in words**

**a) Learning objectives:** Write in words the numbers from 0 to 1000.

**b) Teaching and learning aids:**

- The table of place values or base ten tools.
- Number cards with different numbers between 501 and 999 in different colours.

**c) Teaching and learning activities**

- Use different prompting questions and help learners to recall on how to write numbers in figures from 501 to 1000.
- Ask every learner to get the counters that he or she brought and put similar ones together and ask learners to make collections of 100 similar counters.
- Ask learners to count them in hundreds. Let them make groups of hundreds. They can also use blocks or rods. Show them 8 hundreds, 7 tens and 5 ones.
- Refer to example of **activity 3.6.1** and guide learners to discover how they can expand a number where for example 875 = 8 hundreds 7 tens 5 ones.

Which means that 875 = 800 + 70 + 5. Let learners try to read the number without considering the addition sign. This is 875 = 800 + 70 + 5: *Eight hundred and seventy-five.*

**Help learners to find the rule to follow when writing number in words**:

**Example**: 572: Five hundred and seventy-two. 869: Eight hundred and sixty-nine. Therefore, When you write a `number, you write out the number in words as well as in digits:

- Start with the digit at the left, which has the largest place value.
- Use and between hundred and the next number,
- Use a dash between tens and ones.

- Let learners work in pairs and try to work on questions of **activity 3. 6 .1** to **activity 3. 6. 3)**
- Ask learners to individually imitate how to write the 3-digit numbers in words many times in their notebooks using a pen or a pencil.
- Help learners 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 learners successful in reading and writing the given 3-digit numbers.
- Assign learners to work individually on questions of the given **activity 3. 6**.

- Mark their works and provide feedback.

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

Read and write the following numbers in words or figures.

a) Seven hundred and fifty-nine: 759.
b) 887: Eight hundred and eighty- seven.
c) Nine hundred ninety-six: 996.
d) 678: Six hundred and seventy-eight
e) Nine hundred and thirty-five: 935.
f) 606: Six hundred-six
g) 800: Eight hundred.

## Lesson 7: Comparing numbers within 1000

**a) Learning objectives:** Compare numbers that do not exceed 1000.

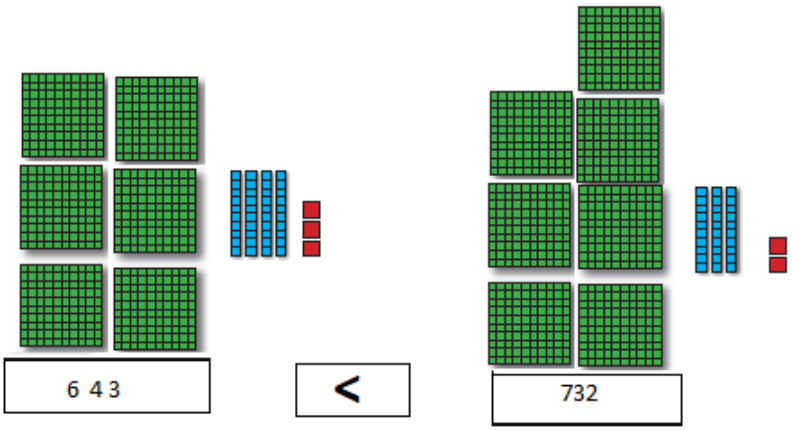
**b) Teaching and learning aids:**

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) Teaching and learning activities**

- Guide learners to recall how to compare the number of objects which are in two groups: which are many, which are few, etc.
- Guide learners to draw a table of place value on the chalk board and in their notebooks, then use the example of **activity 3. 7. 1 and activity 3. 7. 2 to** guide learners how they can compare numbers: saying which is greater than or less than the other.




- Lead learners how to use comparison symbols to compare those numbers;

- Ask learners to work in pairs on questions of **activity 3. 7. 1, activity 3.7.2 and activity 3. 7. 3.**
- Move around in the class guiding learners where necessary; assign other activities to those who finish first;
- Call some groups to present their findings and then help them to harmonize;
- Guide learners to summarize how to compare numbers using a table of place values: Insist on the comparison of hundreds (H), tens (T) and ones (O).
- Help learners to be able to read: 625 < 753 : 625 is less than 753
  or 753 > 625 read as 753 is greater than 625.
- Assign learners the work to be done individually. You can use some questions of the **given activity 3.7**. Check their answers and assign all learners homework to be done.

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

Use the symbols **<, >, =** to compare the following pairs of numbers:

a) 345 **<** 254
b) 442 **>** 424
c) 425 **=** 425
d) 454 **>** 442.

**Lesson 8: Arranging numbers not more than 999 in increasing or decreasing order**

**a) Learning objectives: Arrange numbers that do not exceed 1000 in ascending order.**

**b) Teaching and 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, base ten tools or blocks, different bags containing counters in different amount not more than 1000 counters.

**c) Teaching and learning activities**

- Guide learners to recall how to compare the number of objects which are in many groups: which are bigger, which are smaller, how they can arrange groups starting from the one with few objects to the one with more objects, etc.
- Use the example of **activity 3. 8. 1** and guide learners to arrange the bags from the one with few counters to the one with more counters. Then, help them to be able to arrange more numbers.

- Form groups and assign them to do from **activity 3.8. 2** to **activity 3. 8.3**;
- Move around the class to guide learners where necessary; assign other activities to those who finish first;
- Call some groups to present their findings and then help them to harmonize;
- Assign learners to work on questions of the **given activity 3. 8.1 and check their answers.**

Arrange these numbers in ascending order.

a) 505, 949, 740, 850. Answer: 505, 740, 850, 949.
b) 777, 897, 789, 978, 696. Answer: 696, 777, 789, 897, 978

Arrange these numbers in ascending order.

a) 808,880,707,980,908.
b) 660, 606, 990, 875, 758

- Guide learners to use the example of **activity 3. 8. 4** and guide learners to arrange the bags accordingly and help them to discover how to arrange more numbers starting from the biggest number to the smallest number.
- Form groups or pairs and assign them to do **activity 3.8. 5**
- Move around the class to guide learners where necessary; assign other activities to those who finish first;
- Call some groups to present their findings and then help them to harmonize;
- Assign them to work on the **given activity 3. 8.2** as the activity for assessment.
- Mark their work by checking their answers;
- Assign all learners homework to be done.

**d) More extra exercises and their answers:**

Arrange these numbers in descending order.

a) 805, 999, 740, 650. **Answer**: 999, 805,740,650.
b) 798, 879, 987, 978, 897. **Answer**: 987, 978, 897, 879, 798.

Arrange these numbers in descending order.

a) 608, 880,707,580,508.
b) 763, 909, 990, 805, 508, 850.

**Lesson 9: Addition without carrying of numbers whose sum does not exceed 1000**

**a) Learning objectives:** Add numbers whose sum does not exceed 1000 without carrying.

**b) Teaching and learning aids:**

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

**c) Teaching steps:**

- Use real objects and guide pupils to make 2 groups of objects such that their number can be added without carrying: For example, 63 objects and 25 objects. Ask pupils to count them and write their total number. Then, call a leaner to write on the blackboard and let the class guide hi/her how to add such numbers using vertical addition/standard written method.
- Invite the whole class to follow how addition without carrying is done by using the example of **Activity 3.9.3. Example: 535 + 462 = ?**

  **535**

  **+462**

  **997**

- Form groups/pairs of pupils and assign them to work on questions for the **activity 3.9.2 and activity 3.9.3** 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 guiding 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*.
- Guide pupils to summarize how to add numbers without carrying. Insist on the use of the standards written method which looks like the use of the table of values.
- Provide **the application activity 3. 9. 1** to be done by pupils and check their answers;
- Assign homework to all pupils.

**d) 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 + 712 = 869
c) 719 + 170 = 889
d) 656 + 342 = 998
e) 678 + 321 = 999
f) 734 + 208 = 942

**Lesson 10: Addition with carrying.**

**a) Learning objectives:** Add numbers whose sum does not exceed 1000 with carrying.

**b) Teaching and learning aids:**

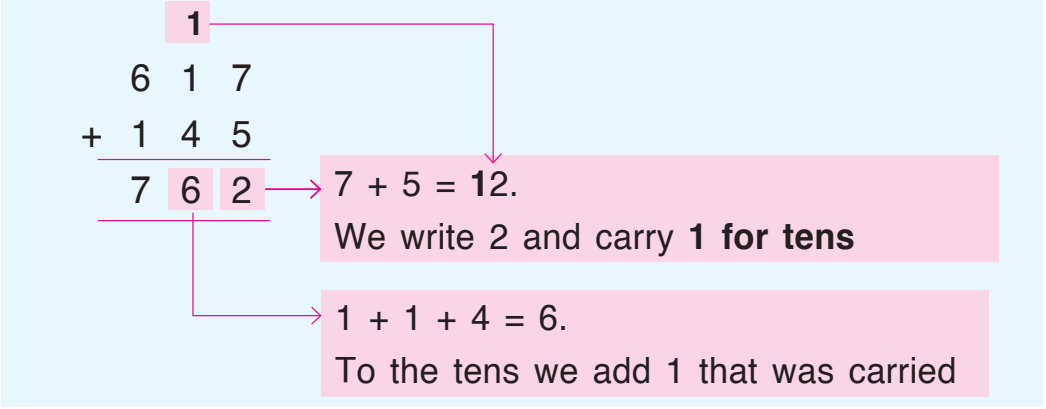
A variety of counters: stones, bottle tops, beans, beads, balloons, maize seeds, tomatoes, books, chalk, and number cards.

**c) Teaching steps:**

- Use real objects and guide pupils to make 2 groups of objects such that their number can be added with carrying: For example, 68 objects and 75objects. Ask pupils to count them and write their total number. Then, call a leaner to write on the blackboard and let the class guide hi/her how to add such numbers using vertical addition/standard written method.
- Call the whole class to follow how addition with carrying is done by using the examples of **Activity 3.9.6.**

**Example 2:** Adding vertically

617+145 = 762



- Form groups or pairs of pupils and assign them to work on questions for the **activity 3.9.6** 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 guiding 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 *with carrying*.
- Guide pupils to summarize how to add numbers with carrying. Insist on the use of the standards written method which looks like the use of the table of values.
- Provide **the the application activity 3. 9. 2** to be done by pupils and check their answers;

Assign homework to all pupils.

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

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

a) 345 + 525 = 870
b) 277 + 713 = 990
c) 749 + 175 = 924
d) 656 + 267 = 923
e) 678 + 231 = 909
f) 734 + 208 = 942

**Lesson 11: Word problems involving addition of numbers not more than 1000**

**a) Learning objectives:** Solve word problems involving addition of numbers whose sum does not exceed 1000.

**b) Teaching and learning aids:**

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

**c) Teaching steps:**

- Guide pupils to read the word problem given as example (see example of **activity 3.10**). Use groups of counters with numbers equal to those given in the given word problem, they then add counters depending on

the mathematical operation needed in the word problem, and tell the sum. You can use the drawing on the board that help learners understand that the operation to be used is the addition.

- Guide them to add vertically to find the total number.
- Guide pupils highlight the steps for solving a word problem: read and u*nderstand the problem, identify facts (given and requested), draw visual representations and solve the problem using the addition.*
- *Assign pupils in pairs to work other questions of the* **activity 3.10**.
- Move around in the class guiding pupils where necessary;
- Call 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.*
- Help learners to identify essential words from the problem that tell them it is the addition: **total, altogether, the sum**, etc.
- Assign them to work on the problem to be done individually for assessment. Use **application activity 3.10**.
- Mark their answer and provide feedback.
- Assign the homework to learners. Use the remaining questions the given **application activity 3.10.**

**d) 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.

   **Answer:** The total number of cattle = 614 + 345 = 959 cattle

2) A school has 1000 students. There are 521 girls and 479 boys. Find the number of students in the school.

   **Answer:** The number of girls + number of boys in the school =

   521girls + 479 boys = 1000 students

**Lesson 12: Subtraction of numbers less than 1000**

**a) Learning objectives:** Subtract without borrowing numbers that do not exceed 1000

**b) Teaching and learning aids:**

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

**c) Teaching steps:**

- Use counters and guide learners to form a group of counters. Ask them to take away a given number of counters from that group and let them give the number of the remaining counters. They will do it in different ways: 1) they can count, 20 they can use subtraction.
- Using pictures of groups of objects in the pupil's book, ask 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. Use questions of **activity 3.11.1**
- Call pupils to follow how they can subtract big numbers without using counters. Use the example of **activity 3.11.2**.

  **995**

  **- 463**

  **532**

- Form groups/pairs of pupils and assign them to work on other questions of **activity 3.11.2 and the activity 3.11.3** where they have to refer to the example and perform the subtraction;
- Move around in the class guiding pupils where necessary;
- Call 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 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 without borrowing.
- Guide pupils to summarize how to subtract numbers without borrowing. Insist on the use of the standards written method which looks like the use of the table of values.
- Provide **the application activity 3.11** to be done by pupils and check their answers.

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

a) 845 – 523 = 322
b) 957 - 713 = 244
c) 989 – 875 = 114
d) 759 - 547 = 212
e) 678 – 521 = 157
f) 834 – 808 = 26

**Lesson 13: Subtraction with borrowing.**

**a) Learning objectives:** Subtract numbers that do not exceed 1000 with borrowing

**b) Teaching and learning aids:**

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

**c) Teaching steps:**

- Ask pupils to make a group of counters for example71 beans. Ask pupils to take away 48 counters and find the number of the remaining counters. Learners will do it in two ways:

1) Count the remaining counters, 2) Use the subtraction to find that number. Then, verify if the answer is the same. Ask them if the subtraction is easy as they have to borrow.

- Using pictures of groups of objects in the pupil's book, ask 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.
- Tell learners to follow how they can carry out the subtraction (with borrowing) of big numbers. Use the example of **activity 3.11.4**:

| Hundreds (H) | Tens (T) | Ones (O) |
|---|---|---|
| | 4 | 10 |
| 6 | 5 | 1 |
| – 2 | 4 | 5 |
| 4 | 0 | 6 |

10 + 1

10 +1= 11

11 - 5 = 6

4 11

6 5 1

- 2 4 5

4 0 6

651 – 245. When you subtract, start by ones .
**1 – 5 is impossible.** I borrow 1 tens from 5 this equals to 10 ones, and 10 Ones + 1 Ones = 11Ones.
then, 11- 5 = 6. For Tens: 4 - 4 = 0
For Tens 6 - 2 = 4

4

6 5 1

- 2 4 5

4 0 6

- Form groups/pairs of pupils and assign them to work on other questions for **activity 3.11.4** 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 guiding pupils where necessary;
- Call some groups to present their findings and then help them to harmonize by explaining how to subtract numbers with 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 and move around to each group to verify their performance;
- Guide pupils to summarize how to subtract numbers with borrowing. Insist on the use of the standards written method which looks like the use of the table of values.
- Provide **the application activity 3.11.2** to be done by pupils and check their answers.

Extra exercises and their answers:

a) 843 – 525 =318
b) 954 - 715 = 239
c) 932 – 675 = 257
d) 756 - 567 = 189
e) 679 – 599 = 79
f) 834 – 808 = 26**.**

**Lesson14: Word problems involving subtraction of numbers in real life**

**a) Learning objectives:** Solve word problems involving subtraction of numbers whose difference does not exceed 1000.

**b) Teaching and learning aids:**

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

**c) Teaching steps:**

- Make groups of counters with numbers equal to those given in the given word problem, then they add or remove counters depending on the mathematical operation in the word problem, and tell the sum or the number of counters remaining.
- Call the whole class to read the solved problem in the activity 3.12. Let them discuss if the subtraction used is correct and why.
- As the number 850 of books is made by big numbers, represent it by base ten tools. Then, cross the blocks representing 615 books to be taken to the classroom (away).
- Guide pupils highlight the steps for solving a word problem: read and u*nderstand the problem, identify facts (given and requested), draw visual representations and solve the problem using the addition.*
- *Assign pupils in pairs to work on other questions of* **activity 1.12**.
- Move around in the class guiding pupils where necessary;
- Call some groups to present their findings and then help them to harmonize by explaining how to subtract numbers using a table of

place values. Guide them to discover that this method is the same as *subtracting vertically or the standard written method.*

- Help learners to identify essential words from the problem that tell them it is the subtraction: **difference, remain, number of others** etc.
- Assign them the problem to be done individually for assessment. Use **application activity 3.12**.
- Mark their answer and provide feedback.
- assign the homework to learners. Use the remaining questions for **the application activity 3.12.**

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

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

1) A school has 1000 students. There are 521 girls. Find the number of boys in that school.

**Answer:** The number of boys in the school = 1000-521 = **479 boys.**

2) Rugira planted 924 trees in his land.. He cuts 594 trees. How many trees remain in his land?

**Answer:** The total number of trees that will remain = 924-594 = **330 trees**

3) Rugerero cell has 967 houses. 556 of the houses are destroyed by the storm. Find the number of houses that are not destroyed by the storm.

**Answer:** Houses not destroyed = 967-556 = 411 houses.

**Lesson 15: Multiplication of numbers by 6.**

**a) Learning objectives:** Multiply whole numbers by 6 and give multiples of 6 that do not exceed 60.

**b) Teaching and learning aids:**

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

**c) 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.
- Ask them to count and tell the number of groups they make and the total number of objects/ counters they contain.
- Using pictures of groups of objects in the pupil's book, ask pupils to make groups of 6 objects / counters each.
- Ask 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 3.13.1).**

- 1 times 6 or 1 group of 6 objects
- 2 times 6 or 2 groups of 6 objects each
- 3 times 6 or 3 groups of 6 objects each.

Teacher helps pupils to read and mathematically write the given sentences:

- 1 times 6 or 1 group of 6 objects is written: 1 x 6
- 2 times 6 or 2 groups of 6 objects each is written: 2 x 6
- 3 times 6 or 3 groups of 6 objects each is written: 3 x 6

- Form groups/pairs 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 guiding pupils where necessary;
- Call 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 work on questions of **activity 3.13.2.** 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.
- Guide pupils to find multiples of 6.
- Provide **the application activity 3.13** to be done by pupils and check their answers.

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

1) Fill in the missing numbers:

a) 6 x … = 36. Answer: 6
b) … x 6 = 48 Answer: 8
c) 60 = … x 6 Answer: 10
d) 42 = 6 x … Answer: 7
e) …x 6 = 24 Answer: 4
f) 2x 6 =… Answer: 12
g) … x 6 = 6 Answer: 1
h) 6 x …= 30 Answer: 5
i) 0 = … x 6 Answer: 0

2) Work in groups and make of counters equalling to multiples of 6.

**Lesson 16: Multiplying a 2 or 3 digit number by 6**

**a) Learning objectives:** Multiply 2digit numbers by 6 without carrying.

**b) Teaching and learning aids:**

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

**c) Teaching steps:**

- Refer to the example given in the **activity 3.14.1** 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 or pairs of pupils and assign them to do the **activity 3.14.2** where they have to refer to the example and multiply by 6 to get the product.
- Move around in the class guiding 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 2or3 digit number by 6. Guide them to discover that this method is the same as multiplying vertically or the standard written method.
- 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.
- Assign them to do **the application activity 3.14** and check their answers;
- Assign homework to all pupils..

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

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

a) 111 x 6 = Answer: 666
b) 12 x 6 = Answer: 72
c) 101 x 6 = Answer:606
d) 22 x 6 = Answer:132
e) 81 x 6 = Answer:486
f) 91 x 6 = Answer:546

**Lesson 17: Word problems involving the multiplication of a number by 6**

**a) Learning objectives:** Solve word problems involving multiplication of 2 by 6.

**b) Teaching and learning aids:**

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

**c) Teaching steps:**

- Prepare enough teaching/learning aids to help a learner to be able to solve word problems that involve multiplying numbers less than 1000

by 6 without carrying;

- Help pupils to solve a one –step or a two-step problem: Guide them to understand the problem, identify facts (given and question).
- Refer to the example of **activity 3.15** and start by guiding pupils to solve some problems in a whole class discussion,
- Provide problems to be solved into groups or in pairs Use other questions from **activity 3.15**.
- Move around in the class guiding 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.
- Call some groups to present their findings and then help them to harmonize by explaining how to solve a problem, words that indicate that the required operation is the multiplication, multiply a 2or3 digit number by 6.
- Guide them to discover that they need to standard written method.
- Assign the **application activity 3.15** to be solved individually.
- Check their answers and provide support where necessary.

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

Use counters to solve the word problems which involve multiplying numbers less than 1000 by 6:

1) UNHCR is giving 6 tents to each refuge family. There are 111 refugee families. Find how many tents are given to the refuge families.

**Answer:** The total number of tents to be given out = 111 x 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 x 6 = 846 bars of soap.

3) A football conference room hosts 151people 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 x 6= 906.

**Lesson 18: Dividing without remainder a 2 or 3-digit number less than 1000 by 6**

**a) a) Learning objectives:** Divide 2 digit numbers by 6 without remainder

**b) Teaching and learning aids:**

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

**c) 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 refer to example in **activity 3.16.1**
- Use example of **activity 3.16.2** and lead the class on how to divide a number by 6.
- Form groups/pairs of pupils and assign them to work on other questions of **activity 3.16.2** where they have to: refer to the example and divide a two-digit number by 6.
- Move around in the class guiding 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**.**
- Call 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.
- Guide pupils to summarize how to divide. Insist on the use of the standards written method.
- Provide **the application activity 3.16** to be done by pupils and check their answers;
- Assign homework to all pupils.

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

Use counters to calculate the following by long division.

a) 66÷ 6 = 11
b) 96÷ 6 = 16
c) 90 ÷ 6 = 15
d) 72÷ 6 = 12
e) 84÷6 =14
f) 48÷6 = 8

a) 666÷ 6 = 111
b) 936÷ 6 = 156
c) 930÷6 = 155
d) 726÷6 = 121
e) 846÷6 = 141
f) 876÷6 = 146

**Lesson 20: Word problems involving the division of a number by 6**

**a) Learning objectives:** Solve word problems involving division 2 or 3 digit numbers by 6 without remainder

**b) Teaching and learning aids:**

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

**c) 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.
- Refer to the solved example of activity 3.17 and guide pupils to solve a one –step or a two-step problem: Guide them to understand the problem, identify facts (given and question), draw visual representations related to equal shares and solve the problem using the division.
- Assign groups or pairs to solve other problems of activity 3.17.
- Move around in the class guiding pupils where necessary; ask probing questions guiding them to know how they can know the required operation and how they can divide starting by the left side and that they can take 2 digits when necessary**.**
- Call some groups to present their findings and then help them to harmonize answers.
- Provide problems to be solved into groups or in pairs and then give **the application activity 3.17** to be solved individually.
- Mark their work and provide feedback.

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

Use counters to solve the word problems which involve dividing numbers less than 1000 by 6:

1) UNHCR has 666 tents to give to refuge families. Each family gets 6 tents. How many families will get those tents?

**Answer**: The total number of tents to be given out = 666

Number of tents to each family= 6

Number of families = 666 tents ÷6

**Answer** = 111 families.

2) Soap factory manufactures 846 bars of soap in 6 days. Find the number of bars of soap it manufactures in 1 day.

**Answer:** The number of bars of soap made in 6 days = 846 bars of soap.

Number of bars of soap made in one day = 846 ÷6

= 141 bars of soap made in 1 day.

3) 906 eggs are laid in 6 days. How many eggs are laid in 1 day?

**Answer:**The number of eggs laid in 6 days = 906.

Number of eggs laid in 1 day = 906 ÷ 6

= 151 eggs laid in 1 day

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 in each column.**

**Lesson 21: Multiplication of numbers by 10 or by 100**

**a) Learning objectives:** Multiply of whole numbers by 10 and 100 with the product not exceeding 999.

**b) Teaching and learning aids:**

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

**c) Teaching steps:**

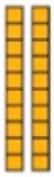
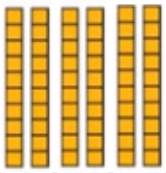
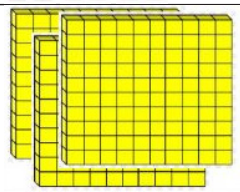
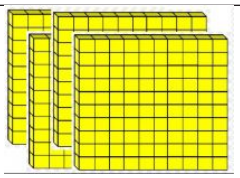
- Pupils in small groups are given real objects or counters less than or equal to 100 and they are requested to make groups of 10 objects or counters each group.
- Ask them to count and tell the number of groups they make and the total number of objects/ counters they contain.
- Using pictures of groups of objects in the pupil's book, ask pupils to make groups of 10 objects / counters each.
- Ask pupils, one by one, to count objects in each group of objects; 1 group of 10 objects, 2 groups of 10 objects each, 3 groups of 10 objects each and then he/she leads pupils to use the following vocabularies " **times and number of groups" (activity 3.13.1).**
  - 1 times 10 or 1 group of 10 objects
  - 2 times 10 or 2 groups of 10 objects each
  - 3 times 10 or 3 groups of 10 objects each.

Teacher helps pupils to read and mathematically write the given sentences:

- 1 times 10 or 1 group of 10 objects is written: 1 x10
- 2 times 10 or 2 groups of 10 objects each is written: 2 x 10
- 3 times 10 or 3 groups of 10 objects each is written: 3 x 10

- Form groups/pairs of pupils and ask each group to combine 2 groups, 3 groups, 4 groups, … 9 groups and 10 groups of 10 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 guiding pupils where necessary;

- Call some groups to present their findings and then help them to harmonize by explaining how to find the multiplication table of 10 and the meaning of multiples of 10.
- Assign the same groups to work on questions of **activity 3.17.1.** 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 10.
- Guide pupils to find multiples of 10.
- Call the whole class to discuss how they can multiply a number by 10 or by 100
- Refer to **activity 1.17.2**, and to teach a lesson showing learners how to multiply by 10 and 100. For example, guide pupils to discover that when they multiply a number by 10, they put one zero on it. When they multiply the number by 100, they put two zeros on it as illustrated below:

| **Hundreds or tens** | **Number groups** | **Total number of units** | **Multiplication by 10 or 100** |
|---|---|---|---|
|  | **2** | **20** | **2 x 10= 20**<br>2 and one zero |
|  | **6** | **60** | **6 x 10 = 60**<br>6 and one zero |
|  | 3 | 300 | 3x100=300<br>3 and two zeros |
|  | 4 | 400 | 4x100 = 400,<br>4 and two zeros |

- Form groups or pairs and let them work on questions of **activity 3.17.1 to 3.17. 4** in groups
- Monitor all learners' activities closely and cater for all learners without leaving any one behind.
- Move around in the class guiding pupils where necessary;

- Call some groups to present their findings and then help them to harmonize by explaining how to multiply by 10 or by 100.
- Assign pupils to work individually on some questions for **the application activity 3.17.** Move around to each group to verify their performance and provide feedback.

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

Use 10 or 100 to fill the missing numbers;

1)

a) 100 x 6 = 600
b) 10 x 48 = 480
c) 650 = 10 x 65
d) 420 = 42 x 10
e) 10 x 24 = 240
f) 9 x 100 = 900
g) 10 x 100 = 1000
h) 100 x 3 = 300
i) 500 = 5 x 100

2) In your groups make groups of counters with numbers equalling to the multiples of 10.

## 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: c) 976 e) 796 g) **769**
   b) 8 O 4 T 9 H: d) **948** f) 849 h) 498
3. Write the expanded number
   a) $(8 \times 100) + (7 \times 10) + (9 \times 1) = 879$
   b) $900 + 90 + 9 = 999$
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) Carry out the addition:

a) 534 + 453 = 987 c) 572 + 418 = 990

b) 738 + 241 = 979 d) 693+ 289 = 982

9) Subtract

a) 857- 727 = 130 c) 935 – 798 =517

b) 967 – 856 = 111 d) 618 – 579 = 39

10) Complete the table

| x 6 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | 6 | 12 | 18 | 24 | 30 | 36 | 42 | 48 | 54 | 60 | : 6 |

11) Multiply

| a. | 9 1 | b. | 8 0 | c. | 71 | d. | 6 1 | e. | 51 | f. | 9 0 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | x 6 | | x 6 | | x 6 | | x 6 | | x 6 | | x 6 |
| | 546 | | 480 | | 426 | | 366 | | 306 | | 540 |

12)Multiply by 10 or by 100

a. 9 x 100 = 900 b. 89 x 10 = 890 c. 10 x 98 = 980 d. 100 x 8 = 800

13) Complete the table

| ÷6 | 6 | 12 | 18 | 24 | 30 | 36 | 42 | 48 | 54 | 60 | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | |

14) Work out the division:

**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) Read and find the answer

a) The number is 202 = (967- 765 = 202

b) The cows that remained = 212 (780 - 568 =212) cows.

c) Every village will have 144 nets (864: 6 = 144)

d) The number of pupils in P2 is 246 (41 x 6 = 246)

e) 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 List of lessons in Unit 4

| **UNIT4: FRACTIONS $\frac{1}{2}, \frac{1}{4}$ *and* $\frac{1}{8}$ (16 Periods)** | | | | **Reinforcement and Extension** |
|---|---|---|---|---|
| | **Lesson title** | **Learning objectives** | **Number of periods** | |
| 1 | Introductory activity | Arouse the curiosity of learners on the content of this unit and its importance in real life. | 1 | |
| 2 | Reading, writing, drawing and shading the fraction $\frac{1}{2}$ | Read, write, draw and shade the fraction $\frac{1}{2}$ | 2 | 1 |

| | | | | |
|---|---|---|---|---|
| 3 | Reading, writing, drawing and shading the fraction $\frac{1}{4}$ | Read, write, draw and shade fractions $\frac{1}{4}$ | 2 | 1 |
| 4 | Remediation | Provide learning support to learners who are falling behind their peers. | 1 | |
| 5 | Reading, writing, drawing and shading the fraction $\frac{1}{8}$ | Read, write, draw and shade the fraction $\frac{1}{8}$ | 2 | |
| 6 | Comparing fractions $\frac{1}{2}, \frac{1}{4}$ *and* $\frac{1}{8}$ | Compare fractions $\frac{1}{2}, \frac{1}{4}$ *and* $\frac{1}{8}$ | 1 | 1 |
| 7 | Putting fractions together to make a whole | Use fractions to make a whole | 1 | 1 |
| 8 | End unit assessment 4 | Read, write, draw $\frac{1}{2}, \frac{1}{4}$ *and* $\frac{1}{8}$ of a whole. | 1 | |
| 9 | Remediation | Provide learning support to learners who are falling behind their peers. | 1 | |

## 4.5 Guidance on the teaching and learning activities

### Lesson 1: Introductory activity

- This lesson is delivered through a conversation between the teacher and pupils.
- Use the picture and ask different questions to pupils in order to arouse their curiosity on the content of this unit.
- Ask pupils to observe the pictures and answer to questions given in the student's book.
- As it is at the beginning of the unit, you have to value all answers from pupils. All answers are possible because the aim of the introductory activity is to get from pupils the predictions on the content of unit to be learnt.
- Conclude the conversation by telling pupils that a paper can be divided into 2, 4 or 8 equal parts so that 2, 4 or 8 children can equally share a paper. Each part represents a fraction that will be learnt in this unit.

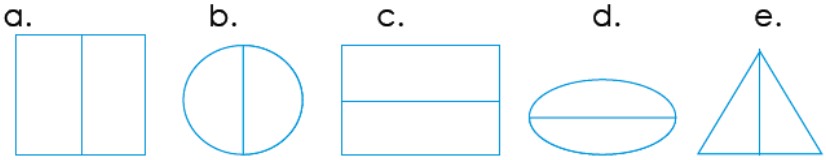
**Lessons 2: Reading, and writing the fraction $\frac{1}{2}$**

**a) Learning objectives:** Read, write, draw and shade the fraction $\frac{1}{2}$

**b) Teaching steps:**

- Use different objects for cutting, help pupils to understand and discover that a whole can be divided into 2 equal parts.
- 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.
- Ask 2 pupils to equally share 1 orange and then ask other pupils to find a share of each pupil. Explain to pupils that each part is **a half** or **1 part out of 2 equal parts** of an orange.
- Use cut outs of a square on different papers, refer to activity 4.1.1and 4.1.2 and ask pupils to find out 2 different parts which can be put together to make a square. Then, ask pupils to compare the 2 parts and discover that they are all equal.
- Ask 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. Lead pupils to find out that one **part is a half of a whole** or **1 part out of 2 equal parts.**
- Ask pupils to observe 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.
- Use activity 4.1.3 and lead pupils on how they write the fraction one half $\frac{1}{2}$
- Lead pupils on how to write and read the fraction $\frac{1}{2}$. Help them to read and write $\frac{1}{2}$ on chalkboard and then in their notebooks.
- -Help pupils to understand that $\frac{1}{2}$ is a fraction made by 2 parts: the numerator and denominator.


- Refer to activity 4.1.5 and use drawings of different shapes (rectangle, square…) divided into 2 equal parts and ask pupils to individually shade a half or $\frac{1}{2}$ of a shape.



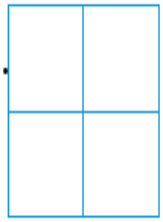
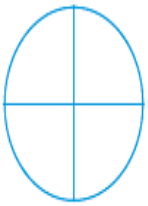
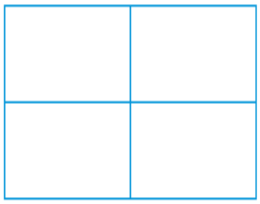
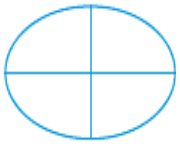

- Call pupils to work individually and answer to questions of the **application activity 4.1.** Mark their work and provide feedback.

Lessons 3: Reading, writing and shading fraction $\frac{1}{4}$

**a) Learning objectives:** Read, write, draw and shade fractions $\frac{1}{4}$

**b) Teaching activities:**

- Use different objects for cutting, help pupils to understand and discover that a whole can be divided into 4 equal parts.
- Divide an orange into 4 equal parts and then show pupils how 4 equal parts can be put together to make a full orange or a whole.
- Ask 4 pupils to equally share 1 orange and then ask other pupils to find a share of each pupil. Explain to pupils that each part is **a quarter** or **1 part out of 4 equal parts** of an orange.
- Use cut outs of a square on different papers, refer to activity 4.2.1and 4.2.2 and ask pupils to find out 4 different parts which can be put together to make a square. Then, ask pupils to compare the 4 parts and discover that they are all equal.
- Ask pupils to fold twice a paper and then divide it into 4 equal parts and then compare the 4 parts in order to find that the 4 parts are equal. Lead pupils to find out that one **part is a quarter of a whole** or **1 part out of 4 equal parts.**
- 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 showing a quarter.
- Ask pupils to observe different pictures in the pupil's book, explain how a whole is divided into 4 equal parts and show $\frac{1}{4}$ of a whole.
- Use activity 4.2 3 and lead pupils on how they write the fraction one quarter $\frac{1}{4}$
- Lead pupils on how to write and read the fraction $\frac{1}{4}$. Help them to read and write $\frac{1}{4}$ on chalkboard and then in their notebooks.
- Help pupils to understand that $\frac{1}{4}$ is a fraction made by 2 parts: 1 is the numerator, 4 is the denominator.
- Refer to activity 4.2.5 and use drawings of different shapes (rectangle, square…) divided into 4 equal parts and ask pupils to individually shade a quarter or $\frac{1}{4}$ of a shape.

a.  b.  c.  d. 

**Lesson 4: Reading, writing and shading fractions: $\frac{1}{8}$**

**a) Learning objectives:** Read, write, draw and shade the fraction $\frac{1}{8}$

**b) Teaching activities:**

- Use different objects for cutting, help pupils to understand and discover that a whole can be divided into 8 equal parts.
- Divide a bar soap into 8 equal parts and then show pupils how 8 equal parts can be put together to make a full bar soap or a whole.
- Ask 8 pupils to equally share 1bar soap or a sugar cane and then ask other pupils to find a share of each pupil. Explain to pupils that each part is **an eighth** or **1 part out of 8 equal parts** of a bar soap.
- Use cut outs of a square on different papers, refer to activity 4.3.1and 4.3.2 and ask pupils to find out 8 different parts which can be put together to make a square. Then, ask pupils to compare the 8 parts and discover that they are all equal.
- Ask pupils to fold 3 times a paper and then divide it into 8 equal parts and then compare the 8 parts in order to find that the 8 parts are equal. Lead pupils to find out that one **part is a an eighth of a whole** or **1 part out of 8 equal parts.**
- 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 $\frac{1}{8}$ of a whole, to read $\frac{1}{8}$ as an eighth or one eighth or one over eight and they will shade the part showing an eighth.
- Ask pupils to observe different pictures in the pupil's book, explain how a whole is divided into 8 equal parts and show $\frac{1}{8}$ of a whole.
- Use activity 4.3 3 and lead pupils on how they write the fraction one eighth $\frac{1}{8}$
- Lead pupils on how to write and read the fraction $\frac{1}{8}$. Help them to read and write $\frac{1}{8}$ on chalkboard and then in their notebooks.
- Help pupils to understand that $\frac{1}{8}$ is a fraction made by 2 parts: 1 is the

numerator, 8 is the denominator.

- Refer to activity 4.3.4 and use drawings of different shapes (rectangle, square…) divided into 8 equal parts and ask pupils to individually shade one eighth or $\frac{1}{8}$ of a shape.
- Assign the same groups to do (refer to **the application activity 4.3)** and move around to each group to verify their performance.

## Lesson 5: Comparing fractions $\frac{1}{2}, \frac{1}{4}$ *and* $\frac{1}{8}$

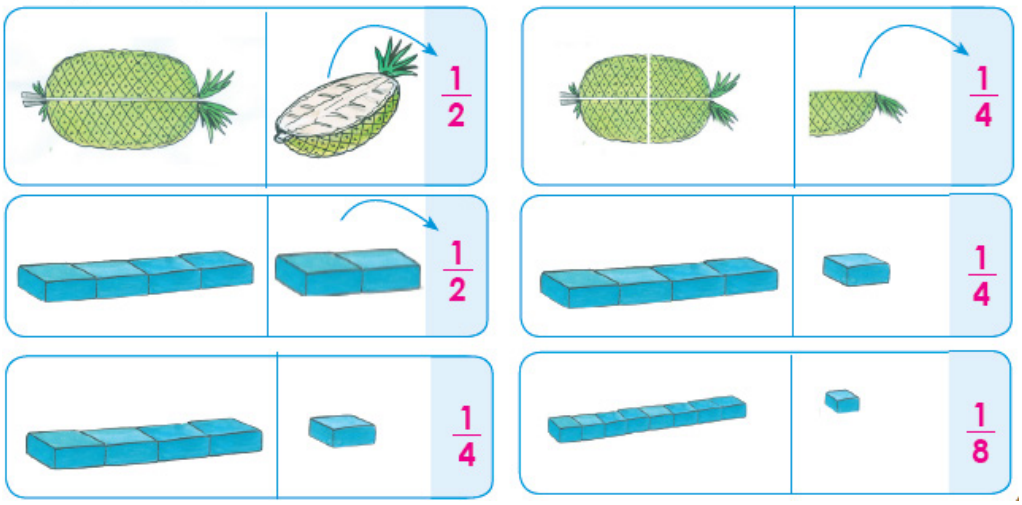
**a) Learning objectives:** Compare fractions $\frac{1}{2}, \frac{1}{4}$ *and* $\frac{1}{8}$

**b) 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 parts of equal sizes;
- Semi concrete objects: drawings showing different fractions, rectangles, squares, circles, etc.

**c) Teaching and learning activities:**

- Show pupils how to divide concrete objects or manipulative materials into equal parts and compare obtained parts, which is bigger, which is smaller, then between the following fractions which is greater than the other? Refer to **activity 4.4.1**:




- 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: You can also use such drawing:

- Show other values of two fractions with fraction strips and ask pupils to compare fractions using <, > or = (**activity 4.4.2**).
- Organize groups of pupils and give them activities to do: Use **activity 4.4.3.** 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 open ending questions for assistance where necessary;
- Call some groups to present and guide the whole class to harmonize on how to compare fractions.
- 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.*
- Provide activities to be done individually and check their answers;
- Assign all pupils to do the homework (refer **to the application activity 4.4**).

**Lessons 6: Combine fractions to make a whole**

**a) Learning objectives:** Use fractions to make a whole

**b) 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 showing different fractions, rectangles, squares, circles, etc.

**c) Teaching and learning activities:**

- Call 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 obtained when those parts are put together (see **activity 4.6**)
- Show other values of two proper fractions with fraction strips 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 values** to be combined to find a whole using cards with addition symbol (+) and equality symbol (=) and a card with a whole. For example how many halves of an orange can make a whole orange? How many quarters of a soap can make a whole soap?
- Move around in the classroom and provide probing questions for assistance where necessary;
- Call some groups to present and guide the whole class to harmonize on how to **add portions to make a whole.**
- Refer to **activity 4.5.2** and organise a group work activity to discuss the importance of fractions. Call groups to discuss their findings in a whole class discussion and guide them to conclude.
- Guide pupils to summarize how to form a whole using its portions.
- 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

1.

$a) \frac{1}{2} = \frac{1}{2}$

$b) \frac{1}{2} > \frac{1}{8}$

$c) \frac{1}{4} > \frac{1}{8}$

$d) \frac{1}{4} = \frac{1}{4}$

$e) \frac{1}{4} < \frac{1}{2}$

$f) \frac{1}{2} > \frac{1}{4}$

$g) \frac{1}{2} < \frac{2}{2}$

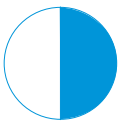
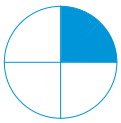
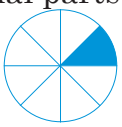
$h) \frac{1}{8} = \frac{1}{8}$

$i) \frac{1}{8} < \frac{1}{2}$

## 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.

Draw a circle ,divide it into equal parts and shade the following frac

a) $\frac{1}{2}$  b) $\frac{1}{4}$  c) $\frac{1}{8}$ 

2) Shade $\frac{1}{8}$ of the following picture.

3) Use >, = and < to compare the following fractions.

a) $\frac{1}{2} < \frac{8}{8}$ 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) $\frac{8}{8} > \frac{1}{4}$

4) Answer by True or false

a) True
b) false
c) True
d) false
e) True
f) True
g) True
h) True
i) False
j) True
k) True
l) True
m) True
n) True

# UNIT 5 LEAGHT MEASUREMENT

## 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 metre 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 List of lessons of Unit 5

| UNIT 5: MEASUREMENTS OF LENGTH (16 Periods) | | | | Reinforcement and Extension |
|---|---|---|---|---|
| | **Lesson title** | **Learning objectives** | **Number of periods** | |
| 1 | Introductory activity | Arouse the curiosity of learners on the content of this unit and the importance of length measurements in real life. | 1 | |
| 2 | Measuring lengths for objects by the use of a metre ruler | Measure lengths for objects by the use of a meter ruler. | 1 | |
| 3 | Dividing a meter into 10 equal parts and a decimetre in 10 equal parts | Define m, dm and cm | 1 | |

| | | | | |
|---|---|---|---|---|
| 4 | Converting units of measurements. | Convert units of measurements. | 1 | 1 |
| 5 | Comparing and arranging length measurements | Compare and arrange lengths of objects | 1 | 1 |
| 6 | Remediation | Provide learning support to learners who are falling behind their peers | 1 | |
| 7 | Adding length measurements | Add length measurements expressed in m, dm and cm. | 1 | 1 |
| 8 | Subtracting length measurements. | Subtract length measurements expressed in m, dm and cm. | 1 | |
| 9 | Multiplying length measurements by a number. | Multiply length measurements by a number. | 1 | 1 |
| 10 | Dividing length measurements by a number. | Divide length measurements by a number. | 1 | |
| 11 | Word problems involving length measurements in m, dm, and cm. | Solve word problems involving length measurements expressed in m, dm, and cm. | 1 | |
| 12 | End unit assessment | Measure, convert , compare, add and subtract length measurements ;<br>Multiply and divide length measurements by a whole number. | 1 | |

## 5.5 Guidance on different lessons

### Lesson 1: Introductory activity and Guidance

**a) Learning objectives:** Arouse the curiosity of learners on the content of this unit and the importance of length measurements in real life.

**b) Teaching and learning aids:**

Chalkboard, chalks, sticks with different lengths, long ropes, tape measure, folding metre, metre ruler notebooks, pens, pupil's book, and charts containing pictures of lengths of objects.

**c) Teaching steps:**

- This lesson is delivered through a conversation between the teacher and pupils.

- Use the picture and ask different questions to pupils in order to arouse their curiosity on the content of this unit (refer to questions from the pupil's book).
- As it is at the beginning of the unit, try to value all answers from pupils. Their answers are valid because the aim of the introductory activity is to get from pupils the predictions on the content of the unit to be learnt.
- Conclude the conversation by telling pupils that lengths of objects are measured to differentiate the shortest from the longest or the shortest from the tallest object or to get the length of an object that they need to use somewhere.

**Lesson1: Measuring lengths for objects by the use of a metre ruler**

**a) Learning objectives:** Measure lengths for objects by the use of a meter ruler.

**b) Teaching and learning aids:**

Chalkboard, chalks, sticks with different lengths, long ropes, tape measure, folding metre, metre ruler, charts containing pictures of lengths of objects.

**c) Teaching steps:**

- Through prompting questions, ask pupils to observe on the length measuring tools and show the length of one metre (1m).
- Guide pupils on how to measure the length of 1m using: tape measure, folding metre or the metre rule. Refer to **activity 5.1**

- Form pairs or small groups of pupils and ask them to measure a stick or a rope of 1 metre using a metre ruler, so that everyone in group have a measuring tool of 1 metre;
- Ask pupils to measure the length of the classroom using his /her measuring tool and then they say the number of metre they find after measuring. **Note**: You can also ask them to measure the length of 3 m, 4m or 5m on a given object or distance. Do not ask pupils to measure in centimeter (cm), decimeter (dm) or millimeter (mm); They will measure only in meter(m).

- Individually, ask 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. - Explain to pupils that a **metre** is a **standard** unit of length measurements, one metre (1m) measured using a meter ruler is the same as 1 metre measured using a folding metre or a tape metre.
- Assign pupils to answer to the question of **the application activity 5.1. M**ove around to each group to verify their performance
- After , this activity of measuring the length, ask pupils to estimate the number of metre contained in a given distance. For example: before measuring, is from here to there equal to2 or 3 m?
- Provide activities to be done by pupils at school or at home. You can ask them to measure the length of their house at home using a metre ruler and record the measured length in metre. You may ask pupils to measure lengths of different objects less or equal to 10 metre.

**Lesson 2: Dividing a metre and a decimetre into 10 equal parts**

**a) Learning objectives:** Define m, dm and cm

**b) Teaching and learning aids:** metre, ruler, manila paper, local material (like tree, rope)

**c) Teaching activities:**

- Call pupils to observe learning materials and explain instructions on activities to be done (use **activity 5.2.1** and **activity 5.2.2**);
- Show them how you cut a1m sugar cane in 10 equal parts and to measure the length of each part;
- Form groups/pairs 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 decimetre.

Guide them to discover that there are 10 dm in one metre: **1m = 10dm**

- When the length of one metre (1m) is divided in 10 parts of the same length, each part measures one decimetre (1dm).
- Then, **1m** equals to **10 decimetre**. **1m = 10 dm**
- When the length of one decimetre (1dm) is divided in 10 parts of the same length, each part measures one centimetre (1cm)
- Then, **1m** equals to **10 decimetre**. **1m = 10 dm**
- And **1dm** equals to **10 centimetre**. **1dm = 10 cm**

- Assign the same groups to answer to questions of **activity 5.2. Mo**ve around to each group to verify their performance;

- Guide pupils to conclude that the units of length get greater in the multiple of 10 where **1m = 10dm** and **1dm = 10 cm**
- Provide activities to be done by pupils and check their answers. Use **the application activity 5.2**
- Assign homework to all pupils.

**Lesson 3: Conversion of Units of length m, dm and cm**

**a) Learning objectives:** Convert units of measurements.

**b) Teaching resources and learning resources**

- Different instruments of measuring the length: metre or centimetre rulers, folding metre, measuring tape, etc,
- Gridded paper, diagrams or pictures of exact measurements.
- Conversion table of length measurements with m, dm and cm.

**c) 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 1m = 10dm= 100cm
- Organize groups of pupils and ask them to refer to the example and do the **activities** from **5.3.1** to **5.3.2**;
- Move around in the classroom and provide probing questions for assistance where necessary;
- Call some groups to present and guide the whole class to harmonize on how to convert the units of length measurements
- Guide pupils to summarize the relation sheep between length measurements, and how to convert from a unit to another using a conversion table.
- Provide activities to be done by pupils (**the application activity 5.3)** and check their answers.
- Assign all pupils a home work.

**Lesson 4: Comparing lengths and arranging length measurements**

**a) Learning objectives:** Compare and arrange lengths of objects

**b) Teaching resources and learning resources**

Step 1:

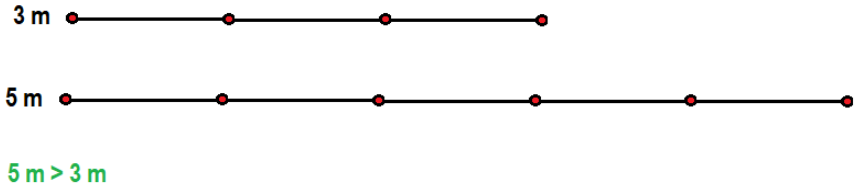
- Different instruments of measuring the length: metre or centimetre

rulers, folding metre, 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.

**c) 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;
- Call 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 5.4.2**);
- Move around in the classroom and provide probing questions for assistance where necessary;
- Call some groups to present and guide the whole class to harmonize on how to compare lengths of objects.
- 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.*
- Provide activities to be done by pupils and check their answers;
- Assign all pupils a home work to do.

Step 2:

- Refer to **activity 5.4.3** and **activity 5.4.4** and guide pupils to order the lengths for objects from the shortest to the longest (from smallest to the biggest).
- Assign the same groups to do (refer to **the application activity 5.4)** and move around to each group to verify their performance

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

**1) Use >, < and = to compare**

1) 5 cm < 8 dm
2) 7 m> 9 cm
3) 3 dm > 3 cm

4) 9 cm < 5 dm
5) 7 m > 6 dm
6) 2 cm < 5 m

**2) Arrange from shortest to longest.**

1) 8 dm, 7 cm, 1 m, 3 dm
   Answer: 7 cm, 3 dm,8 dm, 1 m
2) 9 cm, 4 dm, 7 cm, 6 m
   Answer: 7 cm, 9 cm, 4 dm, 6m
3) 6 dm, 7 m, 2 cm, 4 dm
   Answer: 2 cm,4 dm, 6 dm, 7 m
4) 7 cm, 8 dm, 1m, 9cm.
   Answer: 7 cm, 9 cm, 8 dm, 1m.

**3) Arrange from longest to shortest**

1) 1 dm,7cm, 8 dm, 2 m.
   Answer: 2 m, 8 dm, 1 dm,7 cm.
2) 2 dm, 6 m, 9 cm, 3 dm
   Answer: 6 m, 3 dm, 2 dm, 9 cm
3) 3 m, 5 m, 1 m, 4 m
   Answer: 5 m, 4 m, 3 m, 1 m.
4) 4 m, 8 m, 3 m, 1 m
   Answer: 8 m, 4 m, 3 m, 1 m.

## Lesson 5: Addition of length measurements

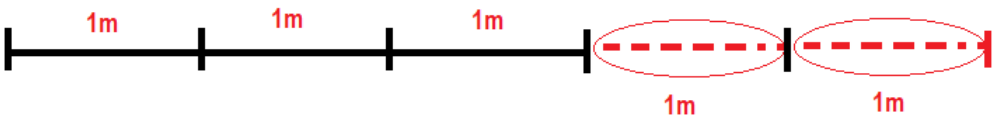
**a) Learning objectives:** Add length measurements expressed in m, dm and cm.

**b) Teaching resources and learning resources**

- Different instruments of measuring the length: meter or centimetre rulers, folding metre, 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.

**c) Teaching activities**

- Help pupils to accurately measure lengths using a meter ruler, a rope or a stick of 1 meter. Ask pupils to measure 2 consecutive lengths and then record their measures and make the sum
- By drawing, help pupils to add lengths in meters




- Write on the chalkboard 3 **m + 2 m = 5 m** and explain that adding lengths measurements, 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 5.5.2**).

**Example** 80dm + 6dm = ___ dm.

**Required unit: dm**

**Answer: 8m + 60cm**
**= 86dm**

| m | dm | cm |
|---|---|---|
| 8 | 0 | |
| ↓ | 6 | |
| 8 | 6 | |

- Guide learners to be aware of **the required unit:** unit of measurement for the answer:In this case, the required unit is dm.

  So they have to covert the given data in **the smaller unit** which is the decimeter, and then express the answer in the required unit.
- Ask 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. Help them to accurately add length measurements in metre and find the correct answer.

**d) Additional activities**

**1) Add the following measurements**

1) 7 m+1 dm = 710 cm
2) 4 m +3 cm= 403 cm
3) 8 m+ 2 dm= 82 dm
4) 5 dm+ 4cm= 54 cm
5) 7 dm + 3 m = 37 dm
6) 6 cm+4 m = 406 cm

**2) Tell three professionals who apply lengths of measurements in your society.**

**Answer:** Builders, tailors, carpenters.

**3) Is learning measurements of length important? How?**

**4) Solve word problems**

a) Batamuriza bought a 9m cloth and her mother bought 10dm. How many cm of cloth do both have altogether?

**Answer:** Total cloth in cm = 9m + 10dm = 910 cm

b) Bineza has 6odm of a Kitenge cloth. Ikirezi has 300cm of the same cloth.How many meters of cloth do they have altogether?

**Answer:** Both have (60 dm + 300cm) = 9m of cloth.

**Assessment**

Discuss with your parents the importance of measurements of length, ask them where they usually apply them and the instruments of measurements they always use.

**Lesson 6: Subtraction of length measurements**

**a) Learning objectives: Subtract length measurements expressed in m, dm and cm.**

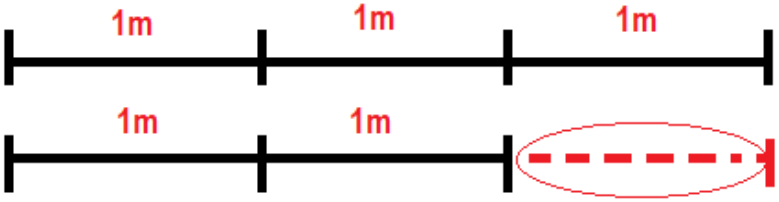
**b) Teaching resources and learning resources**

- Different instruments of measuring the length: meter or centimetre rulers, folding metre, 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.

**c) Teaching activities**

- Teacher helps pupils to discover, by measuring, that a rope of 9 metres (9m) is longer than a rope of 3 metres (3m) and the difference in lengths is 6 metres (6m).

  Using a pair of scissors, teacher may ask pupils to cut out 3 metres from 9 metres of rope and then measure the length of the remaining rope which is 6 metres (6 m).
- Using a meter ruler, pupils may be asked to measure, draw and write 3 metres on the chalkboard, and then measure, draw and write 2 metres on the chalkboard. Teacher asks them to find the difference between the 2 lengths which is 1 metre.




- Refer to activity 5.6.2 and guide pupils how to use conversion table to make subtraction of length measurements:

**Example:** 47 dm - 3m = ... cm

**The required unit is cm**

**Answer:**
**47dm - 3m = 170 cm**

| | m | dm | cm |
|---|---|---|---|
| | 4 | 7 | 0 |
| - | 3 | 0 | 0 |
| | 1 | 7 | 0 |

- In small groups, ask 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.

**d) Additional activities**

**1) Find the difference:**

1) 7 dm -5 cm =65 cm
2) 9 dm – 6 dm =3 dm
3) 8 m – 5 m =3 m
4) 6 dm – 2 dm =4 dm
5) 5 m -1 m =4 m
6) 4 m-2 m =2 m.

**2) Tell three professional who apply lengths of measurements in your society.**

**Answer:** Builders, tailors, carpenters.

**3) Is learning measurements of length important? How?**

**4) Solve word problems**

a) Muneza bought 6m long wood. He used 500cm to make a chair. How many centimetres did he remain with?

He remained with 100cm of wood = (600cm – 500cm)

- Discuss with your parents the importance of measurements of length, ask them where they usually apply them and the instruments of measurements they always use.

**Lesson 7: Multiplication of units of length per a number**

**a) Learning objectives:** Multiply length measurements by a number.

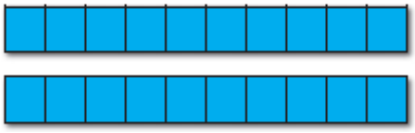
**b) Teaching resources and learning resources**

- Different instruments of measuring the length: metre or centimetre rulers, folding metre, 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.

**c) Teaching and learning activities:**

- Call 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 5.7.2);

**Example : 70cm x 2 =... dm**

**70 cm x 2 = 140 cm**

**140 cm = 14 dm**

**70 cm x 2 = 14 dm**

| m | dm | cm |
|---|---|---|
| | 7 | 0 |
| x | | 2 |
| 1 | 4 | 0 |

- Move around in the classroom and provide probing questions for assistance where necessary;
- Call some groups to present and guide the whole class to harmonize on how to find a product of length measurement by a number**.**
- Guide pupils to summarize how to find a product of length measurement by a number**: change the measurement in the smallest unit given, m**ultiply the obtained value by the given number and copy that small unit then convert the result in the requested unit.
- Provide activities to be done by pupils and check their answers.
- Assign homework to all pupils.

## Lesson 8: Division of a length measurement by a whole number

**a) Learning objectives:** Divide length measurements by a whole number.

**b) Teaching resources and learning resources**

- Different instruments of measuring the length: metre or centimetre rulers, folding metre, 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.

**c) 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 3cm= 6 cm : 2.
- Organize groups of pupils and give them activities to do (for example Activity 5.8.2);

**Example:** 960 cm ÷ 3 = ....cm

**Solution: The required unit is cm**

960 cm ÷ 3 = 320 cm

**960 cm ÷ 3 = 32 dm**

```
   320
3 ) 960
  - 9
    06
  - 6
     00
   - 0
     0
```

– Divide the length in the given unit.

- Move around in the classroom and provide open ending questions for assistance where necessary;
- Call some groups to present and guide the whole class to harmonize on how to divide a length by a whole number
- Guide pupils to summarize how to divide a length by a whole number**: change 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.
- Provide activities to be done by pupils (Refer **the application activity 5.8**) and check their answers.
- Assign homework to all pupils.

**Lesson 9: Word problems involving length measurements in m, dm, and cm**

**a) Learning objectives:** Try problems involving length measurements in m, dm, and cm.

**b) Teaching resources and learning resources**

- Different instruments of measuring the length: meter or centimetre rulers, folding metre, measuring tape, etc;
- Conversion table of length measurements

**c) Teachers activities:**

- Start by guiding pupils to solve some problems in a whole class discussion. Use the solved example of **activity 5.12.1.**
- Provide problems to be solved into groups or in pairs. Use questions for **activity 5.12.1**
- Move around in the classroom and provide probing questions for assistance where necessary;
- Call some groups to present and guide the whole class to harmonize on how to solve a problem:
  - guide them to u*nderstand the problem,*
  - *identify facts (givens and requests),*
  - *draw visual representations and solve the problem using the addition*
- Provide activities to be done by pupils (use **the application activity 5.12**) and check their answers.
- Assign homework to all pupils.

## ANSWERS FOR THE END UNIT ASSESSMENT 5

1) Convert
   a) 7m = 70dm.
   b) 850 cm = 85dm.
   c) 5m= 50dm.
   d) 600 cm =.60dm.
   e) 70 dm =7m.
   f) 900 cm = 90dm
   g) 9dm = 90cm
   h) 78dm = 780cm
   i) 450 cm = 45dm
   j) 9m = 90dm
2) Use <, > or = to compare.
   a) 6 m 8 dm 5cm = 685 cm
   b) 9 m 8dm = 980cm
   c) 650 cm <75 dm
   d) 65dm >75cm
   e) 689cm <7m
   f) 9m > 678cm
3) Arrange the shortest to the longest: 9 m, 75 dm, 8 m, 85 dm.
   75dm, 8m, 85dm, 9m
4) Arrange from the longest to the shortest: 756 cm, 87 dm, 967 cm, 68 dm.
   967cm, 87dm,756cm, 68dm.
5) Complete:
   a) 6 m + 9 dm = 690cm
   b) 500 cm + 80d m =13 m
   c) 987 cm – 9 m 8dm = 7cm
   d) 9 m 7 cm – 9m 7cm =0dm
   e) 848 m÷4 = 212m
   f) 750 dm÷ 5 = 15m
   g) 90 cm × 5 = 45dm
   h) 72 cm × 4 = 288cm

6. Read and find the answer

a) Gisa walks on foot to go to visit his friend. He covers a distance of 45m. Convert this distance in dm.

In dm = 45x10= 450dm.

b) Keza buys a long cloth of 79m. She sells 70 dm from it. How long is the remaining piece of cloth?

She remained with 79m-70dm = 72metres

c) Mucuruzi buys a cloth of 75m. He divides it in 5 equal parts. Find the length for each part.

Each part = 75m ÷ 5 = 15m

d) Gwiza runs a 100m in one round , If Gwiza runs 6 rounds,find the length he runs.

Total length = 100m x 6 = 600m

# UNIT 6 LITRE, THE STANDARD UNIT OF CAPACITY MEASUREMENTS

## 6.1 Key unit competence:

Comparing, adding, subtracting, multiplying and dividing capacity measurements expressed in litres (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 List of lessons

| UNIT 6: LITRE , THE STANDARD UNIT OF CAPACITY MEASUREMENTS (16 Periods) | | | | Reinforcement and Extension |
|---|---|---|---|---|
| | **Lesson title** | **Learning objectives** | **Number of periods** | |
| 0 | Introductory activity | Arouse the curiosity of learners on the content of this unit. | 1 | |
| 1 | Measuring liquids using a litre. | Measure liquids using a litre. | 1 | |

| | | | | |
|---|---|---|---|---|
| 2 | Comparing capacity measurements | Compare capacity of liquid in the containers. | 1 | |
| 3 | Addition of capacity measurements of liquids | Add capacity measurements of liquids | 1 | 1 |
| 4 | Subtraction of capacity measurements of liquids | Subtract capacity measurements of liquids. | 1 | 1 |
| 5 | Solving word problems involving addition or subtraction of capacity measurements of liquids. | Solve word problems involving addition or subtraction of capacity measurements. | 1 | |
| 6 | Remediation | Provide learning support to learners who are falling behind their peers | 1 | |
| 6 | Multiplication of capacity measurements with a whole number | Multiply units of capacity measurements of liquids with a whole number. | 1 | 1 |
| 7 | Division of capacity measurements with a whole number | Divide units of capacity measurements with a whole number. | 1 | 1 |
| 8 | Solving word problems involving multiplication and division of capacity measurements by a whole number. | Solve word problems involving multiplication and division of capacity measurements by a whole number. | 1 | |
| 9 | End unit assessment 6 | Measure, compare, add, subtract capacity measurements, multiply and divide capacity measurements of liquids by a whole number. | 1 | |

## 6.5 Guidance on lessons

### Lesson 1: Introductory activity

**a) Learning objectives:** Arouse the curiosity of learners on the content of this unit and the importance of capacity measurements in real life.

**b) Teaching and learning aids:**

Different bottles to be used when measuring the capacity of liquids and different containers.

**c) Teaching steps:**

- This lesson is delivered through a conversation between the teacher and pupils.
- Use the picture and ask different questions to pupils in order to arouse their curiosity on the content of this unit (refer to questions from the pupil's book).
- As it is at the beginning of the unit, try to value all answers from pupils. Their answers are possible because the aim of the introductory activity is to get from pupils the predictions on the content of the unit to be learnt.
- Conclude the conversation by telling pupils that capacity of liquids is measured to know which container has more quantity of liquid than another.

**Lesson 2: Measuring liquids with a litre as a measuring tool**

**a) Learning objectives:** Measure liquids using a litre.

**b) Teaching resources and learning resources:** Different bottles to be used when measuring the capacity of liquid**s in containers;**

**c) Teaching and learning activities:**

- Call pupils to observe learning materials and explain instructions on activities to be done (use **activity 6.1.1**) where they give different types of liquids that can be measured with a litre.


Water: 1ℓ Milk:1ℓ Fuel: 2ℓ Juice: 1ℓ Oil: 1ℓ Beer: 1ℓ

- Guide them to discover how to measure the capacity of a liquid container: we use a bottle called litre with a quantity known at international level.
- Guide pupils to measure the quantity of water that is equal to 1ℓ and inform them that litre is a standard/basic unit of capacity for liquids.
- Form groups/pairs of pupils and give them bottles and ask them to measure the capacity of different liquids and record them on sheets of paper;
- Assign pupils to work in pairs on the **activity 6.1.2**
- Ask some pairs to present the findings and guide the whole class to harmonize how to measure the capacity and how to read and write it correctly.

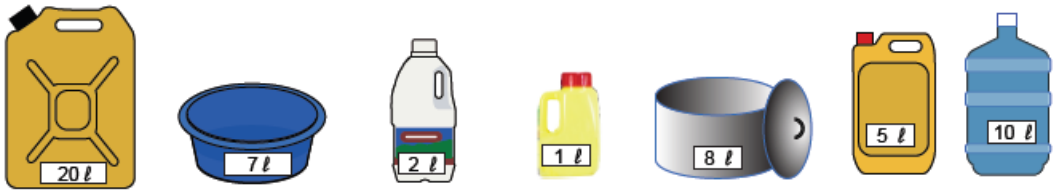
- Guide pupils to summarize how to measure the capacity of liquids, instruments to be used, and to highlight the standard unit of capacity: the litre (ℓ).
- Provide pupils with **application activity 6. 1** from the pupil's book and check their answers.

**Lesson 3: Comparing measurements of capacity for liquids**

**a) Learning objectives:** Compare capacity of liquid in the containers.

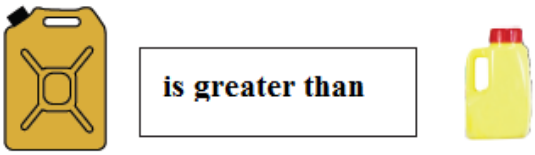
**b) Teaching resources and learning resources:**

- Different bottles containing liquids whose capacity is labelled:




**c) Teaching and learning activities:**

- Refer to **activity 6.2.1 and** show pupils objects of different volume and ask them to compare their capacity before measuring;




**Note:** We say the following:

1) A 20 litres jerry can is greater than a 1 litre jerry can.
2) 20 ℓ > 1ℓ: Twenty litres are greater than one litre.

- Invite one pupil in front of others and guide him/her to discover the capacity of liquid which is labelled 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. Refer to **activity 6.2.2** and **activity 6. 2. 3.**
- Organize groups/pairs of pupils and give them activities to do to arrange capacities in ascending order or in descending order (for example **activity 6.2.4** and **activity 6.2.5**)
- Move around in the classroom and provide probing questions for assistance where necessary;
- Call 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.

- Guide pupils to summarize how to compare capacity of liquid containers and how to arrange them in ascending or descending order.
- Provide **the application activity 6.2** to be done by pupils and check their answers;
- Assign all pupils a home work to do.

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

a) Use >, < and = to compare

1) $25\ell < 48\ell$
2) $37\ell < 69\ell$
3) $13\ell = 13\ell$
4) $29\ell > 25\ell$
5) $87\ell < 96\ell$
6) $92\ell > 75\ell$

b) 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.

c) Arrange from the highest amount to the lowest.

1) 51ℓ, 87ℓ, 38ℓ, 92ℓ.
   Answer: 92ℓ, 87ℓ, 51ℓ, 38ℓ.
2) 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.

**Lesson 4: Addition of capacities expressed in litres**

**a) Learning objectives:** Add capacity measurements of liquids

**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 discover that quantity of the same liquids from 2 or more different small containers can be poured (added) in one big container. When the capacity for every quantity is known, the capacity for the sum can be calculated (use question one for **activity 6.3.1)**

For **example,** the total quantity of water contained in the following jerry cans:


The total quantity of water contained in the 2 jerry cans is: $2\ell + 20\ell = 22\ell$

- Guide pupils to notice how capacity measurements are added using the standard written method:

**Example: $172\ \ell + 124\ \ell =$**

| | | | |
|---|---|---|---|
| $172\ \ell + 124\ \ell =$ | $172\ \ell$ | $\overset{1}{1}52\ \ell$ | $\overset{1\ 1}{1}72\ \ell$ |
| $152\ \ell + 38\ \ell =$ | $+124\ \ell$ | $+\ 38\ \ell$ | $+\ 38\ \ell$ |
| $172\ \ell + 38\ \ell =$ | $296\ \ell$ | $190\ \ell$ | $210\ \ell$ |

- Organize groups of pupils and give them activities to do (for example question two for **Activity 6.3.2).**
- Move around in the classroom and provide probing questions for assistance where necessary; Call some groups to present and guide the whole class to harmonize on how to add capacity measurements
- Assign each group the **activity 6.3.3** to solve word problems involving the sum of capacity measurements.
- Guide pupils to summarize how to add capacity measurements using standard written method.
- Provide **the application activity 6.3** to be done by pupils and check their answers.
- Assign homework to be done by all pupils.

**Lesson 5: Subtraction or difference of capacities in litres**

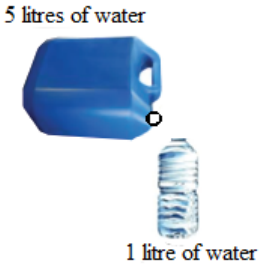
**a) Learning objectives:** Subtract capacity measurements of liquids.

**b) Teaching resources and learning resources:**

Different bottles or liquid containers to be used when measuring the capacity of liquids in containers.

**c) 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 remaining quantity can be calculated (use question one for **activity 6.4.1**):




- Guide pupils to notice how to subtract capacity measurements using the standard written method:

**Example:**

723 ℓ - 312 ℓ = 411ℓ

423 ℓ - 309 ℓ = 114ℓ

$$\begin{array}{r} 723\ \ell \\ -\ 312\ \ell \\ \hline 411\ \ell \end{array} \qquad \begin{array}{r} {\scriptstyle 1\,1} \\ 4\not{2}3\ \ell \\ -\ 309\ \ell \\ \hline 114\ \ell \end{array}$$

- Organize groups/pairs of pupils and call them to work on questions for **activity 6.4.2.**
- Move around in the classroom and provide probing questions for assistance where necessary;
- Call some groups to present and guide the whole class to harmonize on how to subtract capacity measurements;
- Guide pupils to summarize how to add capacity measurements using standard written method.
- Provide **the application activity 6.4** 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 subtraction of capacity measurements**, 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**.**

## Lesson 6: Word problems involving addition or subtraction of capacity measurement

**a) Learning objectives:** Solve word problems involving addition or subtraction of capacity measurements.

**b) Teaching and learning aids:**

Different bottles or liquid containers to be used when measuring the capacity of liquids in containers.

**c) Teaching and learning activities:**

- Guide pupils to discover that some quantity of a liquid can be poured from the container to another. In this case the new capacity in the second container can be known if the capacity for the previous quantity is known.
- Guide pupils to notice how to add or subtract capacity measurements using the standard written method.
- Call pupils to solve one problem on the blackboard: one pupil on the blackboard can be guided by colleagues. Use the solved examples of **activity 6.5.**
- Organize groups/pairs of pupils and invite them to work on other question for **activity 6.5.**
- Move around in the classroom and provide probing questions for assistance where necessary;
- Call some groups to present and guide the whole class to harmonize on how to solve word problems.
- Provide **the application activity 6.5** to be done by pupils and check their answers.
- Assign homework to be done by all pupils.

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

1) A tank of water has capacity of 500l when full. We use 175 litres of water in a week. How many litres of water remain in the tank at the end of the week?

**Solution:**

A tank when full = 500 ℓ

Capacity used = 175 ℓ

Capacity remain in the tank = 500 ℓ - 175 ℓ

**=325 ℓ remains in the tank**

2) There are 725 ℓ of milk in a milk jar. We collect other 215 ℓ from farmers. How many litres of milk do we have now?

**Solution:**

Capacity we have = 725 ℓ

Capacity collected = 215 ℓ

Total capacity we have = 725 ℓ + 215 ℓ

**= 940 ℓ of milk.**

**Lesson 7: Multiplication of capacity measurements per a whole number**

**a) Learning objectives:** Multiply units of capacity measurements of liquids with a whole number.

**b) Teaching resources and learning resources:**

Bottles of the same capacity to be used when measuring the capacity of liquids in containers;

**c) Teaching and learning activities:**

- Call 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 10 litres;


- 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 10ℓ x 4= 40 ℓ .

Note: Pupils can say that it will be: 10ℓ + 10ℓ+ 10ℓ + 10ℓ = 40ℓ, Try to help them to find that

10ℓ + 10ℓ+ 10ℓ + 10ℓ = 40ℓ = 10ℓ x 4.

- Guide pupils to highlight how to multiply (see activity 6.6.1)

**Example:**

72 ℓ x 4 = 288 ℓ

$$\begin{array}{r} 72\ \ell \\ \times\ \ 4 \\ \hline 288\ \ell \end{array}$$

- Organize groups of pupils and give them activities to do (for example **activity 6.6.2**);
- Move around in the classroom and provide probing questions for assistance where necessary;
- Call some groups to present and guide the whole class to harmonize on how to find a product of capacity measurement by a number**.**
- 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 litre.
- Assign **the application activity 6.6** to be done by pupils and check their answers.
- Assign homework to all pupils.

**Lesson 7: Division of capacity measurements by a whole number**

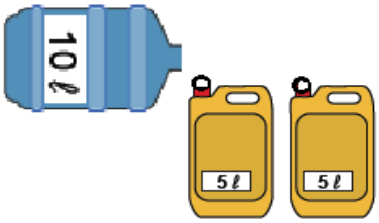
**a) Learning objective:** Divide units of capacity measurements with a whole number.

**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 litres of water to be shared equally among 2 small jerry cans and measure the quantity for one jerry can:




- Ask other pupils to say the capacity for water in one jerry can: they will see that it is equal to 10 litres ÷ 2 = 5 litres. Use also the question of the activity 6.7.1.
- Refer to the solved question of activity 6.7.2 and guide pupils how they can divide using the standard written method:

**Example**

$255\ \ell \div 5 = 51\ \ell$

$$\begin{array}{r} 51 \\ 5\overline{)\ 255\ell} \\ -\ 25\downarrow \\ \hline 005 \\ -\ 5 \\ \hline 0 \end{array}$$

- Organize groups of pupils and give them activities to do (**activity 6.7.2**);
- Move around in the classroom and provide probing questions for assistance where necessary;
- Call some groups to present and guide the whole class to harmonize on how to divide a capacity measurement by a whole number.
- Guide pupils to summarize how to divide capacity measurement by a whole number**: divide** the obtained value by the given number and copy that unit of measurement ($\ell$).
- Assign them with **the application activity 6.7** to be done by pupils and check their answers.

- Assign homework to all pupils.

**Lesson 8: Word problems involving multiplication or division of capacities by a number**

**a) Learning objective:** Solve word problems involving multiplication or division of capacity measurements by a whole number.

**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 litres of water to be shared equally among 2 small jerry cans and measure the quantity for one jerry can.
- Continue to guide pupils on how to solve a word problem. Refer to the solved example in **activity 6.8.1.**
- Form groups or pairs of pupils and give them **activity 6.8.2** to **activity 6.8.3.**
- Move around in the classroom and provide assistance where necessary;
- Call some groups to present and guide the whole class to harmonize on how to divide or multiply capacity measurement by a whole number.
- Guide pupils to summarize how to divide or multiply capacity measurement by a whole number**: divide or multiply** the obtained value by the given number and copy that unit of measurement (ℓ).
- Assign them with **the application activity 6.9** to be done by pupils and check their answers.

  Assign homework to all pupils.

**Additional activities and their answers**

a) Do the following:

1) 47ℓ + 143ℓ = 190ℓ
2) 34ℓ + 53ℓ =87ℓ
3) 12ℓ + 82ℓ = 94ℓ
4) 55ℓ + 44ℓ =99ℓ
5) 57ℓ +53ℓ =110ℓ
6) 95ℓ÷5= 19ℓ
7) 47ℓx2=94ℓ
8) 119ℓ-110ℓ=9ℓ
9) 208ℓ-192ℓ=16ℓ
10) 86ℓx5=172ℓ
11) 955ℓ÷5191ℓ
12) 34ℓx5=170ℓ.

b) Give two people who often apply the use of a litre as a standard unit of capacity measurement of liquids.

**Answer:** Farmers and businessmen.

c) How important is learning measurement of capacity of liquids.

**Answer:** Applied in the buying and selling of fluids like water, milk, petrol and other fluids.

d) Uwamahoro bought 8 litres of milk and her mother bought 9litres. How many litres do they have altogether?

**Answer:** Both have 8litres + 9litres = 17 litres.

e) Butera fetched a full tank of 1000litres. They used 500liters of water to wash clothes. How many litres remained?

**Answer:** 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 litres do both have?

**Answer:** Total number of litres = 600l + 300l = 900l.

## ANSWERS TO THE END UNIT ASSESSMENT 6

1) Fill in with True or False

a) Litre is the standard unit of capacity measurements.

Yes

b) We use a litre to measure the length of a field.

No

c) Litre is used to measure the quantity of liquids such as water.

Yes

2) Use <, > or = to compare

a) 586 ℓ < 856 ℓ

b) 549 ℓ > 478 ℓ

c) 287 ℓ = 287 ℓ

d) 918 ℓ > 908 ℓ

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 of measurements for objects from the biggest to the smallest.

908ℓ, 890ℓ, 980ℓ, 809ℓ

**Answer:** 809ℓ, 890ℓ, 908ℓ, 980ℓ

5) Find the answer

a) 548ℓ + 387 ℓ = 935ℓ

b) 81ℓ x 5 = 405ℓ

c) 978ℓ - 789ℓ = 189ℓ

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 remains in the tank?

**Answer: The water that remained in the tank = 975ℓ-789ℓ=421ℓ**

b) Kirabo has 20ℓ of petrol. She wants to keep it in the small cans with the capacity of 5 ℓ each How many jerrycans will she use?

5 litres

1 litre of mineral water

**Answer: She will use 20ℓ÷5ℓ = 4jerrycans.**

c) Our tank of water is filled by 6 drums. How much water can fill the tank if each drum has 91ℓ?

**Answer: The amount of water that can fill the tank = 91ℓ x 6= 546ℓ of water.**

# UNIT 7 KILOGRAM (kg) AS A STANDARD UNIT 0F 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 List of lessons of unit 7

| UNIT 7: KILOGRAM (kg) AS A STANDARD UNIT 0F MASS (16 Periods) | | | | Reinforcement and Extension |
|---|---|---|---|---|
| | **Lesson title** | **Learning objectives** | **Number of periods** | |
| 1 | Introductory activity | Arouse the curiosity of learners on the content of this unit. | 1 | |
| 2 | Kilogram as a standard unit of mass | Read the weight of objects on balances and discover how to measure the weight of an object expressed in kilogram (kg). | 1 | |

| | | | | |
|---|---|---|---|---|
| 3 | Measuring mass using different types of balance. | Measure the weight of objects using different types of balances | 1 | 1 |
| 4 | Comparing masses of objects and arranging masses of objects | Compare and arrange mass of objects. | 2 | 1 |
| 5 | Remediation | *Provide learning support to learners who are falling behind their peers* | 1 | |
| 6 | Addition of mass measurements and solving related word problems. | Add mass measurements and solve related word problems. | 2 | 1 |
| 7 | Subtraction of mass measurements and solving related word problems | Subtract mass measurements and solve related word problems. | 1 | |
| 8 | Multiplication of mass measurements by a whole number and solving related word problems | Multiply mass measurements by a whole number and solve related word problems. | 1 | 1 |
| 9 | Division of mass measurements by a number and solving related word problems | Divide mass measurements by a number and solve related word problems. | 1 | |
| 10 | End unit assessment 7 | Weigh, compare, add, subtract weights of various objects up to 10 kg, multiply and divide mass measurements in kilograms (kg) by a whole number. | 1 | |

## 7.5 Guidance on lessons

### Lesson 1: Introductory activity

**a) Learning objectives:** Arouse the curiosity of learners on the content of this unit and the importance of mass measurements in real life.

**b) Teaching and learning aids:**

- Different types of balances of measuring the mass: spring, digital balance, top beam balance, double beam (roberval) balance, etc.
- Different objects whose mass is labelled on them.

**c) Teaching steps:**

- This lesson is delivered through a conversation between the teacher and pupils.
- Use the picture and ask different questions to pupils in order to arouse their curiosity on the content of this unit (refer to questions from the pupil's book).
- As it is at the beginning of the unit, try to value all answers from pupils. Their answers are possible because the aim of the introductory activity is to get from pupils the predictions on the content of the unit to be learnt.
- Conclude the conversation by telling pupils that the in this unit they will learn how the mass of objects is measured, that the masses can be added or multiplied by a number.

## Lesson 2: Kilogram as a standard unit of mass

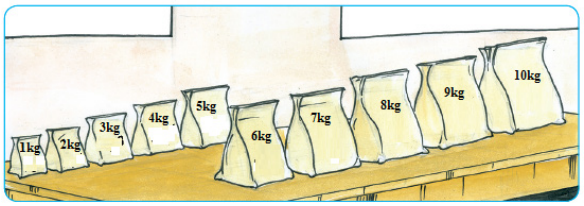
**a) Learning objectives:** Read the weight of objects on balances and discover how to measure the weight of an object expressed in kilogram (kg).

**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 labelled on them.

**c) Teaching and learning activities:**

- Call pupils to observe learning materials and explain instructions on activities to be done (use activity 7.1.1):





- 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 labelled mass is the one shown by the balance.


- Form groups/pairs of pupils and give them balances and ask them to: measure the mass of different objects and record them on sheets of paper;
- Ask some pairs to present the findings and guide the whole class to harmonize how to measure the mass and how to read and write them correctly.
- 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).
- Assign pupils to work individually on the **application activity 7.1**. Check their answers and provide feedback.

**Lesson 2: Measuring masses of objects in kg and types of balances**

**a) Learning objectives:** Measure the weight of objects using different types of balances

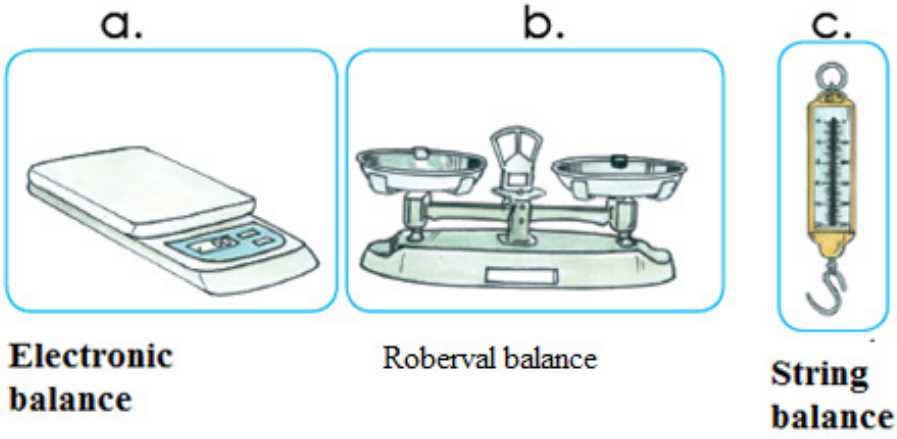
**b) Teaching resources and learning resources**

- Different types of balances of measuring the mass: spring, digital balance, top beam balance, double beam balance,
- Different objects whose mass is labelled on them like 2kg of sugar, 1kg of maize flour, 5kg of beans.

**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:**

- Call a pupil to have two objects of different mass in the hands. Refer to **activity 7.2.1** and ask pupils to give their observation:
- Call pupils to observe balances and explain instructions on activities to be done (use **activity 7.2.2, activity 7.2.3** and **activity 7.2.4);**
- 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 7.2.3** and **activity 7.2.4).**




- Form groups/pairs of pupils and give them a single top beam balance or a double beam balance and ask them to: measure the mass of different objects and record them on sheets of paper;
- Ask some groups/pairs to present the findings and guide the whole class to harmonize how to measure the mass and how to read and write them correctly.
- Guide pupils to summarize how to measure the mass and different types of balances commonly used in the market and in the society.
- Provide **the application activity 7.2** to be done by pupils by weighing different masses in kg and check their answers.
- After this lesson, organize a group discussion to discuss how balances are used, the correct weight and non correct weight (weighted on fake balances which do not meet standards).

**Lesson 3: Comparing and ordering masses (weights) of objects**

**a) Learning objectives:** Compare and arrange mass of objects.

**b) Teaching and learning resources:**

Different types of balances of measuring the mass: spring, digital balance, top beam balance, double beam balance, different objects of different weights 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.

**Example**: This is heavier than this.

- Call one pupil in front of others and guide him/her how to measure and record mass of 2 objects using a balance and then compare the obtained measurements using <, > or = ;

**Example**:

2kg of bananas are **less than** 5 kg of pumpkins: 2kg < 5kg

- Organize groups/pairs of pupils and give them activities to do (for example from activity 7.3.1 to activity 7.3.4);
- Move around in the classroom and provide probing questions for assistance where necessary;
- Call some groups/pairs to present and guide the whole class to harmonize on how to compare weights of objects.
- After this session, assign groups/pairs to do activity 7.3.3 and activity 7.3.4 to arrange weights (masses) in ascending or descending order.

In ascending order: from the lightest (smallest mass) to the heaviest (biggest mass).

In the descending order: From the heaviest (biggest mass) to the lightest (smallest mass).

- Guide pupils to summarize how to compare weights of objects, and how to arrange them in a given order.
- Provide **the application activity 7. 3** to be done by pupils and check their answers;
- Assign all pupils a home work to do.

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

1) Use >, < and = to compare.

| | |
|---|---|
| a) 125kg < 848kg | d) 929kg>725kg |
| b) 437kg < 569kg | e) 487kg< 496kg |
| c) 913kg>183kg | f) 592kg< 875kg |

2) Arrange from lightest to heaviest.

a) 218kg, 547kg, 91kg, 543kg
**Answer**: 91kg, 218kg, 543kg. 547kg.

b) 339kg, 624kg, 257kg, 666kg
**Answer**: 257kg, 339kg, 624kg, 666kg.

c) 496kg, 767kg, 362kg, 754kg
**Answer**: 362kg, 4 96kg, 754kg, 767kg.

d) 475kg, 881kg, 419kg, 898kg
**Answer**: 419kg, 475kg, 881kg, 898kg.

3) Arrange from the highest amount to the lowest

a) 251kg , 687kg, 238 kg, 692 kg

**Answer**: 692kg, 687 kg, 251kg , 238kg

b) 382kg, 756kg, 389kg, 723kg

**Answer**: 756kg, 723kg, 389kg, 382 kg

c) 493kg, 875kg, 411kg, 884kg.

**Answer**: 884kg, 875kg, 493kg, 411kg

d) 584kg, 948kg, 593kg, 981kg

**Answer**: 981kg, 948kg, 593 kg, 584kg.

## Lesson 4: Addition of masses in kilogram and related word problems

**a) Learning objectives:** Add mass measurements and solve related word problems.

**b) Teaching and learning resources:**

- Balances of measuring the mass;
- Objects of different weights to be measured.

**c) Teaching and learning activities:**

- Call 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 by measuring the weights for each object and then adding them using standard written method; use the activity 7.4.1 and the example of activity 7.4.2.

**Example: 205 kg + 414 kg =**

**205 kg + 414 kg = 619 kg**

$$\begin{array}{r} 205\ \text{kg} \\ +\ 414\ \text{kg} \\ \hline 619\ \text{kg} \end{array}$$

- Organize groups/pairs of pupils and give them activities to do (for example from **activity 7.4.2** to **activity 7.4.3**);
- Move around in the classroom and provide probing questions for assistance where necessary;
- Call some groups/pairs to present and guide the whole class to harmonize on how to add mass measurements;
- Guide pupils to summarize how to add mass measurements: **add them using standard written method.**
- Provide **the application activity 7.4** 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 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 **(Activity 7.6.1)**.

**d) Extra exercises and their answers**

Work out the following:

1) 247 kg + 443kg = 690kg
2) 534 kg+ 353kg = 887kg
3) 112kg + 882= kg 994
4) 255kg +144kg= 399kg
5) 157kg + 143 kg =300kg
6) Work out the word problems
   a) Give 3 things with which they apply the use of a kilogram as a standard unit of measurement of their mass.

      **Answer**: Food, medicine, books etc.
   b) How important is learning measurement of mass.

      **Answer**: They are used in the buying and selling as we get to know the amount of items by weight that we have bought or sold.

      They are used in verifying 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?

      **Answer**: Both have 18kg + 12kg = 30kg
   d) Kaneza has 600kg of rice. Kamana has 250kg. What is the total number of kg of rice do both have?

      **Answer**: Total kilograms of Rice = 600kg + 250kg =850kg.

**Lesson 5: Subtraction of masses measurements**

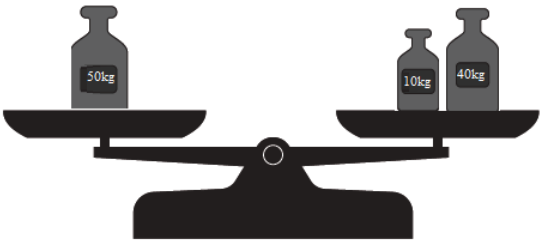
**a) Learning objective:** Subtract mass measurements and solve related word problems

**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:**

- Call one pupil in front of others and guide him/her how to demonstrate subtraction of **mass** measurements starting by using a balance to measure the mass of objects which are together, remove some of them from the balance and see the mass of remaining objects, follow **Activity 7.5.1**): What happens if we take away 10 kg from the second beam of the balance?




- Lead pupils to realize that they have: 40kg -10kg = 30 kg.
- Refer to the example of **activity 7.5.2** and guide pupils how they subtract using the standard written method:

**Example: 475 kg - 364 kg =**

**475 kg - 364 kg = 111kg**

$$\begin{array}{r} 475\ \text{kg} \\ -\ 364\ \text{kg} \\ \hline 111\ \text{kg} \end{array}$$

- Organize groups of pupils and give them activities to do (use **activity 7.5.1** and **activity 7.5. 2**);
- Move around in the classroom and provide probing questions for assistance where necessary;
- Call some groups to present and guide the whole class to harmonize on how to carry out the subtraction involving mass measurements.
- 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 7.5.3**).

- Provide **the application activity 7.5** to be done by pupils and check their answers.
- Assign homework to be done by all pupils.

**Lesson 6: Multiplication of mass measurements by a whole number.**

**a) Learning objective:** Multiply mass measurements by a whole number and solve related word problems.

**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:**

- Call 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 1kg x 2= 2kg. Show them how to multiply using the standard written method: Follow **activity 7.9.**

**Example: 82 kg x 4 =**

**82 kg x 4 = 328 kg**

**82 kg**
**x 4**
**328 kg**

- Organize pupils in groups and let them follow example in **activity 7.9.2** and ask them to do the same activity.
- Move around in the classroom and provide probing questions for assistance where necessary;
- Call some groups to present and guide the whole class to harmonize on how to find a product of mass measurement by a number**.**
- Guide pupils to summarize how to find a product of mass measurement by a number**: m**ultiply 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 7.9.3)**.
- Provide **the application activity 7.9** to be done by pupils and check their answers.
- Assign homework to all pupils.

**Lesson 7: Division of mass measurements by a whole number**

**a) Learning objective:** Divide mass measurements by a number and solve related word problems.

**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 5 kg 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 5 kg: 5 = 1 kg; show them how to divide using the standard written method:

**Example: 75 kg ÷ 3 =**

**75 kg ÷ 3 = 25 kg**

$$\begin{array}{r} 25\ \text{kg} \\ 3\overline{)\ 75\ \text{kg}} \\ -\ 6\downarrow \\ \underline{\phantom{-}} \\ 15 \\ -15 \\ \underline{\phantom{-15}} \\ 00 \end{array}$$

- 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;
- 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 helps 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 **(activity 7.12)**.

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

## ANSWERS FOR THE END UNIT ASSESSMENT 7

1) Write by True or False
   a) Kg is the unit of mass measurements;

      Yes

   b) Kg is the unit of capacity measurements
   c) The litre is the unit of mass measurements

      No

2) Give 3 types of balances. Answer: Beam balance, Electronic balance, String balance.
3) Use <, > or = to compare masses
   a) 721Kg > 271kg
   b) 74Kg = 74kg
   c) 582Kg > 532 kg
   d) 657 kg < 756kg
   e) 67Kg< 76kg
   f) 659Kg > 559kg
4) Arrange the mass measurements the from smallest to the biggest mass
   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 biggest to the smallest mass
   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 Kg + 294 kg = 939kg
   b) 809 Kg + 178 kg = 987kg
   c) 738 Kg – 598 kg = 140kg
   d) 696 Kg – 467 kg = 229kg
   e) 995 Kg÷5 = 199kg
   f) 960 Kg÷ 6 =160kg
7) Read and find the answer
   a) Abatoni buys 6 sacks of cement. If one sack weighs 50kg, find the number of kg she buys.

      The number of kg of cement = 50x6=300kg

   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=17kg

   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 kg + 278 kg + 319 kg=953kg

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 895kg – 547kg =348kg

e) Kamana weighs 45kg. His sister weighs 55kg. Find the total weight for Kamana and his sister.

Both weigh 45kg + 55kg = 100kg.

# UNIT 8 RWANDAN FRANCS 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 100Frw learnt 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 List of lessons in Unit

| **UNIT 8: RWANDAN FRANCS FROM 1FRW UP TO 1000 FRW (16 Periods)** | | | | **Reinforcement and Extension** |
|---|---|---|---|---|
| | **Lesson title** | **Learning objectives** | **Number of periods** | |
| 1 | Introductory activity | Arouse the curiosity of learners on the content of this unit. | 1 | |
| 2 | Characteristics and importance of Rwandan currency from 1Frw to 1000Frwand | Describe Rwandan currency: Sequence of coins of 1Frw, 5Frw,10Frw, 20Frw, 50Frw, 100Frw and notes of 500 Frw and 1000 Frw and its importance. | 2 | 1 |

| | | | | |
|---|---|---|---|---|
| 3 | Exchange of Rwandan currency from 1 Frw to 1000 Frw | Exchange the Rwandan currency from 1 Frw up to 1000 Frw. | 1 | 1 |
| 4 | Comparing Rwandan currency that does not exceed 1000 Frw. | Compare Rwandan currency that does not exceed 1000 Frw. | 1 | |
| 5 | Remediation | *Provide learning support to learners who are falling behind their peers* | 1 | |
| 6 | Addition and subtraction of Rwandan currency that does not exceed 1000 Frw. | Add and subtract Rwandan currency that does not exceed 1000 Frw. | 1 | 1 |
| 7 | Word problems involving addition and subtraction of Rwandan currency that does not exceed 1000 Frw. | Solve problems involving addition and subtraction of Rwandan currency that does not exceed 1000 Frw. | 1 | |
| 8 | Multiplication and division of Rwandan currency that does not exceed 1000 Frw by a number. | Multiply and divide Rwandan currency that does not exceed 1000 Frw by a number. | 2 | 1 |
| 9 | Word problems involving multiplication and division of Rwandan currency that does not exceed 1000 Frw. | Solve word problems involving multiplication and division of Rwandan currency that does not exceed 1000 Frw by a whole number. | 1 | |
| 10 | Remediation | *Provide learning support to learners who are falling behind their peers* | 1 | |
| 11 | Sources of money and its uses, listing down items before buying them | Mention sources of money and its uses, List down items before buying them. | 1 | |
| 12 | Buying and selling goods. | Buy and sell goods. | 2 | 1 |
| 13 | Good use, management and saving of money | Be able to manage, use well and save money. | 1 | |
| 15 | Preparing small income generating projects | Prepare small income generating projects. | 1 | 1 |

| | | | | |
|---|---|---|---|---|
| 16 | End unit assessment | Count and exchange Rwandan currency up to 1000 Frw. | 1 | |

## 8.5 Guidance on different lessons

This lesson is delivered through a conversation between the teacher and pupils.

- Use the real Rwandan francs (notes and coins) and ask different prompt questions to pupils in order to arouse their curiosity on the content of this unit (Refer to the pupil's book).

- Use pictures of Rwandan francs as given in the pupil's book and ask pupils to say what they see on each Rwandan coin or note.

- As it is at the beginning of the unit, try to value all answers from pupils. All answers are possible because the aim of the introductory activity is to get from pupils the predictions on the unit to be learnt.

- Conclude the lesson of the day by enhancing the clear understanding that everyone has to pay money to the seller in order to obtain the needed items. For example when you want a pen, a notebook, a rubber, soap, etc, you need to pay money.

### Lesson1: Characteristics and importance of Rwandan francs up to 1000Frw

**a) Learning objectives:** Describe Rwandan currency: Sequence of coins of 1 Frw, 5 Frw, 10 Frw, 20 Frw, 50 Frw, 100 Frw and notes of 500 Frw and 1000 Frw and its importance.

**b) Teaching and learning aids:**

Rwandan currency from 1Frw to 1000 Frw, Drawings and pictures of Rwandan currency.

**c) Financial education:**

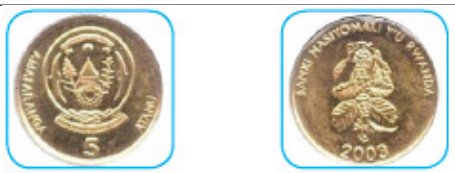
This is addressed as they explain how to appropriately spend money.

**d) Teaching and learning activities:**

- Prepare enough teaching and learning aids to help a learner be able to individually differentiate and show the value of Rwandan currency from 1Frw to 1000 Frw.
- Call pupils to observe coins and notes used in Rwandan francs and explain instructions on activities to be done (refer from **activity 8.1.1** to **activity 8.1.4**);
- 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 1000 Frw and ask them to describe each of them: the value, the colour, matter in which it is made;
- Assign groups the **application activity 8.1** 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.
- Guide pupils to summarize the core characteristics of coins and notes and how to read them correctly.

**Example:**

| Rwandan coin | Features |
|---|---|
|  | - A coin of 1 franc<br>- Silver colour<br>- Branch of wheat<br>- Coat of arm |
|  | A coin of 5 francs<br>- Copper color<br>- Branch of coffee<br>- Coat of arm |
|  | A coin of 10 francs<br>- Copper colour<br>- Banana tree<br>- Coat of arm |
|  | A coin of 20 francs<br>- Silver color<br>- Branch of tea<br>- Coat of arm |
|  | A coin of 50 francs<br>- Sliver color<br>- Maize<br>- Coat of arm |

| | |
|---|---|
|   | A coin of 100 francs<br>- Silver and copper colour.<br>- Coat of arm. |

Notes

| Rwandan note | Features |
|---|---|
|   | A 500 note<br>- BANKI NKURU Y'U RWANDA Coat of arms,<br>- Brown colour.<br>- 3 learners using laptops<br>- A bridge<br>- 500 AMAFARANGA MAGANA ATANU 500 |
|   | A 1000 note<br>- Coat of arm;<br>- National museum Centre;,<br>- A golden monkey<br>- Blue color; |

- Provide activities to pupils from the pupil's 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 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) Tell the important features on the following Rwandan currency notes.
   a) 1000F note.
      Rwandan coat of arms and blue colour.
   b) 500 Frw note.
      Rwandan coat of arms and a laptop.
   c) 100 Frw coin.
      Rwandan coat of arms and silver colour.

**Lesson 2: Exchange of Rwandan francs from 1 Frw up to 1000 Frw**

**a) Learning objectives:** Exchange the Rwandan currency from 1 Frw up to 1000 Frw.

**b) Teaching resources and learning resources:**

Different coins and notes used in Rwandan francs up to 1000 Frw.

**c) 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 8.2**).
- Move around in the classroom and provide probing questions for assistance where necessary;
- Call 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 1000 Frw.
- 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.

Summary

Guide pupils to summarize how to combine notes and coins to represent a given amount of money less than 1000 Frw.

**Assessment**

- Provide **the application activity 8.2** to be done by pupils and check their answers.
- Assign all pupils a homework to be done.

**Lesson 3: Comparing the amount of money that does not exceed 1000Frw**

**a) Learning objectives:** Compare Rwandan currency that does not exceed 1000 Frw.

**b) Teaching and learning resources**

- Different notes and coins not greater than 1000 Frw.

**c) Teaching and learning activities:**

- Show pupils coins and notes s and ask them to compare their values by considering what one can buy with such amount of money;
- Call 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 8.3.1**);
- Move around in the classroom and provide open ending questions questions for assistance where necessary;
- Call 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 8.3.2** to arrange amount of money in ascending 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.
- Guide pupils to summarize how to compare amount of money, and how to arrange them in a given order.

**Assessments**

- Provide **the application activity 8.3** to be done by pupils and check their answers;
- Assign all pupils a home work to do.

**Lesson 4: Addition and subtraction of Rwandan francs**

**a) Learning objectives:** Add and subtract Rwandan currency that does not exceed 1000 Frw.

of money using standard written method.

**b) Teaching resources and learning resources:**

- Different coins and notes used in Rwandan francs up to 1000 Frw;
- Different scenarios involving the need for adding money.

**c) Teaching and learning activities:**

- Explain a situation 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 8.4**);
- Move around in the classroom and provide probing questions for assistance where necessary;
- Call some groups to present and guide the whole class to harmonize on how to add money.
- Guide pupils to summarize when and how to add money: using the standard written method.
- Provide activities to be done by pupils and check their answers.
- Assign homework to be done by all pupils.

**Lesson 5: Word problem involving the addition and subtraction of money**

**a) Learning objectives:** Solve problems involving addition and subtraction of Rwandan francs.

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:

**b) Teaching and learning activities:**

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 8.5).**

**Lesson 6: Multiplication and division of an amount of money by a number**

**a) Learning objectives:** Multiply and divide Rwandan currency that does not exceed 1000 Frw by a number.

**b) Teaching resources and learning resources**

- Different coins and notes used in Rwandan francs up to 1000 Frw;
- Different scenarios involving the need for finding the total amount of money for people who have equal amount of money.

**c) Teaching and learning activities:**

Step1: Multiplication of amount of money by a number

- Explain a situation 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 call 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 100Frw +100Frw +100Frw +100Frw = **100 Frw x 4** = 400 Frw.

- Organize groups of pupils and give them activities to do (for example **Activity 8.6)**;
- Move around to every group and provide probing questions for assistance where necessary;
- Call some groups to present and guide the whole class to harmonize on how to find a product of money by a number**.**

Step 2: 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 1000 Frws;
- Ask them to find the part for one pupil and invite one pupil in front of others and guide him/her to show how to find the answer by dividing such money by 4; they will see that it is equal two **1000 Frw÷ 4 = 250 Frw**.
- Organize groups of pupils and give them activities to do;
- Call 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.
- 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.**
- Provide activities to be done by pupils and check their answers.
- Assign homework to all pupils.

**Lesson 7: Word problems involving multiplication and division of money by a number**

**a) Learning objectives:** Solve problems involving multiplication and division of Rwandan currency that does not exceed 1000 Frw by a whole number.

**b) Teaching and learning activities:**

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 8.7).**

**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.

**Assessment:**

- Provide **the application activity 8.7** to be done by pupils and check their answers.
- Assign homework to all pupils.

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

1) Gisa has 500 Frw and wishes to buy 1kg of sugar that costs 900F. How much money is he missing to buy it?
   He misses 900 Frw -500 Frw = 400 Frw
2) Ingabire had 200 Frw and on her way she picked 500 Frw. How much money did she have altogether?
   She had 500 Frw + 200 Frw = 700 Frw
3) Share equally 500 Frw to 5 people.
   Everyone will get 500 Frw:5= 100 Frw
4) Fill in the missing:
   a) 1000 Frw =500 Frw + 500 Frw
   b) 500 Frw = 200 Frw + 200 Frw + 100 Frw
   c) 100 Frw = 50 Frw + 50 Frw.
5) If one pen costs 90 Frw. How much will 6 pens cost?
   6 pens will cost 90 Frw x6=540 Frw
6) A mother gave 4 children 800F to share. How much did each get?
   Each got 800F: 4 = 200F.

**Lesson 8: Sources of money, the uses of money, listing down items before buying them**

**a) Learning objectives:** Mention sources of money and its uses, List down items before buying them.

**b) Teaching and learning aids:**

- The teacher can guide a session for discussing the **importance of money** and the **sources of money** (**activity 8.8.1** and **activity 8.8.2**)

- Call learners themselves to give the importance of money.
- Guide discussions about the source of money and how it is used.

**Lesson 9: Buying and selling**

**a) Learning objectives:** Buy and sell goods.

**b) Teaching resources** and learning resources

- Different coins and notes used in Rwandan francs up to 1000 Frw;
- Pictorials of coins and notes and toy money;
- Different situations involving the need for buying and selling (Refer from **activity 8.9.1** to **activity 8.9.4**).

**c) Teaching and learning activities:**

- Organize a situation for buying and selling:


- There is a table having different commodities whose prices are labelled on **(use Activity 8.9.1)**
- Role-play the seller who will receive money, he /she will be able to make total of 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 8.9.2** );
- 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**.**
- Guide pupils to summarize how to plan what one can buy depending on the money he/she has.

**Assessment**

- Provide **the application activity 8.9** to be done by pupils and check their answers.
- Assign homework to all pupils.

**d) Extra activity**

If someone gave you 1000 F, what would you use it for?

### Lesson 10: Good use, management and saving of money

**a) Learning objectives:** Be able to manage, use well and save money.

This is a lesson which can be taught in a whole class discussion and then in group or individually.

**b) Teaching and learning aids:**

- Listing down items before buying them

  Pupils can be guided to discover that it is necessary to list down items to be bought before going to buy depending on the money they have and also to avoid misusing that money (use from **activity 8.10.1** to **activity 8.10.3).**
- Listing down items before buying them

Pupils will be guided to select the most important things they can organise to buy when they have money (use **Activity 8.10.1).** In addition, pupils will decide on how they must keep money to avoid damaging coins and notes.

- Provide application activity 8.10 to be done by pupils and check their answers.
- Assign homework to all pupils.

### Lesson 11: Preparing small income generating projects

**a) Learning objectives:** Prepare small income generating projects.

**b) Teaching and learning activities**

- Refer to **activity 8.11** 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 8.11** and guide pupils to discover that: People need money to solve problem; There are different ways of finding money including making 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.

## Answers for the end unit assessment 8

1) Answer by True or False
   a) Rwandan francs are coins only…….
      **No**
   b) Rwandan francs are notes only
      **No**
   c) Rwandan francs are made of different coins and different notes….
      **Yes**
   d) All Rwandan coins and notes have the coat of arm.
      **Yes**
2) Fill in the blanks the missing value
   a) 1000Frw = 500 Frw + 500 Frw
   b) 100Frw = 50 Frw + 20 Frw + 20 Frw + 10 Frw
   c) 50 Frw = 20 Frw + 10 Frw + 20 Frw
3) Choose the good source of money

Salary fishing art-craft farming commerce agriculture

4) Compare amount of money using greater than, less than,equal to
   a) a note of 1000 Frw= 2 notes of 500 Frws
   b) 300Frw> two coins of 100 Frw

5) Arrange the following amount of money from the smallest to the biggest

a) 650 Frw, 900 Frw, 750 Frw, 800 Frw  650 Frw, 750 Frw, 800 Frw,900 Frw

b) 400 Frw, 700 Frw, 650 Frw, 300 Frw  300 Frw, 400 Frw, 650 Frw, 700 Frw

6) Arrange the following amount of money from the biggest to the smallest

a) 450 Frw 550 Frw 350 Frw 250F 650 Frw  650 Frw, 550 Frw, 450 Frw, 350 Frw, 250 Frw

b) 850 Frw 250 Frw 500 Frw 950 Frw 400 Frw  950 Frw, 850 Frw, 500 Frw, 400 Frw, 250 Frw

7) Write the number of coins or notes in the boxes.

a) 1000 Frw = **2** notes of 500 Frw

b) 500 Frw =**5** coins of 100 Frw

c) 100 Frw = **2**coins of 50 Frw.

8) Read and find the answer.

a) Muhizi has 900Frw and he buys 1kg of sugar at 850Frw per kg, how much money does remain with?

He is left with 900 Frw -850 Frw =50 Frw

b) Keza buys the bread at 500 Frw, eggs at 200 Frw and one pizza at 200 Frw. How much does she pay?

She paid 500 Frw + 200 Frw + 200 Frw = 900 Frw.

c) Share 750 Frw equally among 5 children. How much money does she each get?

Each child got 750 Frw÷5= 150 Frw.

d) Masabo goes to school every day. If he pays 400Frw per day. How much money does he pay in 2 days?

He pays 400 Frwx2=800 Frw

e) I have 950 Frw, I want to buy 1 kg of rice at 750 Frw. How much money can I remain with?

I remained with 950 Frw -750 Frw = 200 Frws

# 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 tell 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 List of lessons for Unit 9

| **UNIT 9: HOUR, MONTHS OF THE YEAR AND DAYS OF EACH MONTH (24 Periods)** | | | | **Reinforcement and Extension** |
|---|---|---|---|---|
| | **Lesson title** | **Learning objectives** | **Number of periods** | |
| 1 | Introductory activity | Arouse the curiosity of learners on the content of this unit. | 1 | |
| 2 | Reading and telling the time shown by digital and analogue watches: The hour -o'clock. | Read and tell the time shown by digital and analogue watches: The hour -o'clock. | 2 | 1 |
| 2 | Parts of the day | Look at the pictures and tell , morning, evening | 1 | 1 |

| | | | | |
|---|---|---|---|---|
| 3 | Writing and telling the time shown by digital and analogue watches: The half past an hour | Write and tell the time shown by digital and analogue watches: The half past an hour. | 2 | 1 |
| 4 | The calendar: Days of the week. | Name and list the days of the week and dates | 1 | |
| 5 | Remediation | *Provide learning support to learners who are falling behind their peers* | 1 | |
| 6 | The calendar: Months of the year and weeks of the month and of the year. | Name and list the months of the year and tell the number of weeks of the month and of the year . | 2 | 1 |
| 7 | Arranging school activities timetable | Make and arrange school activities in a timetable | 1 | 1 |
| 8 | Preparing a daily activity plan. | Prepare a daily activity plan | 2 | |
| 9 | Preparing a weekly activity plan. | Prepare a weekly activity plan. | 1 | 1 |
| 10 | Remediation | *Provide learning support to learners who are falling behind their peers* | 1 | |
| 11 | End unit assessment | Read, write and draw the time shown with clock faces hour o'clock and half past an hour, use a calendar to identify months of the year and days of each month. | 1 | |

## 9.5 Guidance on different lessons

### Lesson 1: Introductory activity

This lesson is delivered through a conversation between the teacher and pupils.

- Give pupils the concrete clock faces, real watches, the calendar and their pictures so that they observe them.
- Ask different probing questions to pupils in order to arouse their curiosity on the content of this unit: Use example of questions given in the pupil's book.
- As it is at the beginning of the unit, try to value all answers from pupils: All answers are possible because the aim of the introductory activity is to get from pupils the predictions on the unit to be learnt.

**Lesson 2: parts of the day**

Use different drawings and guide pupils to discuss the parts of the day.

Pupils will say different activities they are used to do in each part.
In the morning:
At noon:
In the afternoon:
In the evening:
They can also say the characteristics of each part of the day. How is the sun? Do we see the moon? etc

**Lesson 3: Reading, telling and writing time on a clock face**

**a) Learning objectives:** Read and tell time shown by digital and analogue watches: The hour -o'clock.

**b) 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).

**c) Teaching and learning activities:**

- Call pupils to observe clock faces showing hours o'clock and explain instructions on activities to be done in **activity 9.1.1 to activity 9.1.2**);
- Use different open ending 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 watches showing hours o'clock and ask them to read, tell to each other and write the time indicated: use the **activity 9.1.1** and **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 show that time.

- 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.
- Provide application activity 9.1 to pupils from the pupil's book to do and check their answers

**Lesson 4: Reading, telling and writing a half past**

**a) Learning objectives:** Read, tell and write time shown by digital and analogue watches: 30 minutes or half past an hour.

**b) Teaching resources and learning resources:**

Different real clock faces and digital watches;

Toys for clock faces with minute hand and hour hand.

**c) Teaching and learning activities:**

- Invite pupils to observe clock faces, digital watches describe it by telling: the minutes shown by the minute hand and the hour shown by the hour hand using **activity 9.2.1**
- Use different open ending questions to guide them to discover how to read, to tell and how to make a half past.
- Form groups of pupils and give them activities to be done and discussion in **activity 9.2.6**
- Ask some groups to present the findings and guide the whole class to harmonize how to read, to tell and how to make a half past an hour.
- Guide pupils to summarize how to read and tell a half past an hour.
- Provide **application activity 9.2.1** to be done by pupils and check their answers.

**Lesson 5: The calendar: Days of the week.**

**a) Learning objectives:** Name and list of the days of the week

**b) Teaching resources and learning resources**

Calendars of different years;

Manila paper with drawings showing days of the week in tables where pupils can complete day for a given week when a reference day with its date is given.

**c) Teaching and learning activities:**

- Invite pupils to observe a calendar, explaining it by telling: days in a week and weeks of months (use **Activity 9.3** );
- Use different open ending questions to guide them to discover how to read, to tell and how to make a calendar for the week and month
- Form groups of pupils and give them **activity 9.3.1** 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 week or month.

- Guide pupils to summarize on the number of days for each week in a month, how to make a calendar for the week: given the reference day and its date in the given month, put it on the calendar for its month and complete others accordingly.
- Provide **application activity 9.3.1** to be done by pupils and check their answers

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

1) How many days does a week have?
   A week has 7 days.
2) What is the last day of the week?
   It is Saturday
3) How many weeks does a month have?
   A month has 4 weeks.

**Lesson 6: The calendar, Months of the year and weeks of the month and of the year**

**a) Objectives:** Name and list the months of the year and tell the number of weeks of the month and of the year.

**b) Teaching resources and learning resources:**

A Calendar showing the months of the year and weeks in a month.

**c) Teaching and learning activities:**

- Invite one pupil in front of others and guide him/her to present the calendar of the year. Ask the pupil to read the names of the months on the calendar.
- Ask each pupil to say the month in which he or she was born. Can that pupil locate the month in which he/she was born on a calendar?
- Allow pupils born in the same month to show that month on a calendar.
- Organize groups of pupils and give them **activity 9.3.2** to do be done where they have to refer to calendar.
- 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 arrange the months in a year
- Guide pupils to summarize how to interpret the months in a calendar year.
- Provide **application activity 9.3** to be done by every pupil and check their answers;
- Assign all pupils a home work to do.

**Lesson 7: Arranging school activities timetable**

**a) Learning objectives:** Make and arrange school activities in a timetable

**b) Teaching resources and learning resources:**

Manila paper, a calendar showing days of the week

**c) Teaching and learning activities:**

**Step 1: Preparing a daily activity plan**

- In this step you can use Manila paper on which there is daily activity plans.
- 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.
- Guide pupils to summarize how to plan activities for a week.
- Provide individual activities to be done by every pupil and check their answers;
- Assign all pupils a home work to do.

**Lesson 8: Preparing a daily activity plan.**

**a) Learning objectives:** Prepare a weekly activity plan.

**b) Teaching resources and learning resources:**

Manila paper, a calendar showing days of the week

**c) Teaching and learning activities:**

Step 2: Preparing a weekly activity plan

- In this step you can use Manila paper on which there is weekly activity plans.
- 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 of Kagabo (for example **activity 9.5**) and do a plan for an ordinary P2 pupil;
- Move around in the classroom and provide open ending 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.
- Guide pupils to summarize how to plan activities for a week.
- Provide individual activities to prepare a weekly plan activity and check their work;
- Assign all pupils a home work to prepare a weekly plan activity for their family.

**Note**: After this activity refer to the activity **activitiy 9.5.** and guide pupils to discuss the outcomes of disobeying the timetable.

## Answers for the end unit assessment 9

1) Complete
   a) One year has **12**months.
   b) The long hand of a clock face shows **minutes**.
   c) The short hand of a clock face 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 clock face with hands showing.
   a) "Ten o'clock".
   b) "one o'clock".
3) Complete the table below

| **Months** | **Days** | **Months.** | **Days.** |
|---|---|---|---|
| January | 31 | July | 31 |
| February | 28 or 29 | August | 31 |
| March | 31 | September | 30 |
| April | 30 | October | 31 |
| May | 31 | November | 30 |
| June | 30 | December | 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 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.

## 10.4 List of lessons of unit 10

| **UNIT 10: TYPES OF LINES AND ANGLES (8 Periods)** | | | | **Reinforcement and Extension** |
|---|---|---|---|---|
| | **Lesson title** | **Learning objectives** | **Number of periods** | |
| 1 | Introductory activity | Arouse the curiosity of learn-ers on the content of this unit. | 1 | |
| 2 | Types of lines: | Name different types of lines: closed and open lines, straight lines, curved lines and zigzag (broken) lines. | 1 | 1 |

| | | | | |
|---|---|---|---|---|
| 3 | Types of angles: Right angle, Acute angles and obtuse angle | Name and form different types of angles: Right, acute and obtuse angles. | 2 | |
| 4 | Comparing angles | Compare angles. | 1 | 1 |
| 5 | End unit assessment 10 | Identify and draw different types of lines, acute and obtuse angles. | 1 | |

## 10.5 Guidance on different lessons

### Lesson 1: Introductory activity

This lesson is delivered through a conversation between the teacher and pupils.

- Give pupils the teaching aids such as sticks and matchsticks and ask them to make angles basing on the example of the angle you make.
- Ask them different probing questions to pupils in order to arouse their curiosity on the content of this unit: refer to questions from the pupil's book.
- As it is at the beginning of the unit, try to value all answers from pupils: All answers are valid because the aim of the introductory activity is to get from pupils the predictions on the content of the unit to be learnt.
- Conclude the lesson of the day by inviting pupils to pay attention in the coming lessons as the concept they will learn in this unit are very important in their life.

### Lesson 2: Types of Lines

**a) Learning objectives:** Name different types of lines: closed and open lines, straight lines, curved lines and zigzag (broken) lines.

**b) Teaching and Learning resources:**

Manila Paper, Rulers, meter ruler, T-square, different colored pencils.

**c) 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 (refer from activity **Activity 10.1.1 to activity 10.1.10);**
- Direct pupils to explain briefly the different types of lines and how to draw them.
- Give pupils **application activity 10.1** on types of lines found in the pupils' book.

**Lesson 3: Types of angles**

**a) Learning objectives: Name and form different types of angles: Right, acute and obtuse angles.**

**b) Teaching and Learning resources:**

Manila Paper, Rulers, Meter ruler, T-square, different colored pencils, gridded papers.

**c) Teaching and Learning Activities:**

- Guide pupils to discuss in difference ways based on the given activities (from activity **10.2.1** to **activity 10.2.8).**
- Move around in the class for guiding pupils where necessary and ask open ending 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.
- Direct pupils to name briefly the different types of angles, how to draw them and explain the difference among them.
- Give pupils application activities to be done from in the pupils' book on types of angles;
- Provide **application activity 10.2** to be done by every pupil and check their answers;
- Assign all pupils a home work to do.

**Lesson 4: Comparing right angle, obtuse angle and acute angle**

**a) Learning objective: Compare angles.**

**b) Teaching and Learning resources:**

Manila Paper, Rulers, Meter ruler, T-square, different colored pencils.

**c) Teaching and Learning Activities:**

- Refer to **Activity10.3** 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.
- Provide activities to be done and mark them to verify whether your objectives were achieved.

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

1) 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.
2) Monitoring group activities where learners are discussing the differences between right angles, acute angles and obtuse angles on different objects and places.
3) Appropriate use of different teaching and learning aids.

**e) 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.

## 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) waved line.
h) Right angle
i) Acute angle
j) Obtuse angle
k) Right angle

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

# UNIT 11

# GRIDS

## 11.1 Key unit competence

Construct a grid and locate points on a grid

## 11.2 Prerequisite

To do some activities of locating a point on a grid as it was learnt in P1.

## 11.3 Crosscutting issues to be addressed

Inclusive education: Catering for learners with special education needs.

- Give to fast learners the extension activities.
- Give to slow learners the consolidation or reinforcement activities, suitable for their level.
- Give special treatment to learners with physical impairment by making those with hearing and visual impairment sit in front and the teacher uses the special teaching/learning aids like big print, etc.

**Gender:** Addressed when both boys and girls work together in all activities 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.

## 11.4. List of lessons for unit 11

| UNIT 11: GRIDS (8 periods) | | | | Reinforcement and Extension |
|---|---|---|---|---|
| | **Lesson title** | **Learning objectives** | **Number of periods** | |
| 1 | Introductory activity | Arouse the curiosity of learners on the content of this unit. | 1 | |

| | | | | |
|---|---|---|---|---|
| 2 | Characteristics of a grid and construction of a grid | Identify characteristics of a grid and construct a grid. | 1 | |
| 3 | Putting points in a grid. | Put points on a grid. | 1 | 1 |
| 4 | Locating a point in a grid | Explain the position of a given point on a grid | 1 | 1 |
| 5 | End unit assessment | Construct a grid and locate points. | 1 | |

## 11.5 Guidance on different lessons

### Lesson 1: Introductory activity

- Guide pupils to do activities question 1 and question 2.
- Invite 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, harmonize answers and arouses the curiosity of pupils on the content of this unit.

As it is at the beginning of the unit, the teacher has to value all answers from pupils. All answers are valid because the aim of the preliminary activity is to get from pupils the predictions on the unit to be learnt.

### Lesson 2: Characteristics of a grid and construction of a grid

**a) Learning objective:** Identify characteristics of a grid and construct a grid.

**b) Teaching/learning aids:**

Meter ruler, manila paper, pencils etc.

**c) Teaching and Learning Activities:**

- Ask the pupils to look at the grid in the **Activity 11.1** and say the number of horizontal lines and vertical lines**.**
- Guide pupils to highlight that horizontal lines are called **crossing bars** and vertical lines are called **posts**;
- In pairs, ask pupils to draw a grid and then say the number of horizontal and vertical lines
- Ask each pupil to draw a grid and say the number of horizontal and vertical lines - Invite pupils in a whole class discussion to discuss how to number posts and crossing bars of a grid.
- Help pupils to find out that:

- 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.

- Ask pupils to work out the **application activity 11.1 as an assessment** activity on how to make a grid

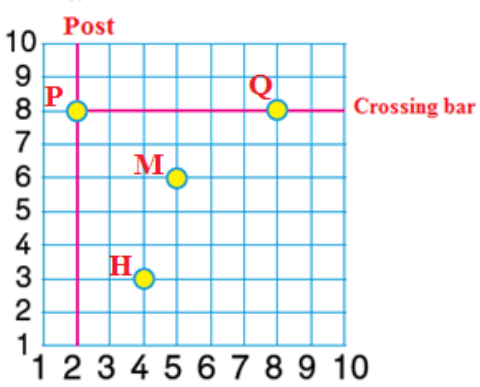
**Lesson 3: Putting a point on a grid**

**a) Learning objective:** Put points on a grid.

**b) Teaching and learning aids:** pencil, ruler, gridded paper

**c) Teaching and learning activities:**

- After the previous lesson, the teacher refers to **activity 11.2.1** and **activity 11.2.2** and guide pupils 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.**




- Ask pupils to put on a grid the point A with the crossing bar number **2** and the post number **4.**
- Provide **application activity 11.2** to be done by pupils as an assessment

**Lesson 4: Locating a point on a grid**

**a) Learning objective:** Identify and explain the position of a given point on a grid

**b) Teaching and Learning resources:**Manila paper, rulers, meter, T-square, different pencils, paper and boxes.

**c) Teaching and Learning Activities:**

- Assign pupils the **Activity 11.3** to identify the position of a point by indicating the number of post and the number of crossing bars which form that point;

- Help pupils to talk about 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 located at the intersection of post number 3 and the crossing bar number 3 is written as follow A (3,3).
- Ask each pupil to draw a grid and then locate different points on it.
- Give pupils the **application activity 11.3 as an assessment** .

**d) More notes for the teacher:**

- Monitor all activities closely and catering for all learners without leaving any one behind.
- Explain deeply how to construct a grid.
- Prepare 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.
- Monitor pairs activities and gives learners opportunities to explain how to construct and put points in a grid.
- Ensure appropriate use of different teaching and learning aids.

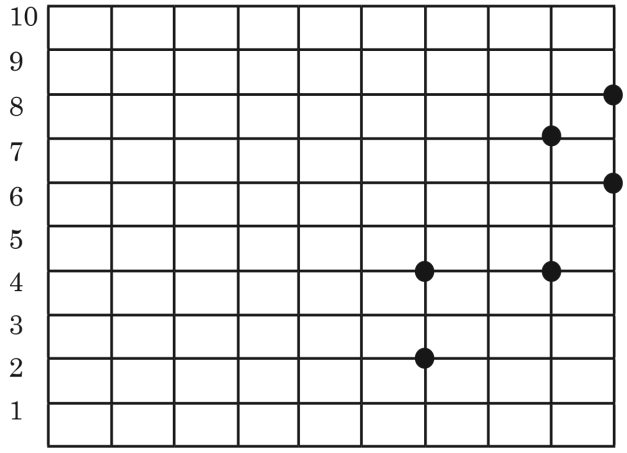
**e) Extra exercises and their answers:**

Draw a grid with a given number of posts and a number of crossing bars. Indicate points to be located in the grid.

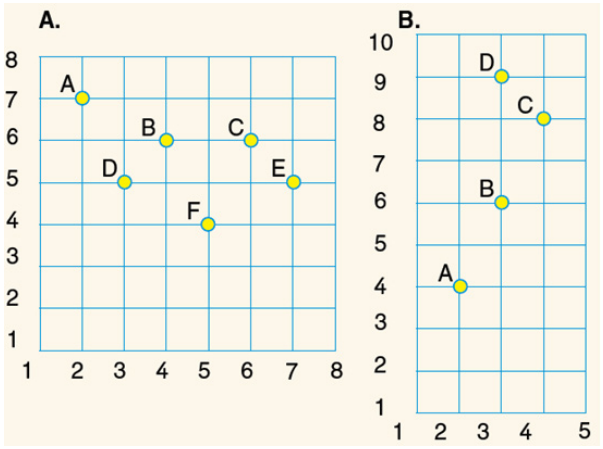
## Answers for the end unit assessment 11

1) a. Draw a grid with 10 posts and 10 crossing bars.
   b. Put the points on the grid at:
      (a) A is at post number 3 and the crossing bar number 7.
      (b) B is at post 10 and the crossing bar 8
      (c) C is at the crossing bar 5 and the post 9.
      (d) D is at the crossing bar 7 and the post 8
      (e) E is at the crossing bar number 4 and the post number 6
      (f) F is at the crossing bar number 6 and the post number 10.

Answer:




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.

F. 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 4.

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 Crosscutting issues to be addressed

Inclusive education: Catering for learners with special education needs.

- Give to fast learners the extension activities.
- Give to slow learners the consolidation or reinforcement activities, suitable for their level.
- Give special treatment to learners with physical impairment by making those with hearing and visual impairment sit in front and the teacher uses the special teaching/learning aids like big print, etc.

**Gender:** Addressed when both boys and girls work together in all activities 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.

## 12.4 List of lessons for unit 12

| UNIT 12: SQUARE, RECTANGLE AND TRIANGLE (16 Periods) | | | | Reinforcement and Extension |
|---|---|---|---|---|
| | **Lesson title** | **Learning objectives** | **Number of periods** | |
| 1 | Introductory activity | Arouse the curiosity of learners on the content of this unit. | 1 | |
| 2 | Characteristics of a square | Observe a squared object and identify characteristics of a square. | 1 | |

| | | | | |
|---|---|---|---|---|
| 3 | Drawing a square | Draw a square. | 1 | 1 |
| 4 | Measuring and calculating the perimeter of a square | Measure and calculate the perimeter of a square. | 2 | 1 |
| 5 | Remediation | *Provide learning support to learners who are falling behind their peers* | 1 | |
| 6 | Characteristics of a rectangle | Observe a rectangular object and identify characteristics of a rectangle | 1 | |
| 7 | Measuring and calculating the perimeter of a rectangle | Measure and calculate the perimeter of a rectangle | 1 | 1 |
| 8 | Characteristics of a triangle | Observe a triangular object and identify characteristics of a triangle. | 2 | |
| | | | | |
| 9 | Measuring and calculating the perimeter of a triangle | Measure and calculate the perimeter of a triangle | 1 | 1 |
| 10 | End unit assessment | Identify a square, a rectangle and a triangle from other geometrical shapes and calculate their perimeter. | 1 | |

## 12.5 Guidance on different lessons

This lesson is delivered through a conversation between teachers and pupils. The teacher uses pictures in the pupils' book and asks different prompting questions to pupils in order to get their predictions about the unit to be learnt.

As it is at the beginning of the unit, the teacher has to value all answers from pupils. The teacher concluded the lesson by enhancing the clear understanding on the unit learnt.

### Lesson 2: Characteristics of a square

**a) Learning objective:** Observe a squared object and identify characteristics of a square.

**b) Teaching and Learning resources:**

Manila paper, rulers, mete ruler, T-square, pencils, gridded paper and boxes.

**c) Teaching and Learning Activities:**

- Through **activity 12.1.1** to **activity 12.1.3, assist pupils to** use a

T-square and a ruler or a gridded paper and a ruler to draw a square

Ask the pupils to look at a square carefully and say the number of sides and angles.

- Draw on a manila paper a square of 3 small squared on each side. Ask pupils to measure the sides of the square by counting the number of small squares. Ask pupils to use a T-square to measure the angles of the square and guide others to notify that it is a square of 4 equal sides and 4 right angles.
- Guide pupils to find out that a Square has **4 equal sides** and **4 right angles**.
- Assign pupils to do the **application activity 12.1 as assessment;**
- Invite pupils to present their answer on the activity 12.1;
- - Verify that every child is able to draw a square using a ruler and a gridded paper;
- - Ask pupils to identify a square from other geometric figures (square, rectangle, triangle, circle).

Activity 12.2.1 Lesson 3: Drawing a square

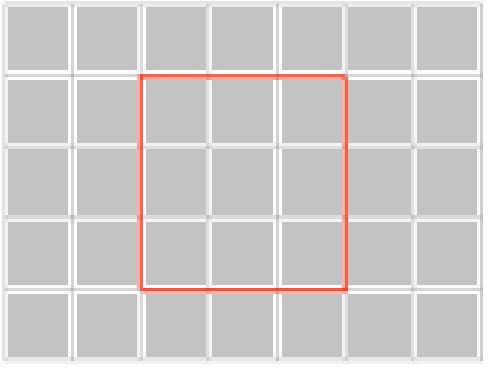
**a) Learning objective: Draw a square.**

**b) Teaching and Learning resources:**

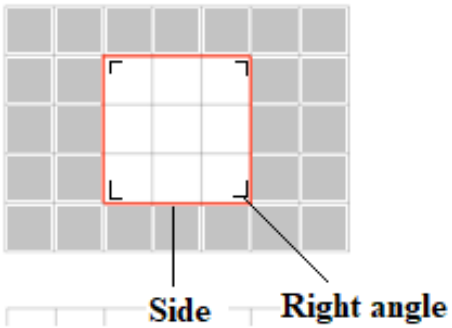
Manila paper, rulers, metre ruler, T-square, pencils, gridded paper

**c) Teaching and learning activity:**

- On a manila paper, help pupils to observe a drawn red square of 3 small squares on each side and ask them to say the number of sides, number of small squares on each side, and number of angles.



- Guide every pupil to draw a square on a grid paper, measure the sides of the square by counting small squares, measure the 4 angles of a square using a T-square;
- Help pupils to find out that all the sides of a square are equal and all angles of a square are right angles.




- Provide **application activity 12.2** to be done by pupils as assessment and check their answers.

**Lesson 4: Finding the perimeter of a square**

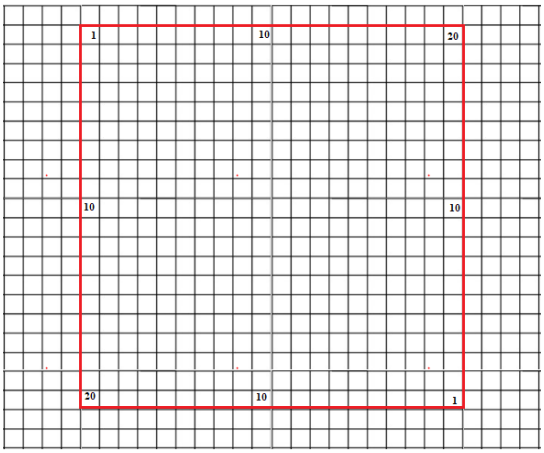
**a) Learning objective:** Measure and calculate the perimeter of a square.

**b) Teaching and Learning resources:**

Manila paper, rulers, meter ruler, T-square, pencils, grid paper and boxes

**c) Teaching and Learning activities:**

- Draw a square on a manila paper or on the chalkboard and ask pupils to measure the total length of all its sides **(Activity 12.3.1)**,




- Ask pupils to find out other ways of finding the total length surrounding a square known as the perimeter of a square;

Ask pupils to refer to the example of activity 12.3.2 and find out the perimeter of a square. This activity serves as consolidation and reinforcement activity.

- Guide pupils to notice that the perimeter of a square is calculated as follow:

  Perimeter = Side + side + side + side; The perimeter of a square is equal to the length of its side four times (Perimeter = Side × 4 ).

- Give pupils an **application activity 12.3** on how to find the perimeter of a square as assessment

**Lesson 5: Characteristics of a rectangle**

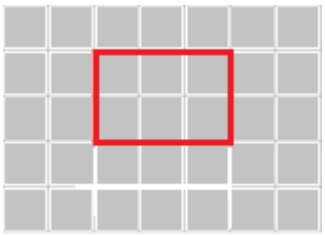
**a) Learning objective:** Observe a rectangular object and identify characteristics of a rectangle.

**b) Teaching and Learning resources:**

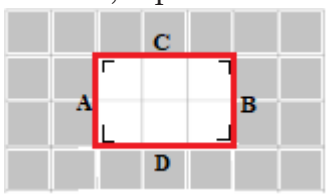
Manila paper, rulers, mete ruler, T-square, pencils, grid paper and boxes.

**c) Teaching and Learning Activities:**

- On a manila paper, help pupils to observe a drawn red rectangle of 3 small squares on one side and 2 small squares on another side. Ask pupils to say the number of sides, number of small squares on each side, and number of angles.



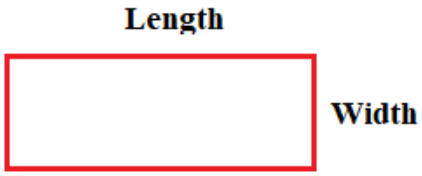
- Guide every pupil to draw a rectangle on a grid paper, measure the sides of the rectangle by counting small squares, measure the 4 angles of a rectangle using a T-square;
- Help pupils to find out that 2 parallel sides of a rectangle are equal and all angles of a rectangle are right angles.
- Assist pupils to discover that the 2 sides A and B of a rectangle are equal to 2 small squares each and 2 sides C and D of a rectangle are equal to 3 small squares each. Therefore, 2 parallel sides of a rectangle are equal.




- Through activities 12.4.1, activity 12.4.2 and activity 12.4.3, help pupils to consolidate and reinforce their knowledge on the characteristics of a rectangle and increase their skills on how to draw a rectangle.

Guide pupils to notice that a rectangle is a figure with 4 sides; Two parallel sides are equal; and it has 4 **right angles.**

The small sides are called **widths (W)**, the longer sides are called the **lengths (L).**




- Ask pupils to identify a rectangle from other geometric figures and justify answer basing on characteristics.
- Provide **application activity 12.4** to be done by pupils as assessment and check their answers.

**Lesson 6: Measuring and calculating the perimeter of a rectangle**

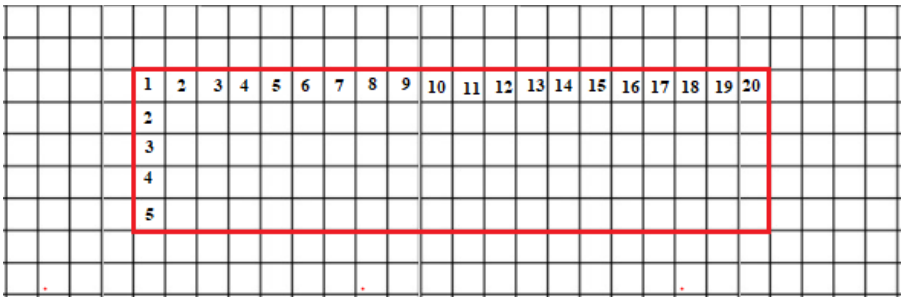
**a) Learning objective:** Measure and calculate the perimeter of a rectangle

**b) Teaching and Learning resources:**

Manila paper, rulers, meter ruler, T-square, pencils, grid paper and boxes

**c) Teaching and Learning activities:**

- Draw a rectangle of 20 cm length and 5 cm width on a manila paper or on the chalkboard and ask pupils to measure the total length of all its sides




- Draw a rectangle and ask pupils to measure the total length of all its sides **(Activity 12.5.1 )**,
- Ask pupils to find out other ways of finding the total length surrounding a rectangle known as the perimeter of a rectangle;
- Ask pupils to refer to the example of activity 12.5.2 and find out the perimeter of a rectangle. This activity serves as consolidation and reinforcement activity.
- Guide pupils to notice that the perimeter of a rectangle is calculated as follow:
- Perimeter = Side + side + side + side; Perimeter = **(Length + Width) x 2.**
- Or **Perimeter = (L+W) x 2**

- Give pupils an **application activity 12.5** on how to find the perimeter of a square as assessment

**Lesson 7: Characteristics of a triangle**

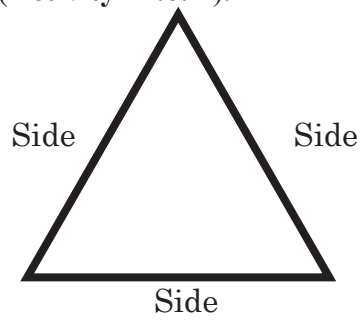
**a) Learning objective:** Observe a triangular object and identify characteristics of a triangle.

**b) Teaching and Learning resources:**

Manila paper, rulers, metre ruler, T-square, pencils, grid paper and boxes.

**c) Teaching and Learning Activities:**

- Use a ruler to draw a triangle and then ask the pupils to look at it carefully and say the number of sides and angles (**Activity 12.6.1** ).




- Ask pupils to go to the blackboard, count and say the number of sides and measure their lengths.
- Ask pupils to count and say the number of angles;
- Guide every pupil to draw a triangle, measure the sides of the triangle making sure that the figure has 3 sides and 3 angles.
- Ask pupils to do an activity 12.6.2 to choose a triangle from different shapes as an assessment activity.

**Lesson 9: Measuring and calculating the perimeter of a triangle**

**a) Learning objective:** Draw, measure and calculate the perimeter of a triangle

**b) Teaching and Learning resources:**

Manila paper, rulers, meter ruler, T-square, different pencils, gridded paper and boxes

**c) Teaching and Learning activities:**

- Draw a triangle and ask pupils to measure the total length of all its sides **(Activity 12.7.1)**,
- Ask them to discover other way of finding how they should get that total length called also a perimeter of that triangle;
- Ask pupils to refer to the example in the **Activity 12.7.2 and then do**

**the rest as consolidation or reinforcement activities** ;

- Invite pupils to present and guide the whole class to harmonize their findings.
- Guide pupils to notice that the perimeter of a triangle is calculated as follow:

  The perimeter of a triangle = First side + second side + third side

Give pupils the application activity 12.7 on how to find the perimeter of a triangle as an assessment.

**d) More notes for the teacher:**

- Monitor all activities closely and catering for all learners without leaving any one behind.
- Explain deeply how to effectively draw a square, rectangle and triangle.
- Prepare enough teaching and learning aids to be used in measuring and calculating the perimeter of a square, rectangle and triangle.
- Monitor pair activities giving learners tasks to identify a square, rectangle and triangle from other geometric figures.
- Support learners with learning difficulties giving them activities that suit their ability.
- Gives learners opportunities to discuss the best method to find the perimeter of a square, rectangle and triangle.

**e) Reinforcement and extension exercises and their answers.**

a) Draw a square of sides 8 cm.

b) Draw a rectangle of length 12 cm and width 8 cm.

c) Find the perimeter of a square with sides 15 cm.

d) Perimeter of a square = side x 4

= 15 cm x 4

= 60 cm

e) Find the perimeter of a rectangle with length 25 cm and width 21 cm.

Perimeter of a rectangle = (L + W) x 2

= (25 cm + 21cm) x2

= 72 cm

f) Find the perimeter of an equilateral triangle with sides 22cm.

Perimeter of an equilateral triangle = 22cm x 3 = 66cm

## Answers for the end of unit assessment 12

1) Name the following figures:


**a. Triangle.**
**b. Square.**
**c. Rectangle**.

2) Comment by True or False

a) A square has 4 equal sides. **True**
b) The short sides of a rectangle are called length (L). **False**
c) A rectangle has 4 right angles. **True**
d) A square has 4 acute angles. **False**
e) A rectangle has 3 sides, for which 2 parallel and equal. **False**
f) The long sides of a rectangle are called Width. **False**
g) A triangle has 4 sides and 3 angles. **False**

3) Find the perimeter of:

a) (a) A square with the side of 12cm.
Perimeter = side X 4 = 12 cm x 4 =24 cm.
b) (b) a rectangle whose length is 12cm and the width of 8cm.
P= (L + W) x2 = (12 cm + 8 cm) x2 = 40 cm.
c) (c) A triangle which has: 7cm, 8cm and 9cm of sides.
Perimeter = 7 cm +8 cm +9 cm= 24 cm

4) Write **1** on a square, write **2** on a rectangle and write **3** on a triangle.

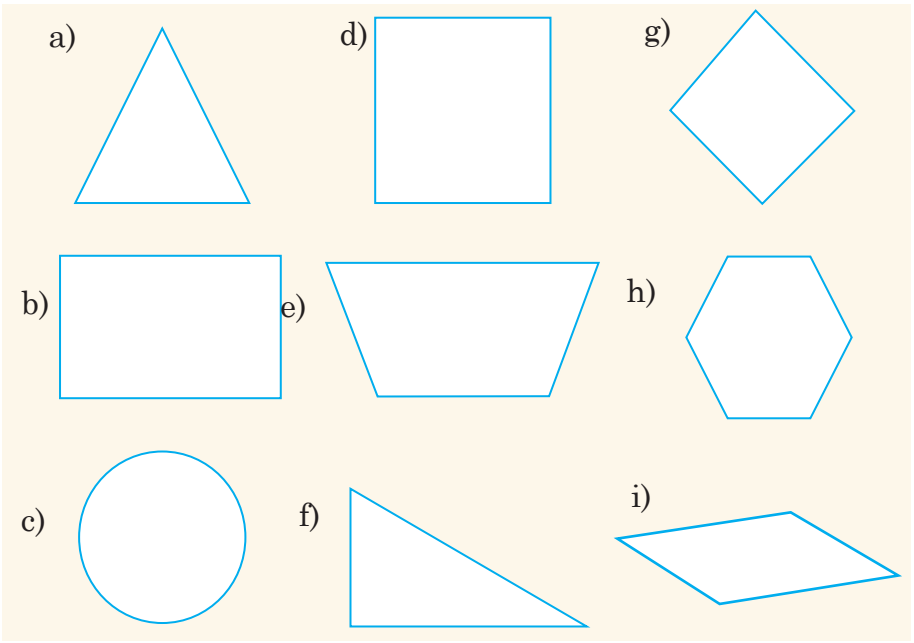



Figure (d) is a square, figure (b) is a rectangle, and figures (a) and (f) are triangles.

5) Find the perimeter of a flower garden with the shape of:

a) A square of 80m of side.

**Perimeter = side x 4= 80 cm X 4 = 320 cm**

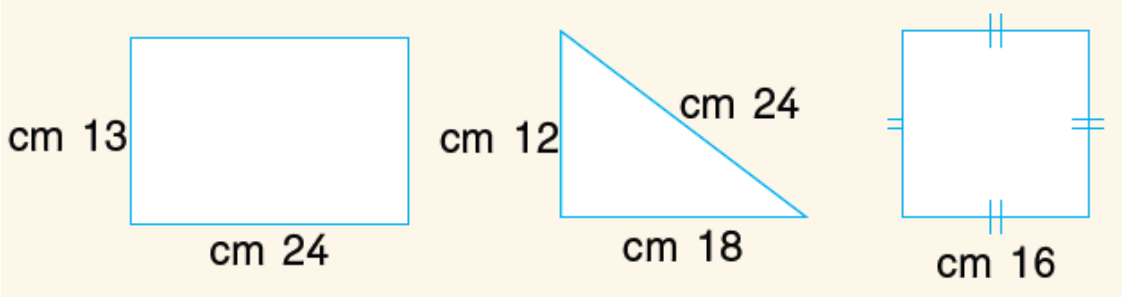
b) a rectangle with 54m of length and 40m of width.

**Perimeter of a rectangular land = 2(L+W) = 2(54 + 40) = 188 cm**

c) A triangle with 25m, 27m and 30m of sides.

**Perimeter of a triangular land = 25 m + 27 m + 30 m =82 m**

6) Find the perimeter for the following figures:




a) Perimeter = (13 cm + 24 cm) x 2 = 74 cm

b) Perimeter = 12 cm + 24 cm + 18 cm = 5 4cm

c) Perimeter = 16 cm x 4 = 64 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 Crosscutting issues to be addressed in the lessons

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

- Give to fast learners the extension activities.
- Give to slow learners the consolidation or reinforcement activities, suitable for their level.
- Give special treatment to learners with physical impairment by making those with hearing and visual impairment sit in front and the teacher uses the special teaching/learning aids like big print, etc.

**Gender:** Addressed when both boys and girls work together in all activities 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.

## 13.4 List of lessons of the unit 13

| UNIT 13: MISSING NUMBERS IN ADDITION, SUBTRACTION MULTIPLICATION AND DIVISION (16 Periods) | | | | Reinforcement and Extension |
|---|---|---|---|---|
| | **Lesson title** | **Learning objectives** | **Number of periods** | |
| 1 | Introductory activity | Arouse the curiosity of learners on the content of this unit. | 1 | |
| 2 | Finding the missing number in a number sentence with addition or subtraction | Find the missing number in a number sentence pattern addition or subtraction | 2 | 1 |
| 3 | Finding the mising number in a number sentence with multiplication or division | Find the missing number in a number pattern with multiplication or division | 2 | 1 |
| 4 | Remediation | *Provide learning support to learners who are falling behind their peers* | 1 | |
| 5 | Finding the common difference in a number pattern | Find the pattern rule/ common difference in a number pattern | 2 | 1 |
| 6 | Completing the missing number in a number pattern | Complete the missing number in a number pattern | 2 | 1 |
| 7 | End unit assessment | Find the missing number in number pattern with addition, subtraction, multiplication and division of numbers. | 1 | |
| 8 | Remediation | *Provide learning support to learners who are falling behind their peers* | 1 | |

## 13.5 General guidance on different lessons

### Lesson 1: Introductory activity

This lesson is delivered through a conversation between teachers and pupils. The teacher uses pictures in the pupils' book and asks different prompting questions to pupils in order to get their predictions about the unit to be learnt.

As it is at the beginning of the unit, the teacher has to value all answers from pupils. The teacher concluded the lesson by enhancing the clear understanding on the unit learnt.

**Lesson2: Finding the missing number in a number sentence with addition or subtraction**

**a) Learning objective:** Find the missing number in a number sentence with addition or subtraction

**b) Teaching and Learning resources:**

**c) 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 through activity **13.1.1** to **activity 13.1.6;**
- Invite learners to discover the rule applied when finding the missing number in the number patterns with addition or subtraction;
- In pairs, guide pupils to refer to the worked example to do **application activity 13.1 ( a), (b), (c);**
- Invite some pupils to present answers by explaining how they worked to find the missing numbers and guide pupils to conclude;
- Guide pupils to find out the rules to follow in finding the missing number in addition and in subtraction:
  - 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 subtracted, find it by adding the difference and the subtrahend/the number that was subtracted from the other.
    - When the missing number is subtracted from the other, you subtract the difference from the minuend/number subtracted.
- Give pupils the **application activity 13.1 (d)** 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, and explain how to find the missing number.

**Lesson 3: Finding the missing number in a number sentence with multiplication or division**

**a) Learning objective:** Find the missing number in a number pattern with multiplication or division

**b) Teaching and Learning resources:**

Table of place value, abacus, multiplication tables and number cards in different colors.

**c) Teaching and Learning Activities:**

- Guide pupils to do **Activity 13.2 and** find the missing number in a number pattern with multiplication or division**;**
- Invite learners to discover the rule applied when finding the missing number in the number pattern with multiplication or division;
- Guide pupils to find out the rules to follow in finding the missing number a number pattern with multiplication or division:
  - To find the missing number in multiplication, you divide the product by multiplicand/number of objects to be multiplied by a group.
  - 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.
- Give pupils the **application activity 13.2 as assessment and ask them to** find the missing number in multiplication or division.

**Lesson 4: Finding the pattern rule/ common difference in a number pattern**

**a) Learning objective:** Find the pattern rule/ common difference in a number pattern.

**b) Teaching and Learning resources:**

Abacus, number cards to make a number pattern, Manila paper, counting objects to make a pattern.

**c) Teaching and Learning Activities:**

- Based on the **activity 13.3.1**, ask pupils to observe the picture and find the numbers of balls needed for the 2 next steps and explain how they find those numbers.
- Fix a number and ask pupils to add a common number in order to get the next number. For example: First number is 2, find the 4 next numbers by adding 3 to the new sum : 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 find out the 2 next numbers on the following list: 2, 5, 8, 11, 14, …;
- Help pupils to discover that the number 3 to be added is the pattern rule/ common difference between two consecutive numbers of the list: 5-2=3, 8-5=3, 11-8=3, 14-11=3, …;
  - Give pupils other numbers and the rule/ common difference and ask pupils to find the next 5 terms of the number pattern. **Examples:** 1.

The first number is 35, the pattern rule is to add 5, find the 5 next terms ,

- Give pupils a number pattern and ask them to find the pattern rule/ common difference.
- Explain to pupils that the list of numbers made by following a certain rule is called a **number pattern**, and that the difference between two consecutive numbers of a number pattern is called a pattern rule or a **common difference.**
- Assist pupils to make a summary on how to find a pattern rule/ common difference in a number pattern:
  - When numbers are arranged from the smallest to the biggest, the common difference is the difference of two consecutive numbers. This is the **additive common difference.**
  - When numbers are arranged from the biggest to the smallest, the common difference is the difference of two consecutive numbers. This is the **subtractive common difference**.
- Give pupils the application activity 13.3 as assessment to be done individually and encourage a pair correction to mark their work.

**Lesson 5: Completing the missing number in a number pattern**

**a) Learning objective:** Complete the missing number in a number pattern

**b) Teaching and Learning resources:**

Abacus, number cards to make number patterns , counting objects to make number patterns, manila paper.

**c) Teaching and Learning Activities:**

- Ask pupils to refer to the example in the activity 13.4.1, find the pattern rule / common difference and find out the missing terms of the given number patterns in the **Activity 13.4.1 (a), (b) and (c))**;
- Ask pupils to do activity 13.4.1 (d), (e), (f), (g) and (h) as reinforcement and activity 13.4.2 as consolidation activities.
- Assist pupils to make a summary on how to find a missing number of a number pattern:
  - First, find out the pattern rule/ common difference between consecutive numbers,
  - Second, make addition in order to find the missing terms of a number pattern for additive common difference or make subtraction in order to find the missing terms of a number pattern for subtractive common difference.

- Give pupils the **application activity 13.4 as assessment** to be done individually and encourage a pair correction to mark their work. **d) More notes for the teacher** Monitor all activities closely and catering for all learners without leaving any one behind.
  - Explain deeply how to effectively identify or find the missing numbers in number patters with addition, subtraction, multiplication or division.
  - Prepare enough teaching and learning aids that learners count and arrange in order to make a number pattern and find out the missing numbers in addition, subtraction, multiplication or division.
  - Monitor and assist learners to make a number pattern and identify the missing numbers in addition, subtraction, multiplication or division. Guide learners to use different teaching and learning aids appropriately.

**d) Reinforcement and extension activities and their answers.**

1) Find the pattern rule/ common difference that was used in the following number pattern.
   a) 45,75,105,135.

Answer: The pattern rule /common difference is75-45 = add 30

   b) 100,75,50,25

Answer: The pattern rule/ common difference is (100-75) = subtract 25

   c) 20,40,60,80

Answer: The common difference is 40-20 = add 20

   d) 45, 36, 27, 18.

Answer: the pattern rule /Common difference is (45-36) = subtract 9

2) Fill in the missing number in the pattern.
   a) 45, 90,135,**180**,225,270. The pattern rule is "add 45", the missing number is 180
   b) 0,15,30,**45,**60,75,90. The pattern rule is "add 15", the missing number is 45
   c) 108,**100,**92,84,76,68. The pattern rule is "subtract 8", the missing number is 100
   d) 47,60,73,86,**99**,112. The pattern rule is "add 13", the missing number is 99

**Answers for the end unit assessment**

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 these number patterns

a) 25, 30, 35, 40, 45. **30-25= add 5**

b) 100,150, 200, 250, 300**.** **150-100= add 50**

c) 95, 87, 79, 71, 63. **95-87= subtract 8**

d) 125, 100, 75, 50, 25. **125-100= subtract 25**

3) Find the missing number.

(a) 4**0**6 + 492 = 898

(b) 98**9** − 566 = 423

(c) 6 **1** × 6 = 366

4) Find the missing number

| | | | | | | |
|---|---|---|---|---|---|---|
| a | 48 | 54 | 60 | **66** | **72** | 78 |
| b | 81 | 72 | 63 | **54** | 45 | **36** |
| c | 95 | 105 | 115 | **125** | **135** | **145** |
| d | 900 | 800 | 700 | **600** | 500 | **400** |
| e | 375 | 400 | 425 | **450** | 475 | **500** |
| 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 explain the information provided by a given pictograph/ simple graphs

## 14.2 Prerequisites:

Using objects available in the school environment, pupils can identify objects of the same types and organize them vertically.

## 14.3 Crosscutting 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 live and work in harmony and share ideas in a peaceful way with respect of each other's views during group discussion.
- **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…

## 14.4. List of lessons for unit 14

| **UNIT 14: PICTOGRAPHS /SIMPLE GRAPHS (8 Periods)** | | | | **Reinforcement and Extension** |
|---|---|---|---|---|
| | **Lesson title** | **Learning objectives** | **Number of periods** | |
| 1 | Introductory activity | Arouse the curiosity of learners on the content of this unit | 1 | |
| 2 | Grouping objects according to their types | Form groups of objects according to their types | 1 | |
| 3 | Observing a pictograph and identify its characteristics | Observe a pictograph and say the types of objects and the number of objects in each column. | 1 | |

| | | | | |
|---|---|---|---|---|
| 4 | Observing a pictograph, and compare the number of objects for different types | Compare the number of objects in a pictograph | 1 | 1 |
| 5 | Drawing a pictograph using the given information. | Draw a pictograph with the given objects. | 1 | 1 |
| 6 | End unit assessment | Describe and explain the information provided by a given pictograph/simple graphs. | 1 | |

## 14.5 Guidance on different lessons

### Lesson 1: Introductory activity

This lesson is delivered through a conversation between teachers and pupils. The teacher uses figures in the pupils' book and asks different prompting questions to pupils in order to get their predictions about the unit to be learnt.

As it is at the beginning of the unit, the teacher has to value all answers from pupils. All answers are valid because the aim of the introductory activity is to get from pupils the predictions on the unit to be learnt.

### Lesson 2: Grouping objects according to their types

**a) Learning objective:** Group the objects according to their types

**b) Teaching and Learning resources:**

Different types of counters with different colors, gridded manila paper, etc.

**c) 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 on the same column so that it is easy to count them; **Horizontally**: one can find out the number of groups of objects);
- In pairs, ask pupils to do activities of describing a certain pictograph
- Guide pupils to find out how objects are arranged on a pictograph and how to get information from it:
  - Each column has the 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.

- Give pupils an application activity 14.1 to be done as assessment and let pupils in pair to mark their works.

**Lesson 3: Observing a pictograph and identify its characteristics**

**a) Learning objective:** Observe a pictograph and say the types of objects and the number of objects in each column

**b) Teaching and Learning resources:**

Manila paper, different counters with different colors.

**c) Teaching and Learning Activities:**

- Guide pupils to recall how objects are arranged on a pictograph and how to get information from it;
- In pairs, ask pupils to work out the **activity14.2,** identify and make group of similar objects and then illustrate / portray/show those groups of objects using a pictograph;
- Provide support to pupils with open ending questions where necessary to help them to make a correct pictograph;
- Guide pupils to make a summary on how to make a pictograph (see the previous lesson).
  - Give pupils the **application activity 14.2** individually as an assessment and mark their works.
  - Make small pieces of paper with pictographs, putting them in a box and asking each pupil to pick one paper randomly, identify groups of objects on a pictograph and say the number / amount of things that appear on it.

**Lesson 4: Comparing the number of objects for different types**

**a) Learning objective:** Compare the number of objects in a pictograph

**b) Teaching and Learning resources:**

Manila paper, different counters with different colors.

**c) Teaching and Learning Activities:**

- In pairs, assign pupils the Activity **14.3 and ask them to identify the same objects on a pictograph, count them and write their number.**;
- Guide the pupils to talk about the number of objects on each column;
- Ask the pupils to present the smallest number and the largest number by using number card.

- Give pupils an application activity 14.3 to be done individually as assessment and ask them to mark their work in pairs.

**Lesson 5: Drawing a pictograph with the given information or objects**

**a) Learning objective:** Draw a pictograph with the given objects.

**b) Teaching and Learning resources:**

Manila paper, different counters with different colors.

**c) Teaching and Learning Activities:**

- Guide pupils to recall how objects are arranged on a pictograph (refer to **activity 14.3**);
- In pairs, ask pupils to observe objects in the activity 14.4 , identify the same objects, put them on a pictograph. Provide support with open ending questions where necessary to help pupils to make a correct pictograph.;
- Guide pupils to explain how to make a pictograph (see the previous lessons):
  - Each column has the 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.
- Give pupils the application activity 14.4 to be done and marked in pairs.

**Note:**

From activities 14.1 to 14.4, help pupils to make a pictograph by using real objects on charts.

**d) More notes for the teacher:**

Monitor all activities closely and catering for all learners without leaving any one behind.

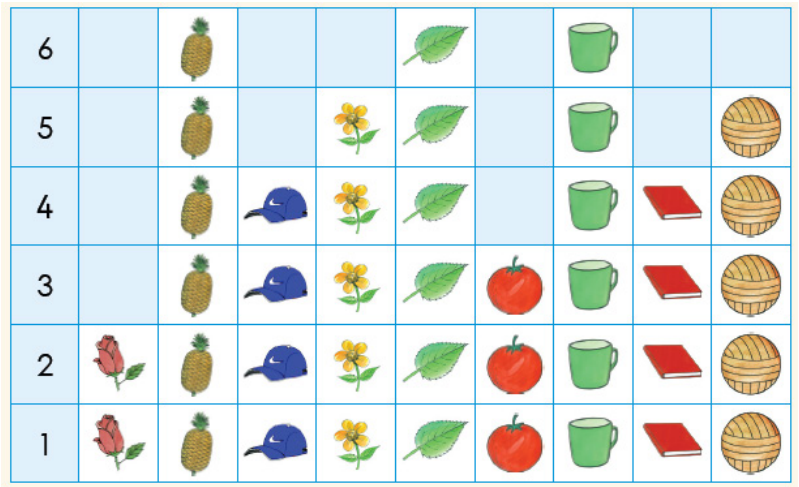
- Explain deeply how to draw a pictograph to represent number of objects.
- Prepare enough teaching and learning aids to be used in making a pictograph. Monitor pair activities and give learners opportunities to group objects and represent them in practical manner with a pictograph.

**e) Reinforcement and extension activities:**

Draw / make a pictograph made by 6 pencils, 8cups, 4 buckets, 7 balls and 2 dolls.

## Answers for the end unit assessment 14

a. Observe the following pictograph and answer to questions

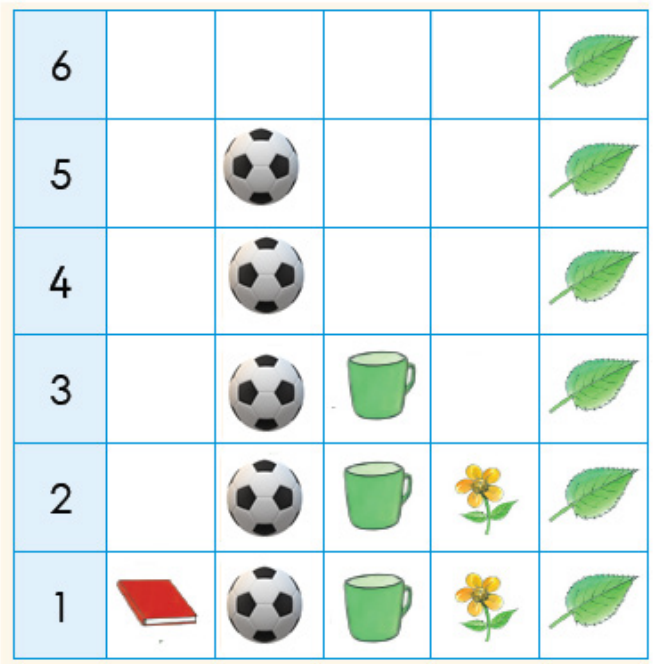



a) How many flowers are missing in order to have 4 flowers?
**Answer: 2 flowers are missing.**

b) What is the number of pineapples?
**Answer:** There are 6 pineapples.

c) How many tomatoes are on the pictograph?
**Answer: There are 3 tomatoes on the pictograph.**

b. Draw a pictograph with the following pictures: 1 notebook, 5 balls, 3 cups, 2 flowers, and 6 leaves.



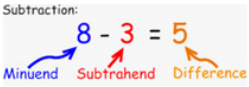
## GLOSSARY

1. **Addition / plus:** Mathematical operation of finding a sum of numbers
2. **Subtraction:** A mathematical operation of finding the difference of numbers.
3. **Mass**: A physical quantity that is measured in terms of weight.
4. **Angle:** is a figure which is formed by intersection of two straight lines
5. **Ascending order/increasing order:** when numbers are arranged from the smallest to the biggest
6. **Fraction:** A fraction is a part of a whole
7. **Coin:** is a small, usually round and flat piece of metal used primarily as a medium of exchange.
8. **Quotient:** A number we get when we divide one number by another.
9. **Compare:** find similarity or difference between two numbers or objects
10. **Minuend:** A number in subtraction sentence from which we subtract another number.
11. **Currency:** Money in the form of paper or coins, issued by a government and accepted at face value,
12. **Capacity:** A maximum quantity a container can hold.
13. **Curved line:** A curved line is a line that is not straight and is bent.
14. **Descending order/decreasing order:** when numbers are arranged from the biggest to the smallest
15. **Difference:** the result of subtracting one number from another
16. **Subtrahend:** A number to be subtracted from another number
17. **Equal:** Having the same value
18. **Exceed:** to be greater than a value or a quantity. For example, if a number "x" exceeds another number "y," it means that x is greater than y.
19. **multiplicand:** A quantity or number that is multiplied by the other.
20. **Exchange:** to convert from one unit of money to another
21. **Horizontal:** a line perpendicular to a surface or to another line considered as a base
22. **Dividend :** A number that is to be divided into equal parts.
23. **Length:** measurement of how long something / object is
24. **Meter:** A meter is the standard unit of measuring length in the International System of Units (SI)
25. **Money:** coins and notes used to pay for goods and services
26. **Multiple:** is the number you get when you multiply a certain number by an integer. For example, multiples of 5 are: 10, 15, 20, 25, and 30…etc. Multiples of 7 are: 14, 21, 28, 35, 42, and 49…etc.
27. **Multiplication:** is a method of finding the product of two or more numbers;

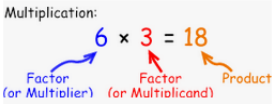
28. **Number pattern:** A number pattern is a series of numbers that follow a certain rule or order in mathematics;
29. **Decompose :** to break down or expand
30. **Order:** to arrange things according to a certain rule;
31. **Place value:** is the position of a digit in a number that determines its value;
32. **Remaining:** Continuing to exist or be left after other parts or things have been used or taken away;
33. **Sequence:** is an ordered list of numbers or objects
34. **Subtraction / minus:** Mathematical operation taking one number away from another;
35. **Take away / to subtract:** To take some objects from a set of many objects;
36. **To shade:** is to hide partly by or as if by a shadow;
37. **Vertical line:** a straight line which goes from top to bottom and bottom to top;
38. **Word problem:** Mathematical problems written in words rather than symbols;
39. **Facilitate:** to guide
40. **Perimeter:** is the total distance around the shape
41. **Important expressions and examples**

- **Sum:** the answer obtained when you add numbers. These numbers are called **addends.**

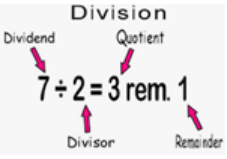

- **Difference:** The answer obtained when you subtract a number **(subtrahend)** from another **(minuend).**




- **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




- **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.



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