

PRIMARY LEARNER'S

# MATHEMATICS

TEACHERS' GUIDE

FOR RWANDA SCHOOLS

P4



**REB**

Rwanda Education Board

# INTRODUCTION

## BACKGROUND

The new Upper Primary Mathematics Syllabus– “the Competency Based Mathematics Syllabus” was reviewed to ensure that it is responsive to the needs of the learner and to shift from the traditional “Objective and Knowledge” based learning to “Competency Based Learning”. The “Competent Learner’s Maths Book 4” has been written to enhance the hands-on learning which is the driving force to attaining practical mathematics skills and mathematics competencies which a Rwandan child needs to effectively integrate in to the world community and foster our country’s development.

## MATHEMATICS AND SOCIETY

Mathematics is an excellent vehicle for the development and improvement of a person’s intellectual competence in logical reasoning, spatial visualisation, analysis and abstract thought. Learning mathematics develops numeracy, logical reasoning skills, critical thinking skills and problem solving skills. Therefore mathematics is very actively used in almost all aspects of daily life and it henceforth serves as a very important tool for the growth and development of a society.

Mathematics plays an important role in society through abstraction and logic, counting, calculation, measurement, systematic study of shapes and motion. It is also used in natural sciences, engineering, medicine, finance, astronomy and social sciences. Applied maths like statistics and probability play an important role in the Rwandan society, for example in the national census, scientific research, Rwanda Bureau of Statistics etc.

## MATHEMATICS AND LEARNERS

Learners need enough basic mathematical competencies to be effective members of the rapidly transforming Rwandan society. These competencies include the ability to count, estimate, measure, calculate, manage and handle money, interpret statistics, assess probabilities, and read commonly used mathematical representations and graphs. Watching news on TV, listening to news on radio reading newspaper require many of these competencies and productive citizenship requires the ability to interpret critical information received.

In this book, the teacher has the task of trying to make mathematics a reality in life. The methods and approaches to learning experiences are mostly practical and based on the experience of the learners.

## COMPETENCIES

Competence is defined as the ability to perform a particular task successfully, resulting from having gained an appropriate combination of knowledge, skills and attitude.

## GENERIC COMPETENCES AND VALUES

- **Critical and problem solving skills**  
This book provides a platform for learners to use different techniques to solve mathematical problems related to real life situations. The book seeks to engage them in mathematical thinking so that they may construct, symbolise, apply and generalise ideas.
- **Creativity and innovation**  
The book also ensures that learners become creative and innovative. The acquisition of such skills will help learners to take initiatives and use imagination beyond the knowledge provided to generate and create new concepts.
- **Research**  
Research helps learners to find answers to questions based on existing information and concepts as well as explain phenomena based on findings from information gathered.
- **Communication in official languages**  
Learners should communicate effectively their findings through explanations, construction of arguments and drawing relevant conclusions. Mathematics teachers will be an example to the learners in ensuring the proper and effective use of the language of instruction through speaking and writing.
- **Cooperation, inter-personal management and life skills**  
Learners are engaged in cooperative learning groups to promote higher achievement rather than competitive and individual work. This will help learners to cooperate with others as a team in whatever task they are assigned and to practice positive ethical moral values and respect for the rights, feelings and views of others.

## BROAD MATHEMATICS COMPETENCIES

During and at the end of the learning process, the learner can:

- Promote problem solving in life situations
- Develop and enrich their aesthetic and linguistic experiences.
- Promote scientific, technical and cultural knowledge, skills and positive attitudes needed to promote development, self sufficiency and wealth.
- Apply acquired mathematics knowledge and skills in future training.
- Work in a systematic way to develop a clear, logical, coherent and creative reasoning.
- Develop imagination, initiative and flexibility of mind.
- Describe, explain, interpret and analyse information.
- Use ICT tools to solve mathematics problems.

## **2. PEDAGOGICAL APPROACH**

The change to a competence-based curriculum is about transforming learning to ensure that learning is deep, enjoyable and habit-forming.

Various teaching strategies, methods and approaches such as direct instruction, discovery learning, cooperative learning, investigation, guided discovery and use of ICT tools must be incorporated. Among the approaches to use are:

- Learner centred learning
- Different learning abilities and styles of learning (individualisation)
- Use of relevant, suitable and effective teaching materials
- Formative evaluation to determine the effectiveness of the teaching and learning process.

Some other suitable approaches include;

- Co-operative learning
- Contextual learning
- Mastery learning
- Constructivism

### **THE ROLE OF THE LEARNER**

Teachers should note that in competence-based learning, the learner is the principal actor of his/her education process, taking in to account the initial capacities and abilities of the learner.

The following are the expectations from (or roles of) the learner:

- Learners construct the knowledge either individually or in groups in an active way. Opportunity should be given to the learner to manipulate concrete objects and to use models during the learning process.
- Learners will be encouraged to do research and present their findings through group work activities.
- Learners are responsible for their learning and their own participation in the learning process and also for making sure others participate.
- Learners should seek help from the group during group activity and the teacher is asked for help only when the whole group agrees to ask a question.
- Consensus on the answer is required from the whole group.
- The learners who learn at a faster rate do not do the task alone, but everyone must be fully involved in completing the task.
- The group evaluates its own strategies and ideas rather than relying solely on the teacher.
- Learners will accord opportunity to each learner to present their work to the whole class in a responsible and constructive manner so as to improve their English literacy, self confidence and public speaking ability.

### **THE ROLE OF THE TEACHER**

Some of the specific duties of the teacher when implementing competence-based activities are:

- He/she is a facilitator. His/her role is to provide opportunities for the learners to meet problems that create interest and challenge them which they can solve with appropriate effort.
- He/she is an organiser. He/she organises the learners in or out of the classroom and engage them through participatory and interactive methods through the learning processes as individuals, in pairs or in groups. In order to ensure that the learning is personalised, active and participative, the teacher must identify the needs of the learners, the nature of the learning to be done and the means to shape the learning experience accordingly.
- He/she is an advisor to the learners. He/she provides counselling and guidance, offers comfort and encouragement by valuing their contribution in class activities.
- He/she is a conflict solver. He/she should settle disputes within a group or within groups.
- He/she must be very ethical. The teacher must be looked by the learners as a role model, a parent, an impartial person and someone who cares for slow learners and learners with physical impairments.

### **3. ASSESSMENT APPROACH**

Assessment evaluates the teaching and learning process through collecting and interpreting evidence of an individual's learning progress and makes judgement about the learners achievements measured against some defined standards.

In the new competence-based curriculum, assessment must also be competence-based, where by a learner is given a complex situation related to his/her everyday life and asked to try to overcome the situation by applying what he/she has learned.

### **TYPES OF ASSESSMENT**

#### **FORMATIVE ASSESSMENT**

Formative assessment is done within the teaching/learning process. In our primary schools, formative assessment can be done as a continuous assessment. The teacher may use one or a combination of the following:

- (a) observation of behavioural change
- (b) pen and paper
- (c) oral questioning.

The teacher should ensure that all the learners have mastered the stated key unit competencies based on the criteria stated at the beginning of each unit.

#### **SUMMATIVE ASSESSMENT**

Summative assessment gives a learner's performance at any specific time. Learners may be given an assessment test which is done by all learners at a specific time, marked and the marks recorded.

The results of summative assessment are used to grade or rank learners. This ranking or grading may be used for promotion in to the next level and for

certification. In this kind of assessment, a learner must be able to show mastery of all competencies.

Summative assessment may be internal or external (district exams and national exams). Internal exams may be done monthly, termly or at the end of the year.

In the “Competent Learner’s Math Book 4”, there are numerous exercises and class activities which you should use for your summative assessment.

## **RECORD KEEPING**

It is important that you develop an efficient mechanism of record keeping. You may use folders (portfolio) or a computer to store the marks for continuous assessment of your students. This provides you with a mechanism to keep in touch with your learners’ strengths and weaknesses. It also provides a record of the activities undertaken over time as part of student learning. It can also be used as a verification tool for each learner that he/she attended the whole learning.

## **PARENTS’ INVOLVEMENT**

As a teacher, it is important to realise the very important role that a parent/guardian plays in the learning process of his/her child. As such keep the parent/guardian well informed of the child’s academic progress. Share with them where the child is doing well and where they need to improve.

## **4. RESOURCES**

Teachers should use a variety of real/authentic materials to help learners gain experience, construct abstract ideas, make inventions, build self confidence, encourage independence and inculcate the spirit of co-operation. Some of these resources are;

- Reference books
- Geometry set
- Computers
- Graph books/papers
- Calculator
- Manila cards
- Bead counters/abacus
- Projectors
- Tracing paper

## **SKILLS, VALUES AND QUALITIES REQUIRED FOR THE TEACHER OF MATHEMATICS**

- Engage learners in a variety of learning activities.
- Use multiple teaching and assessment methods
- Adjust instruction to the level of the learners
- Use creativity and innovation in the teaching and learning process.
- Be a good communicator and organiser
- Be a guide/facilitator and counsellor
- Manifest passion and impartial love for children in the teaching and learning process.
- Link the use of mathematics with other subjects and real life situations.

- Have a good mastery of mathematics content.
- Have good classroom management skills.

## **HOW MANY STUDENTS IN A GROUP?**

The suggested number is between three to four or five learners depending on the size of the class and competence of learners. One misconception of teachers is that all groups must have the same number of members. In fact, a group of reticent students may be up to three to force all to speak, while a larger group of six dominant students will receive valuable practice at social turn-taking. Having partner is also an excellent way of ensuring collaboration and full participation of learners. There is no instructional rule that demands equal group size.

## **FLEXIBLE GROUPING**

Flexible grouping is very important in achieving the aims of group work each student belongs to three or four different fixed groups and rotate among them based on the learning objectives and the type of task that is assigned.

## **PLANNING FOR GROUP MEMBERSHIP**

Choosing group membership requires much artistry, as it demands sensitivity to cultural contexts, to individual personalities in the class, and to the variety of skill levels. There are several bases on which experienced teachers form groups: language proficiency, personality, friendships, shared native language, and academic orientation. However, one of the variables not often considered by the classroom teacher is the objective of the task itself. While general guidelines may point the teacher in the direction of conventional wisdom, the content of the task may point a different way. Several options on how to plan group membership around task objectives follow.

### **(i) Oral language proficiency grouping**

It is often better to group individuals by similar proficiency so that all will have equal opportunity and responsibility to speak. One technique for quick implementation is to keep a list of students ordered by proficiency level, with the most proficient students in the class at the top and the least proficient at the bottom. If you choose to for triads, for example, count down the list by three, draw a line, and group by three until you reach the end of the list. This gives you ready-made proficiency groups.

### **(ii) Personality grouping**

Personality grouping is based on dominance (Active) vs. reticence (silent and reserved). In other words, in a homogeneous scheme, active students are grouped together to fight it out, allowing reticent learners to interact more casually. When forming groups based on personality, it is important for the teacher to designate a group leader who possesses the positive traits of high task orientation, negotiating ability, and leadership. In following this plan, the group leader models effective leadership for

other members so that later they may take over the leadership role.

**(iii) Controlled affiliation grouping**

What is the level of trust among group members? How important is diversity of opinion and diversity of perception? When friends are grouped with friends, trust will be high, but diversity will be limited because of the likelihood of common experiences and viewpoints. In general, asking learners to work with members of the class whom they do not know well fosters more on-task learning, allows multiple viewpoints to be considered, and nurtures the growth of a class community as individuals get to know and trust one another.

**(iv) Assigning group roles**

Again, it is important to assign each group member a role within the group. While the teacher may select the leader-facilitator or may have each group choose the leader on its own, other roles are also needed.

## **BEHAVIOUR MANAGEMENT**

Different teachers have different ways of managing their classroom behaviour. However, some important things you may consider are as follows:

- Setting expectations and consequences when you first meet the class. You can use the learners to help you set expectations and consequences as this will make it possible for them to follow them and seem very fair to all of them.
- Remind the learners of the class rules and consequences before you begin a lesson.
- Always remember to be consistent with the rules and consequences.

## **ASSESSMENT**

Assessment is viewed as closely related to instruction. Assessment is needed to help teachers and administrators make decisions about students' linguistic abilities, their placement in appropriate levels, and their achievement. The success of any assessment depends on the effective selection and use of appropriate tools and procedures as well as on the proper interpretation of students' performance. Assessment tools and procedures, in addition to being essential for evaluating students' progress and achievement, also help in evaluating the suitability and effectiveness of the curriculum, the teaching methodology, and the instructional materials. It helps demonstrate to young learners that they are making progress in their linguistic development, which can boost motivation. This encourages students to do more and the teacher to work on refining the process of learning rather than its product. Assessment can be formal and informal. Keep a record of the learners' progress as explained in the teaching content. Consider Formative and continuous assessment, and summative assessment at the end of each unit.



## ABOUT THE BOOK

### UNITS

This teacher's guide is divided into Units (from unit 1 to unit 18). These units stem from 4 main topics in math namely Numeration, Metric measurement, Algebra, Geometry and Statistics and Probability. These units are structured as follows:

- **Key Unit competence:** This is the different for every unit. It shows the general picture of why learners have to study a particular unit. As a teacher, this gives you a clear view of the path or direction you would like the learners to take. This shows what learners should be able to do in a particular unit.
- **Learning objectives:** There are 3 learning objectives namely:
  - ♦ **Knowledge and understanding**
  - ♦ **Skills**
  - ♦ **Attitudes and Values:** In a bid to develop the wholeness of the learner, each unit has set attitudes and values whose aim is to cultivate and inspire certain attitudes coupled with attaining knowledge and skills so that the learner is able to compete favourably in both regional and international level. As a teacher, you will start every unit with a discussion about these attitudes and values so that the learner is able to see the bigger picture in learning. And then discuss it after the unit.
- **Content:** This clearly defines all the concepts to be learnt in each topic or sub topic.
- **Learning objectives:** This provides a sample of various learning activities that the teacher can engage the learners in during the learning process.
- **Links to other subjects:** This component of the teacher's guide gives you a glimpse of connectivity to other subjects. The curriculum review stipulates connectivity across all subjects since this will help the learner develop higher order thinking skills as a whole. As a teacher, endeavour to make this connectivity very clear to the learner.
- **Materials/learning aid:** In every unit, there is a set of materials that work as a guide for the teacher. These are mostly low or no cost materials for you to use in the classroom. These include flashcards and pictures, photographs, some classroom objects, household objects. It is also important for you to complete a class activity before you ask learners to do it. The book gives additional resources that are supposed to be got from the Internet. ICT is also an important tool in the language learning process of mathematics globally.

The book consists of the following key icons:

- Example = Fully worked examples to enable learners grasp the concepts effectively.
- Class Activity which will engage learners in numerous cooperative learning manipulations. This will strengthen team work among learners while

developing in them positive ethical moral values, respect for the rights, feelings and views of others.

- **THINK!!!** = This part consists of numerous intriguing Math problems in real life. It requires the learner to think critically and find solutions to problems in real life situations.
- **Exercise** = various exercise for the learners to work in a systematic way to develop clear, logical, coherent and creative mathematical reasoning.
- **Additional References:** This directs you to additional resources on the internet. Access to the listed websites will allow the learner to explore unlimited learning activities, games, puzzles, brain teasers, demonstrations, animations and various other online resources.

The topics and units are arranged in a very orderly manner that will facilitate a smooth transition from one unit to the next. Enjoy Math.

### Use of exercises and their answers

Even though answers for exercises and question were provided in this book, the teacher is requested to do every activity before marking learner's work.

## SAMPLE LESSON PLAN

School Name: .....

Teacher's name: .....

Term	Date	Subject	Class	Unit N°	Lesson N°	Duration	Class size
One	24 <sup>th</sup> March 2016	Mathematics	P.4	4	1	8:00 – 8:40 am	28
<b>Type of Special Educational Needs to be catered for in this lesson and number of learners in each category</b>		One learner who is physically disabled in one hand. One hand is lame but the other hand is normal.					
<b>Unit title</b>		Fractions of the same denominator					
<b>Key Unit Competence:</b>		Explain the meaning of fractions, add and subtract same denominator fractions, multiply and divide fractions accurately.					
<b>Title of the lesson</b>		Writing fractions, forming fractions and reading fractions.					
<b>Instructional Objective</b>		<ul style="list-style-type: none"> <li>– A learner should be able to identify, write, read and demonstrate fractions.</li> <li>– Using flash cards, learners will identify fractions from a list of numbers from a chart and fraction circles.</li> <li>– Learner will write five examples of fractions in their note books.</li> <li>– Learner will cut an orange using a knife to show fractions, one-quarter, half, and three-quarters.</li> <li>– Learner will use his body to show the fraction 'half'.</li> <li>– Learner will read the fractions <math>\frac{1}{3}, \frac{2}{3}, \frac{1}{5}, \frac{2}{5}, \frac{4}{5}, \frac{1}{10}</math> written on charts.</li> </ul>					
<b>Plan for this Class (location: in / outside)</b>		Learners sit in groups of five (5). Each group sits around a large common table so that every learner has equal access to the table. Learners generally sit according to their learning abilities.					

<b>Learning Materials (for all learners)</b>	Fraction circles, Fraction Charts, oranges, knife, crayons, pencils, geometry set, Primary Learner's Math Textbook for P4, computer and projector.
<b>References</b>	1. Primary learner's Math for P4 by Otim John Bosco Pages 47, 48 and 49. 2. Internet: <a href="http://www.math-play.com/fractions">www.math-play.com/fractions</a>

Timing for each step	Description of teaching and learning activity		Generic competences and cross cutting issues to be addressed + a short explanation
	Teacher activities	Learner activities	
<b>Introduction</b> First 5 mins	<ul style="list-style-type: none"> <li>- Teacher greets the learners in soft clear and audible voice. He introduces him/her self.</li> <li>-Teacher groups learners in to groups.</li> <li>- Teacher prompts learners to say the main concepts learnt in the previous lesson.</li> <li>-Teacher tells the learners the lesson objectives. For example, "Today we shall learn how fractions arise, how to form fractions using real objects and how to write and read fractions".</li> </ul>	<ul style="list-style-type: none"> <li>-Learners respond to the teacher's greetings.</li> <li>-Learners sit in groups</li> <li>-Learners say what the main concepts for the previous lessons were.</li> <li>-Learners listen attentively</li> </ul>	<ul style="list-style-type: none"> <li>-Communication in official language.</li> <li>-Promoting positive cultural attitudes and values by greetings, sharing.</li> <li>-Cooperation and interpersonal management.</li> </ul>
<b>Development of the lesson</b> Next 30 mins	<ul style="list-style-type: none"> <li>-Teacher describes the learning activity to the learners.</li> <li>-Teacher distributes learning materials/resources to the learners.</li> <li>-Tell the learners to cut the orange provided in to four equal parts. Let the learners discover how to use these parts to show the fractions <math>\frac{1}{4}</math>, <math>\frac{2}{4}</math> and <math>\frac{3}{4}</math>.</li> <li>-Teacher instructs learners to complete the tasks in Activity 4.1, 4.2 and 4.3</li> <li>-Teacher goes round the class checking the progress of group activities.</li> <li>-Teacher gives individualised attention to slow learners and SENs.</li> <li>-Teacher attends to SEN learners and presents the content specially adjusted to fit the need of the SEN learner. For example a short video related to the content can be played for both the SEN learners and the other learners.</li> </ul>	<ul style="list-style-type: none"> <li>-Learners listen and watch the learning materials provided.</li> <li>-Learners share ideas and experiences.</li> <li>-Learners discuss the activities.</li> <li>-Learners cut the oranges and use them to show fractions.</li> <li>-Learners carry out the activities and present their answers.</li> <li>-Learners write down their answers in the book.</li> <li>-Learners shade the circle fractions</li> <li>-SEN navigates through the SEN material specially prepared by the teacher to meet the needs of the SEN learner(s).</li> </ul>	<ul style="list-style-type: none"> <li>-Working in a systematic way to develop a clear, logical and coherent reasoning.</li> <li>-Developing initiative and imaginative capability of the mind.</li> <li>-Describe, interpret and analyse the information.</li> <li>-Working together and developing interpersonal skills.</li> <li>-Respect for all members in the community irrespective of their health, appearance, sex etc.</li> </ul>

<b>Conclusion</b> Last 5 mins	-Teacher asks learners to say what they have learnt during the lesson. -Teacher summarises and discusses conclusions with the learners.	-Learners say what they have learnt during the lesson. -Learners discuss the lesson conclusions. -Learners listen to the teacher and to each other.	-Communication in official language. -Working together.
<b>Teacher self-evaluation</b>	What two things went really well? Sample answers: 1. Conveying the idea of shading circle fractions. 2. Active participation by learners What things would have improved the lesson? Sample answers: 1. Provision of more fruits for every learner to be able to demonstrate. 2. A short video clip or quiz related to fractions could be given to the learners. 3. Having a pre-arranged classroom with the materials already on tables before a lesson starts. This can help with time management. What have I learned from this lesson about the class or individuals that will inform my next lesson? Sample answer: -One group was very slow to actually start the activity and only managed to show just one fraction when others had finished all the four fractions.		

### Question Stems And Activities Derived From Bloom's Taxonomy

Our authors have provided the questions and activities adapted and developed from Bloom's Taxonomy for creating skill-based activities for teachers to use in the class for learners at different levels.

## **A Menu Of Competence Supporting Activities**

Different types of activities, are included in the textbooks as well as in the teachers' guides. These activities will serve as a means of developing required skills and competences.

## CONTENT MAP

<b>Unit-1: Mathematical Operations on Whole Numbers up to 100 000</b>	
Number of Periods	42
Introduction	<ul style="list-style-type: none"> <li>• Understanding number system</li> <li>• Addition, Subtraction, Multiplication and Division of numbers</li> <li>• Forming numbers and place values</li> </ul>
Classroom Organisation	<ul style="list-style-type: none"> <li>• Whole class orientation then individual and group works</li> </ul>
Equipment Required	<ul style="list-style-type: none"> <li>• Paper and pens</li> <li>• Abacus and beads</li> <li>• Number cards and flash cards</li> </ul>
Activities	<ul style="list-style-type: none"> <li>• Play games of matching numbers with number names</li> <li>• Form numbers from the given digits</li> <li>• Make cards of numbers</li> </ul>
Competences Practised	<ul style="list-style-type: none"> <li>• Team work</li> <li>• Different operations on whole numbers</li> <li>• Compare, calculate and simplify numbers</li> </ul>
Language Practice	<ul style="list-style-type: none"> <li>• Writing and solving different word problems</li> </ul>
Vocabulary Acquisition	<ul style="list-style-type: none"> <li>• Place value, natural and whole numbers, abacus, etc.</li> </ul>
Numeracy	<ul style="list-style-type: none"> <li>• Forming numbers</li> <li>• Different operations like addition, subtraction, multiplication and division of numbers</li> </ul>
Study Skills	<ul style="list-style-type: none"> <li>• Solving problems of exercise book</li> <li>• Collecting and solving the related questions from different sources</li> </ul>
Revision	<ul style="list-style-type: none"> <li>• Revise the questions given in the exercises</li> </ul>
Assessments	<ul style="list-style-type: none"> <li>• Formative assessment through different operations explained in this unit</li> </ul>
Learning Outcomes	<ul style="list-style-type: none"> <li>• Understanding number system</li> <li>• Reading and writing numbers in words and in figures</li> <li>• Forming new numbers from given digits</li> <li>• Comparing numbers</li> <li>• Adding, Subtracting, Multiplying and Division of numbers.</li> </ul>

<b>Unit-2: Positive and Negative Integers</b>	
Number of Periods	14
Introduction	<ul style="list-style-type: none"> <li>• Explaining positive and negative integers</li> <li>• Representing integers on number line</li> <li>• Calculating distance between two integers</li> <li>• Comparing and ordering integers</li> </ul>
Classroom Organisation	<ul style="list-style-type: none"> <li>• Whole class orientation and then individual and group work</li> </ul>
Equipment Required	<ul style="list-style-type: none"> <li>• Paper and pens</li> <li>• Ruler, string, thread, nails, scissors, etc.</li> <li>• Hammer, card board box, black marker pen, etc.</li> </ul>
Activities	<ul style="list-style-type: none"> <li>• Discussing positive and negative numbers</li> <li>• Performing different activities in the playground or field to understand the concept of integers</li> </ul>
Competences Practised	<ul style="list-style-type: none"> <li>• Team work</li> <li>• Group discussion</li> <li>• Activity</li> </ul>
Language Practice	<ul style="list-style-type: none"> <li>• Writing and solving different word problems based on the positive and negative integers</li> </ul>
Vocabulary Acquisition	<ul style="list-style-type: none"> <li>• Positive, negative, up, down, right, left, high, low, etc.</li> </ul>
Numeracy	<ul style="list-style-type: none"> <li>• Representation of integers on number line</li> <li>• Comparing and ordering integers</li> </ul>
Study skills	<ul style="list-style-type: none"> <li>• Searching problems related to integers and solving them</li> </ul>
Revision	<ul style="list-style-type: none"> <li>• Revise the problems provided in exercises</li> </ul>
Assessments	<ul style="list-style-type: none"> <li>• Formative assessment based on the problems of positive and negative integers</li> </ul>
Learning Outcomes	<ul style="list-style-type: none"> <li>• Understanding positive and negative integers</li> <li>• Showing integers on numbers line</li> <li>• Comparing and ordering positive and negative integers.</li> </ul>

### **Unit-3: Classifying Numbers by their Properties**

Number of Periods	14
Introduction	<ul style="list-style-type: none"><li>• Knowing more about numbers</li><li>• Explaining prime, composite and square numbers</li><li>• Finding factors, multiple, square root, LCM, etc.</li></ul>
Classroom Organisation	<ul style="list-style-type: none"><li>• Whole class orientation then individual and group work</li></ul>
Equipment Required	<ul style="list-style-type: none"><li>• Flash cards and number cards</li></ul>
Activities	<ul style="list-style-type: none"><li>• Play games to identify even, odd and prime numbers</li></ul>
Competences Practised	<ul style="list-style-type: none"><li>• Team work</li><li>• Play game</li><li>• Listing numbers</li></ul>
Language Practice	<ul style="list-style-type: none"><li>• Read and write word problems.</li><li>• Solve word problems</li></ul>
Vocabulary Acquisition	<ul style="list-style-type: none"><li>• Terms related to the numbers like whole, natural, odd, even, square, prime, composite, factor, multiple etc.</li></ul>
Numeracy	<ul style="list-style-type: none"><li>• Listing different types of numbers</li></ul>
Study Skills	<ul style="list-style-type: none"><li>• Discussion with friends</li><li>• Identify different types of numbers</li></ul>
Revision	<ul style="list-style-type: none"><li>• Solve the problems given in exercises</li></ul>
Assessments	<ul style="list-style-type: none"><li>• Formative assessment based on the different types of activities.</li></ul>
Learning Outcomes	<ul style="list-style-type: none"><li>• Identifying different types of numbers</li><li>• Classifying prime and composite numbers</li><li>• Finding factors and multiples of numbers</li><li>• Calculating LCM and square root of the numbers.</li></ul>



<b>Unit-4: Fractions of the Same Denominator</b>	
Number of Periods	21
Introduction	<ul style="list-style-type: none"> <li>• Understanding fractions with same denominators</li> <li>• Reading and writing fractions</li> <li>• Comparing fractions</li> <li>• Adding, subtracting, multiplying and dividing fractions</li> </ul>
Classroom Organisation	<ul style="list-style-type: none"> <li>• Whole class orientation then individual and group work</li> </ul>
Equipment Required	<ul style="list-style-type: none"> <li>• Orange and pizza</li> <li>• Pens, pencils and crayons</li> <li>• Clock, bottle tops</li> </ul>
Activities	<ul style="list-style-type: none"> <li>• Divide the pizza and orange in equal parts and write the fraction for different parts</li> </ul>
Competences Practised	<ul style="list-style-type: none"> <li>• Team work</li> <li>• Divide any shape in equal parts and write fraction for each parts</li> <li>• Shade the parts for given fractions</li> </ul>
Language Practice	<ul style="list-style-type: none"> <li>• Read and solve the word problems</li> <li>• Write word problems based on the fraction</li> </ul>
Vocabulary Acquisition	<ul style="list-style-type: none"> <li>• Terms related to fraction like numerator, denominator, proper, improper, mixed, etc.</li> </ul>
Numeracy	<ul style="list-style-type: none"> <li>• Comparison, addition, subtraction, multiplication and division of fractions.</li> </ul>
Study Skills	<ul style="list-style-type: none"> <li>• Work in groups to write fractions</li> <li>• Find different problems based on fraction</li> <li>• Solve different problems of fraction</li> </ul>
Revision	<ul style="list-style-type: none"> <li>• Revise the questions given in the exercises</li> </ul>
Assessments	<ul style="list-style-type: none"> <li>• Formative assessment based on the different activities on operations of the fractions of same denominators.</li> </ul>
Learning Outcomes	<ul style="list-style-type: none"> <li>• Reading and writing fractions</li> <li>• Comparing fractions</li> <li>• Operations on fractions</li> <li>• Solving real life problems involving fractions</li> </ul>

<b>Unit-5: Decimal Fractions/Numbers</b>	
Number of Periods	14
Introduction	<ul style="list-style-type: none"> <li>• Understanding the decimal fractions</li> <li>• Representing decimals on number line</li> <li>• Place values of the digits in decimals</li> <li>• Comparison, addition and subtraction of decimal numbers</li> </ul>
Classroom Organisation	<ul style="list-style-type: none"> <li>• Whole class orientation then individual and group work</li> </ul>
Equipment Required	<ul style="list-style-type: none"> <li>• Paper and pens</li> <li>• Flash cards</li> </ul>
Activities	<ul style="list-style-type: none"> <li>• Play number games using decimal point</li> <li>• Two children are standing with number cards 3 and 5 before a decimal point and two other with cards 9 and 4 after decimal. Then decimal number is 35.94</li> </ul>
Competences Practised	<ul style="list-style-type: none"> <li>• Group discussion and team work</li> <li>• Add and subtract different decimal numbers</li> <li>• Solve problems of real life situation based on decimal numbers</li> </ul>
Language Practice	<ul style="list-style-type: none"> <li>• Read, write and solve word problems</li> </ul>
Vocabulary Acquisition	<ul style="list-style-type: none"> <li>• Terms related to decimal numbers like decimal point, tenth, hundredth, thousandth, etc.</li> </ul>
Numeracy	<ul style="list-style-type: none"> <li>• Compare, add, subtract decimal numbers</li> </ul>
Study Skills	<ul style="list-style-type: none"> <li>• Work in groups to write and read decimal numbers</li> <li>• Find how to write place values of each digits of a decimal number</li> <li>• Practice, adding and subtracting decimal numbers</li> </ul>
Revision	<ul style="list-style-type: none"> <li>• Revise the questions given in the exercises</li> </ul>
Assessments	<ul style="list-style-type: none"> <li>• Formative assessment on the place value, comparison, addition and subtraction of decimal numbers.</li> </ul>
Learning Outcomes	<ul style="list-style-type: none"> <li>• Explaining about decimal numbers</li> <li>• Representing decimal numbers on number line</li> <li>• Finding place values of each digits in a decimal number</li> <li>• Comparing, adding and subtracting decimal numbers</li> </ul>

<b>Unit-6: Length Measurement</b>	
Number of Periods	21
Introduction	<ul style="list-style-type: none"> <li>• Knowing different instruments for measuring length.</li> <li>• Unit and estimation of length.</li> <li>• Conversion of units.</li> <li>• Addition and subtraction of length and finding perimeter.</li> </ul>
Classroom Organisation	<ul style="list-style-type: none"> <li>• Whole class orientation then individual and group work.</li> </ul>
Equipment Required	<ul style="list-style-type: none"> <li>• Ruler, measuring tape, yard stick, micrometer, screw gauge.</li> </ul>
Activities	<ul style="list-style-type: none"> <li>• Measure the length and breadth of your classroom using metre ruler.</li> <li>• Measure the length of different objects found in your home using ruler.</li> </ul>
Competences Practised	<ul style="list-style-type: none"> <li>• Group work</li> <li>• Convert the length of an object in different units of measurement</li> <li>• Add and subtract units of length.</li> </ul>
Language Practice	<ul style="list-style-type: none"> <li>• Read and write the word problems related to real life situations.</li> <li>• Solve the word problems.</li> </ul>
Vocabulary Acquisition	<ul style="list-style-type: none"> <li>• Terms related to length like distance, height, width, thickness, perimeter, etc.</li> </ul>
Numeracy	<ul style="list-style-type: none"> <li>• Adding and subtracting lengths.</li> <li>• Finding perimeter of the plane shapes.</li> </ul>
Study Skills	<ul style="list-style-type: none"> <li>• Measuring the lengths of different objects.</li> <li>• Converting the lengths in different units.</li> <li>• Adding and subtracting the lengths.</li> </ul>
Revision	<ul style="list-style-type: none"> <li>• Solve all the questions given in the exercises</li> </ul>
Assessments	<ul style="list-style-type: none"> <li>• Formative assessment based on the measurement of length, conversion, addition, subtraction of length and perimeter.</li> </ul>
Learning Outcomes	<ul style="list-style-type: none"> <li>• Explaining instrument for measurement</li> <li>• Conversion of units</li> <li>• Adding and subtracting lengths</li> <li>• Finding perimeter of plane shapes</li> </ul>

<b>Unit-7: Capacity Measurement</b>	
Number of Periods	7
Introduction	<ul style="list-style-type: none"> <li>• Understanding capacity</li> <li>• Estimating capacity and conversion of units</li> <li>• Addition and subtraction of capacity</li> </ul>
Classroom Organisation	<ul style="list-style-type: none"> <li>• Whole class orientation then individual and group work</li> </ul>
Equipment Required	<ul style="list-style-type: none"> <li>• Measuring litre, measuring cylinder, measuring jug, feeding bottle, milk can, etc.</li> </ul>
Activities	<ul style="list-style-type: none"> <li>• Discuss with your friend and compare the capacity of different containers.</li> <li>• Estimate the capacity of different containers.</li> <li>• Measure the water of a jug in litre and change it into millilitre.</li> </ul>
Competences Practised	<ul style="list-style-type: none"> <li>• Team work</li> <li>• Write the capacity of a glass in different units of capacity.</li> <li>• Add and subtract the capacity.</li> </ul>
Language Practice	<ul style="list-style-type: none"> <li>• Read and write word problems related to capacity</li> <li>• Solve the word problems</li> </ul>
Vocabulary Acquisition	<ul style="list-style-type: none"> <li>• Terms related to capacity like, litre, hectolitre, decalitre, decilitre, centilitre, millilitre, etc.</li> </ul>
Numeracy	<ul style="list-style-type: none"> <li>• Adding and subtracting the capacities</li> </ul>
Study Skills	<ul style="list-style-type: none"> <li>• Measuring the capacity of different containers and compare them.</li> <li>• Converting capacity from one unit to other.</li> </ul>
Revision	<ul style="list-style-type: none"> <li>• Revise the problems given in the exercises</li> </ul>
Assessments	<ul style="list-style-type: none"> <li>• Formative assessment based on the capacity measurement, conversion of units and their addition and subtraction.</li> </ul>
Learning Outcomes	<ul style="list-style-type: none"> <li>• Understanding the concept of capacity.</li> <li>• Converting capacity form one unit to other.</li> <li>• Adding and subtracting capacities.</li> </ul>

<b>Unit-8: Mass Measurement</b>	
Number of Periods	7
Introduction	<ul style="list-style-type: none"> <li>• Estimating mass</li> <li>• Measuring mass</li> <li>• Knowing about instrument for measuring mass</li> <li>• Conversions between units of mass</li> <li>• Addition and subtraction of masses</li> </ul>
Classroom Organisation	<ul style="list-style-type: none"> <li>• Whole class orientation then individual and group work</li> </ul>
Equipment Required	<ul style="list-style-type: none"> <li>• Paper and pens</li> <li>• Weight balance, stones</li> <li>• Different weights of 100 g, 200 g, 500 g, 1 kg, 2 kg etc.</li> </ul>
Activities	<ul style="list-style-type: none"> <li>• Estimate weights of different stones by comparing it with standard weights.</li> <li>• Measure the weights of different objects.</li> <li>• Write the mass in different units.</li> </ul>
Competences Practised	<ul style="list-style-type: none"> <li>• Converting mass from one unit to other</li> <li>• Estimating masses</li> <li>• Adding and subtracting masses</li> </ul>
Language Practice	<ul style="list-style-type: none"> <li>• Read, write and solve word problems related to mass measurement.</li> </ul>
Vocabulary Acquisition	<ul style="list-style-type: none"> <li>• Terms related to mass measurement like Top pan balance, Beam balance, Triple beam balance, Electronic balance, etc.</li> </ul>
Numeracy	<ul style="list-style-type: none"> <li>• Add and subtract different masses.</li> </ul>
Study Skills	<ul style="list-style-type: none"> <li>• Work in groups to measure and compare the masses of different objects.</li> <li>• Convert masses from one unit to other.</li> <li>• Add and subtract the masses.</li> </ul>
Revision	<ul style="list-style-type: none"> <li>• Solve all the questions given in the revision exercises.</li> </ul>
Assessments	<ul style="list-style-type: none"> <li>• Formative assessment based on the mass measurement, conversion of units, addition and subtraction of masses.</li> </ul>
Learning Outcomes	<ul style="list-style-type: none"> <li>• Able to estimate mass</li> <li>• Able to measure mass</li> <li>• Able to convert mass from one unit to other</li> <li>• Able to add and subtract masses</li> </ul>

<b>Unit-9: Area and Land Measurements</b>	
Number of Periods	14
Introduction	<ul style="list-style-type: none"> <li>• Understanding area of 2D shapes</li> <li>• Knowing units of area</li> <li>• Calculating area of land</li> <li>• Adding and subtracting areas</li> </ul>
Classroom Organisation	<ul style="list-style-type: none"> <li>• Whole class orientation then individual and group work</li> </ul>
Equipment Required	<ul style="list-style-type: none"> <li>• Paper, pens, measuring tape.</li> </ul>
Activities	<ul style="list-style-type: none"> <li>• Measure the length and breadth of your classroom and multiply them to calculate the area of classroom.</li> </ul>
Competences Practised	<ul style="list-style-type: none"> <li>• Work in groups to calculate the area of a field.</li> <li>• Measure the area of your desk and bench.</li> <li>• Write the units of area in different units.</li> </ul>
Language Practice	<ul style="list-style-type: none"> <li>• Read and write word problems based on the area of land.</li> <li>• Solve word problems.</li> </ul>
Vocabulary Acquisition	<ul style="list-style-type: none"> <li>• Terms related to area like are, hectare, acre, etc.</li> </ul>
Numeracy	<ul style="list-style-type: none"> <li>• Write area in different units</li> <li>• Add and subtract areas</li> </ul>
Study Skills	<ul style="list-style-type: none"> <li>• Team work to find the area of a land.</li> <li>• Find relationship between area, hectare, acre and square metre.</li> <li>• Adding and subtracting areas of different lands.</li> <li>• Adding and subtracting capacities.</li> </ul>
Revision	<ul style="list-style-type: none"> <li>• Solve all the problems given in the exercises.</li> </ul>
Assessments	<ul style="list-style-type: none"> <li>• Formative assessment on the conversion of units of area and calculation of area</li> </ul>
Learning Outcomes	<ul style="list-style-type: none"> <li>• Knowing about area of land.</li> <li>• Explaining units of area.</li> <li>• Calculating area of land.</li> <li>• Adding and subtracting areas.</li> </ul>

<b>Unit-10: Time</b>	
Number of Periods	7
Introduction	<ul style="list-style-type: none"> <li>Introducing the use of 'past' and 'to' unit of time and conversion, calendar of the year, telling time on 12 hour clock.</li> </ul>
Classroom Organisation	<ul style="list-style-type: none"> <li>Whole class orientation, group work</li> </ul>
Equipment Required	<ul style="list-style-type: none"> <li>Clocks, digital clock, wall clock, calender</li> </ul>
Activities	<ul style="list-style-type: none"> <li>Reading and telling time from clock</li> <li>Make a model clock show minute and hour hand, then read and tell time from clock.</li> <li>Daily routine, primary school P4 time table.</li> </ul>
Competences Practised	<ul style="list-style-type: none"> <li>Reading time using 'past' and 'to'</li> <li>Reading time table, understanding calendar of year</li> <li>Team work</li> </ul>
Language Practice	<ul style="list-style-type: none"> <li>Clock, calendar, time table</li> </ul>
Vocabulary Acquisition	<ul style="list-style-type: none"> <li>Terms used while reading and writing time.</li> </ul>
Numeracy	<ul style="list-style-type: none"> <li>Representing digital clock and wall clock.</li> <li>Using A.M. and P.M.</li> <li>Representing calendar of the year</li> </ul>
Study Skills	<ul style="list-style-type: none"> <li>Choosing the right question to understand the concept.</li> </ul>
Revision	<ul style="list-style-type: none"> <li>Assessment exercises provided</li> </ul>
Assessments	<ul style="list-style-type: none"> <li>A formative assessment of the ability to write successfully in the group</li> </ul>
Learning Outcomes	<ul style="list-style-type: none"> <li>Understanding types of clocks</li> <li>Reading and writing of time using 'past' and 'to'</li> <li>Understanding calendar</li> <li>Understanding school or class time table</li> <li>Understanding time management in daily situations.</li> </ul>

<b>Unit-11: Money and its Financial applications</b>	
Number of Periods	7
Introduction	<ul style="list-style-type: none"> <li>Identifying various denominations of Rwandan currency.</li> <li>forming single budget</li> <li>Learn different ways of using money to meet their needs.</li> </ul>
Classroom Organisation	<ul style="list-style-type: none"> <li>Demonstration, Explanation</li> <li>Individual work as well as group work</li> <li>Observation</li> </ul>
Equipment Required	<ul style="list-style-type: none"> <li>Real money</li> <li>Pictures and drawings of Rwandan currency</li> <li>Empty tins, boxes</li> </ul>
Activities	<ul style="list-style-type: none"> <li>Identify different Rwandan coins and notes</li> <li>Group work: use of money in selling and purchasing of goods</li> <li>Making a budget</li> </ul>
Competences Practised	<ul style="list-style-type: none"> <li>Team work</li> <li>Group discussion</li> <li>Activities</li> </ul>
Language Practice	<ul style="list-style-type: none"> <li>Use of Rwandan currencies in buying and selling things</li> <li>Identifying profit and loss while buying and selling things</li> </ul>
Vocabulary Acquisition	<ul style="list-style-type: none"> <li>Currency, Coins, Notes, Buying, Selling, Budget</li> </ul>
Numeracy	<ul style="list-style-type: none"> <li>Planing according to needs and their wants</li> <li>Buying and selling</li> </ul>
Study Skills	<ul style="list-style-type: none"> <li>Organising information</li> <li>Budget making</li> <li>Able to buy and sell things</li> <li>Team work</li> </ul>
Revision	<ul style="list-style-type: none"> <li>Revision and assessment exercises provided</li> </ul>
Assessments	<ul style="list-style-type: none"> <li>Formative assessment based on different types of Rwandan currency, their use and needs.</li> </ul>
Learning Outcomes	<ul style="list-style-type: none"> <li>Understanding how to buy and sell things</li> <li>Understanding to make a budget</li> <li>Understanding profit and loss by buying and selling objects.</li> </ul>



<b>Unit-12: Number Patterns</b>	
Number of Periods	10
Introduction	<ul style="list-style-type: none"> <li>Introducing various number patterns of ascending order, descending order, arithmetic progression and geometric progression of numbers.</li> </ul>
Classroom Organisation	<ul style="list-style-type: none"> <li>Group work</li> <li>Individual work</li> <li>Black board approach</li> <li>Representing data in an organised sequence</li> </ul>
Equipment Required	<ul style="list-style-type: none"> <li>Scissors, Markers, Chart, Chalk, Pencil, Papers</li> <li>Various number patterns</li> </ul>
Activities	<ul style="list-style-type: none"> <li>Fill in the missing numbers in various number patterns.</li> <li>Group activity</li> </ul>
Competences Practised	<ul style="list-style-type: none"> <li>Arranging given numbers in increasing or decreasing order</li> <li>Fill missing numbers in number patterns</li> <li>Arithmetic progression</li> <li>Geometric progression</li> </ul>
Language Practice	<ul style="list-style-type: none"> <li>Understand and solve number patterns</li> </ul>
Vocabulary Acquisition	<ul style="list-style-type: none"> <li>Whole numbers, Ascending, Descending, Number order, Arithmetic, Geometric, Progression</li> </ul>
Numeracy	<ul style="list-style-type: none"> <li>Progression, Sequence</li> <li>Missing number in pattern</li> </ul>
Study Skills	<ul style="list-style-type: none"> <li>Work in group</li> <li>Completing missing number sequence</li> </ul>
Revision	<ul style="list-style-type: none"> <li>Revision and assessment exercises are provided.</li> </ul>
Assessments	<ul style="list-style-type: none"> <li>A formative assessment based on various number patterns.</li> </ul>
Learning Outcomes	<ul style="list-style-type: none"> <li>Understanding increasing and decreasing order of number pattern.</li> <li>Understanding missing number sequence.</li> </ul>

### **Unit-13: Filling in the missing numbers**

Number of Periods	7
Introduction	<ul style="list-style-type: none"><li>• Introducing Arithmagon</li></ul>
Classroom Organisation	<ul style="list-style-type: none"><li>• Whole class orientation</li><li>• Group work, Individual work</li></ul>
Equipment Required	<ul style="list-style-type: none"><li>• Text book, Coloured pencils, Geometry sets, Flash cards, Chalk board</li></ul>
Activities	<ul style="list-style-type: none"><li>• Divide learners in group and solve arithmagon by adding or subtracting numbers.</li></ul>
Competences Practised	<ul style="list-style-type: none"><li>• Fill in the missing numbers in arithmagon</li></ul>
Language Practice	<ul style="list-style-type: none"><li>• Solve an arithmagon</li></ul>
Vocabulary Acquisition	<ul style="list-style-type: none"><li>• Arithmagon, Missing number, Addition, Subtraction</li></ul>
Numeracy	<ul style="list-style-type: none"><li>• Explain the concept of arithmagon and its solution.</li></ul>
Study Skills	<ul style="list-style-type: none"><li>• Arithmagon (a polygon with number at its vertices), its importance.</li></ul>
Revision	<ul style="list-style-type: none"><li>• Revision and assessment exercises are given at the end.</li></ul>
Assessments	<ul style="list-style-type: none"><li>• Formative assessments by filling missing number in various arithmagons.</li></ul>
Learning Outcomes	<ul style="list-style-type: none"><li>• Understanding the concept of arithmagon.</li></ul>

<b>Unit-14: Types of Lines and Angles</b>	
Number of Periods	7
Introduction	Lines, types of lines, measurement of line segments, angles, types of angles, measurement of angles.
Classroom Organisation	<ul style="list-style-type: none"> <li>• Whole class orientation group work</li> <li>• Practical work</li> </ul>
Equipment Required	<ul style="list-style-type: none"> <li>• Complete geometry set, Protractor, Black board, Text book, Scale</li> </ul>
Activities	<ul style="list-style-type: none"> <li>• Draw line segment and measure its length (group work)</li> <li>• Measure angles, zero angle</li> <li>• Observe some objects near by you, which represent an angle</li> </ul>
Competences Practised	<ul style="list-style-type: none"> <li>• Learn types of lines</li> <li>• Learn types of angles</li> <li>• Measure line segments</li> <li>• Measure angles</li> </ul>
Language Practice	<ul style="list-style-type: none"> <li>• Angle, Line, Line segment, Complementary angle, Supplementary angle, Reflex angle</li> </ul>
Vocabulary Acquisition	<ul style="list-style-type: none"> <li>• Intersecting, Parallel, Perpendicular, Protractor, Scale, Reflex, Complementary, Supplementary</li> </ul>
Numeracy	<ul style="list-style-type: none"> <li>• Study types of lines</li> <li>• Measuring of line segment using ruler</li> <li>• Measuring angle using protractor</li> </ul>
Study Skills	<ul style="list-style-type: none"> <li>• Choosing all types of angles and measure them in the range from 0 to 130° to understand the concept.</li> </ul>
Revision	<ul style="list-style-type: none"> <li>• Revision exercises and assessment exercises are provided.</li> </ul>
Assessments	<ul style="list-style-type: none"> <li>• A formative assessment through activities and questions are provided.</li> </ul>
Learning Outcomes	<ul style="list-style-type: none"> <li>• Understanding lines, types of lines, measuring line segments.</li> <li>• Understanding angles, types of angles, measuring angles.</li> </ul>

## Unit-15: 2D shapes and their properties

Number of Periods	14
Introduction	<ul style="list-style-type: none"><li>• Introducing 2D shapes (triangle, quadrilaterals)</li><li>• Properties of 2D shapes</li><li>• Line symmetry</li><li>• Rotational symmetry</li></ul>
Classroom Organisation	<ul style="list-style-type: none"><li>• Whole class orientation group work, practical work</li></ul>
Equipment Required	<ul style="list-style-type: none"><li>• Pair of scissors, Geometry set, Text book, 2D shapes (sketch)</li></ul>
Activities	<ul style="list-style-type: none"><li>• Identify 2D shapes and write their names.</li><li>• Identify 10 objects from your surrounding.</li></ul>
Competences Practised	<ul style="list-style-type: none"><li>• Triangle and its properties</li><li>• Types of triangle in terms of sides and angles</li><li>• Quadrilateral</li><li>• Types of quadrilateral</li><li>• Rotational symmetry</li></ul>
Language Practice	<ul style="list-style-type: none"><li>• 2D shapes, Triangle, Vertex, Sides, Angles, Quadrilateral, Polygon, Lines of symmetry</li></ul>
Vocabulary Acquisition	<ul style="list-style-type: none"><li>• Equilateral, isosceles, scalene, acute, obtuse, bisect, perpendicular, rhombus, parallelogram, trapezium, symmetry.</li></ul>
Numeracy	<ul style="list-style-type: none"><li>• Triangles in terms of sides</li><li>• Triangle in terms of angles</li><li>• Types of quadrilateral and their properties</li><li>• Lines of symmetry</li><li>• Rotational symmetry</li></ul>
Study Skills	<ul style="list-style-type: none"><li>• Learn the properties of 2D shapes</li></ul>
Revision	<ul style="list-style-type: none"><li>• Revision and assessment exercises are provided</li></ul>
Assessments	A formative assessment make learners able to recognise and classify different types of shapes such as triangle, rectangle, square, rhombus and parallelogram.
Learning Outcomes	<ul style="list-style-type: none"><li>• Understanding triangle and its properties</li><li>• Understanding quadrilaterals and its properties</li><li>• Forming various 2D shapes such as, circle, square, rectangle, polygon, triangle, etc.</li><li>• Use of scissors and geometry set.</li></ul>

<b>Unit-16: Area and Perimeter of 2D shapes</b>	
Number of Periods	14
Introduction	Introducing the measurement of area and perimeter of 2D shapes
Classroom Organisation	<ul style="list-style-type: none"> <li>• Group work in calculating the area and perimeter of 2D shapes</li> <li>• Individual work</li> <li>• Practical approach</li> </ul>
Equipment Required	<ul style="list-style-type: none"> <li>• Complete geometry sets, text book, manilla paper, crayons, graph paper, scissors, flash cards</li> </ul>
Activities	<ul style="list-style-type: none"> <li>• Finding area of rectangle by counting number of square in the rectangle.</li> <li>• Finding area of triangle from a rectangle.</li> <li>• Finding area of parallelogram from rectangle.</li> </ul>
Competences Practised	<ul style="list-style-type: none"> <li>• Area of rectangle</li> <li>• Area of square</li> <li>• Area of parallelogram</li> <li>• Area of rhombus</li> <li>• Perimeter</li> </ul>
Language Practice	<ul style="list-style-type: none"> <li>• Square grid</li> <li>• Area of 2D shapes</li> <li>• Perimeter of 2D shapes</li> </ul>
Vocabulary Acquisition	<ul style="list-style-type: none"> <li>• Area, perimeter, diagonals, base, height, trapezium, square grid, irregular shapes</li> </ul>
Numeracy	<ul style="list-style-type: none"> <li>• Calculating area of triangle from rectangle</li> <li>• Calculating area of parallelogram from rectangle</li> <li>• Calculating perimeter of irregular polygons</li> </ul>
Study Skills	<ul style="list-style-type: none"> <li>• Choosing right questions, activities and examples to study the concept</li> </ul>
Revision	<ul style="list-style-type: none"> <li>• Revision exercises and assessment exercises are provided</li> </ul>
Assessments	<ul style="list-style-type: none"> <li>• A formative assessment through activities and exercises</li> </ul>
Learning Outcomes	<ul style="list-style-type: none"> <li>• Understanding the concept of finding area and perimeter of 2D shapes</li> </ul>

<b>Unit-17: Elementary Statistics</b>	
Number of Periods	14
Introduction	<ul style="list-style-type: none"> <li>• Introducing qualitative and quantitative data, bar graph</li> </ul>
Classroom Organisation	<ul style="list-style-type: none"> <li>• Practical approach</li> <li>• Individual work</li> <li>• Group work</li> </ul>
Equipment Required	<ul style="list-style-type: none"> <li>• Manilla charts, manilla paper, geometry set</li> </ul>
Activities	<ul style="list-style-type: none"> <li>• Representing data in a table</li> <li>• Find the greatest and least number of objects represented by data</li> <li>• Representing data in a bar graph</li> </ul>
Competences Practised	<ul style="list-style-type: none"> <li>• Qualitative and quantitative data</li> <li>• Presentation of data</li> <li>• Bar graph</li> </ul>
Language Practice	<ul style="list-style-type: none"> <li>• Data</li> <li>• Representing data in a table form and by a bar graph</li> <li>• Reading information from bar graph</li> </ul>
Vocabulary Acquisition	<ul style="list-style-type: none"> <li>• Data, table, bar graph, statistics, census, survey, interview</li> </ul>
Numeracy	<ul style="list-style-type: none"> <li>• Representing information through collected data in a table form and graphical form.</li> </ul>
Study Skills	<ul style="list-style-type: none"> <li>• Correct examples, questions and exercises for understanding the concept</li> </ul>
Revision	<ul style="list-style-type: none"> <li>• Revision and assessment exercises are provided</li> </ul>
Assessments	<ul style="list-style-type: none"> <li>• Formative assessment through group work, individual work and practical approach</li> </ul>
Learning Outcomes	<ul style="list-style-type: none"> <li>• Understanding representation of data in a table form and a graphical form.</li> </ul>

<b>Unit-18: Introduction to Probability</b>	
Number of Periods	7
Introduction	<ul style="list-style-type: none"> <li>• Introducing probability</li> <li>• Possibility of happening</li> <li>• An event</li> <li>• A chance</li> </ul>
Classroom Organisation	<ul style="list-style-type: none"> <li>• Group work, Individual work, Practical approach</li> </ul>
Equipment Required	<ul style="list-style-type: none"> <li>• Coin, die, geometry set, paper, pen</li> </ul>
Activities	<ul style="list-style-type: none"> <li>• Tossing a coin</li> <li>• Tossing three coins at once</li> <li>• Drawing a card from pack of playing cards</li> </ul>
Competences Practised	<ul style="list-style-type: none"> <li>• Fair and unfair event</li> <li>• Favourable outcomes in tossing a coin</li> </ul>
Language Practice	<ul style="list-style-type: none"> <li>• Possible outcomes in drawing a card from pack of cards.</li> <li>• Chance of winning in tossing a coin</li> </ul>
Vocabulary Acquisition	<ul style="list-style-type: none"> <li>• Coin, winning, chance, playing cards, die, heads, tails</li> </ul>
Numeracy	<ul style="list-style-type: none"> <li>• Learning the concept of probability through tossing a coin, cards, throwing a dice, snakes and ladders, bingo etc</li> </ul>
Study Skills	<ul style="list-style-type: none"> <li>• Activities are designed for understanding the concept</li> </ul>
Revision	<ul style="list-style-type: none"> <li>• Revision and assessment exercises are provided</li> </ul>
Assessments	<ul style="list-style-type: none"> <li>• Formative assessment through activities</li> </ul>
Learning Outcomes	<ul style="list-style-type: none"> <li>• Understanding the concept of probability at initial stage.</li> </ul>

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# 1 UNIT

## Mathematical Operations on Whole Numbers up to 100 000

### INTRODUCTION

Up to this level, many learners have heard people using different numbers in day to day activities such as in the taxi/bus, church/mosque, market etc. But many will have difficulty recognising very large numbers with many zeros.

### KEY UNIT COMPETENCE

By the end of this unit, a learner should be able to write, compare and calculate whole numbers up to 100 000.

### ATTITUDE AND VALUES

- develop personal confidence in the use of numbers.
- appreciate the importance of addition, subtraction, division and multiplication of numbers in real life.
- appreciate the need for manipulating numbers.

### REFERENCES

P4 Mathematics curriculum and Mathematics Pupil Book 4.

### LINKS TO OTHER SUBJECTS

Contribution to the use of spoken and written English when writing numbers in words.

### ASSESSMENT CRITERIA

The learner will be able to describe the concept of number system; natural numbers and whole numbers. He/she will be able to read and write number names. He/she can tell the place values of digits, compare numbers, add, subtract, multiply and divide numbers.

**Sub-unit 1** **Number System: Natural and Whole Numbers**

*Number of periods: 15*

*Total time for each period: 40 minutes*

**SPECIFIC OBJECTIVES**

By the end of this topic the learner will be able to understand the concept of number system, i.e. natural numbers and whole numbers.

**BACKGROUND KNOWLEDGE**

To perform well in this lesson learners must be able to:

- Differentiate between counting numbers and digits

**TEACHING METHODS**

- Demonstration method: Introduce the learners about the number system.
- Question Answer method: Ask the learners about natural and whole numbers.
- Group work: Guide the learners to do the activities in groups.

**VOCABULARY**

Natural numbers, whole numbers, number names, ascending, descending.

**MATERIALS REQUIRED**

Text Book, Manila paper, pencils, crayons, coloured pencils, geometry set, scissors, chalk, black board, flash cards, etc.

**PROCEDURE (Teaching Steps):**

**Step 1:** Give learners a few examples of 2-digit and 3-digit number.

**Step 2:** Guide the learners about the biggest and smallest number.

**Step 3:** Display charts showing examples of place value.

**Step 4:** Guide the learners to read and write number in words. For example:

92 246—Ninety-two thousand two hundred forty six.

**Activity 1.1 (Page No. 7)**

In this class activity '**given on page no. 7**', you will guide the learners to form numbers from five given digits.

## MATERIALS REQUIRED

Flash cards (manila paper), markers, a pair of scissor.

1. Prepare flash cards from the manila paper.
2. Give each learner a flash card.
3. Guide the learners in writing the numbers 5,2,4,1 and 3 on the flash cards.
4. Guide learners in using the flash cards to form a 5 digit number which begins with 5. This can be done by arranging the flash cards on the table to show different numbers.
5. Let learners form other numbers beginning with 5, 2, 4, 1 and 3.
6. Instruct learners to arrange the numbers formed in ascending order.

The smallest 5 digit number formed is 12 345.

The biggest 5 digit number formed is 54 321.

## Activity 1.2 (Page No. 8)

In this class activity, learners will play a game of matching numbers.

1. Divide your pupils into 2 groups : A and B.
2. Arrange the pupils in a straight line so that they sit facing each other. The pupils seated opposite to each other will compete against each other.
3. Instruct learners to write one large number in words and one large number in figures on the two manila cards.
4. Let learners take turns in playing the game by showing their opponents the numbers they have written on the cards. The opponent should say the number aloud or write the number on the blackboard. If the number on the flash card is in words, the opponent should write it in figures and if the number on the flash card is in figures, the opponent should write it in words. The teacher together with the rest of the pupils will act as judges.
5. Award 3 marks for the correct answer and 0 mark for the wrong answer.
6. Let learners participate in adding up the marks for the two groups and see which group wins.

## REMEDIAL EXERCISES

1. Write the following number in words:
 

(a) 251	(b) 1 201	(c) 600	(4) 1 100
(d) 170			

2. Write the following numbers in figures:
  - (a) Two hundred one.
  - (b) Fifty five.
  - (c) Eighty five.
  - (c) Nine hundred.
  - (d) Four.
3. Write a smallest 2- digit number formed from the digit 4, 1, 3, 2.
4. Find the largest 2-digit number that can be formed from the digit 1, 9, 8, 6
5. Arrange the following digit in ascending order. 9, 6, 4, 3, 1, 5, 7.

### ADDITIONAL NOTE

- Explain the number systems.
- Engage the learners to write the numbers from figures to words and from words in figures.
- If learners feel any problem, then guide them.
- Encourage the learners with special educational needs (SEN) to take active participation in this class activity.

## Sub-unit 2 Place Value of Whole Numbers

*Number of periods: 12*

*Total time for each period: 40 minutes*

### SPECIFIC OBJECTIVES

By the end of this topic the learners can understand the concept of place value and identify the place value of each digit in the given numeral.

### BACKGROUND KNOWLEDGE

To perform well in this lesson, learners must be able to:

- Define places in a number, i.e. Ones, tens, hundreds, etc.
- Use an abacus.
- Compare numbers

### TEACHING METHODS

- Demonstration method: Introduce the place value to learners.
- Question Answer: Ask the learners to calculate the place values.
- Group work: Make groups of 5 learners and conduct the activities.

### VOCABULARY

Digit, place value, expanded form, ones, tens, hundreds, thousands

### MATERIALS REQUIRED

Manila paper, pencils, crayons, coloured pencils, abacus, geometry set, scissors, chalk board, etc.

### PROCEDURE (Teaching Steps):

**Step 1:** Use pre prepared cards with numbers, demonstrate with the learners, the place value of the numbers on the cards.

**Step 2:** Guide the learners to identify the place value of each digit in the numeral.

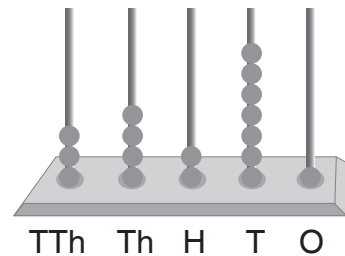
**Step 3:** Help the learners to compare number, i.e. less than or more than.

**Step 4:** Let learners expand a few numbers using place values.

### Activity 1.3 (Page No. 11)

In this class activity, guide the learners to get an abacus frame

1. Guide them to place 3 beads on the ten thousand's spike, 4 on the thousand's spike, 2 on the hundred's spike, 7 on the ten's spike and 1 on the one's spike.
2. Let them read the number they have formed.



### Activity 1.4 (Page No. 12)

1. In this class activity, guide the learners to make cards of the numbers such as 5 tens, 7 hundred,  $3 \times 1\,000$ ,  $5 \times 10$ , 3 ones, 3 thousand,  $7 \times 100$ .
2. After making the numbers, distribute the cards among 8 students in a group.
3. Let hem calculate the values of each card and pair themselves with the same value.

### Activity 1.5 (Page No. 13)

1. In this class activity, make a group of 5 learners.
2. Make 5 flash cards and distribute them among 5 pupils.
3. Guide the learners to write the biggest number they know.
4. Compare the numbers written on the flash card of all the learners in the group.

**THINK (Page 14, Mathematics Pupil Book 4)**

There is a three digit number. The second digit is four times as big as the third digit, while the first digit is three less than the second digit. What is the number?

**ANSWER**

The third digit can only be 1 or 2. This is because  $4 \times 1 = 4$  and  $4 \times 2 = 8$ . Otherwise, the product of  $4 \times 3$  is a 2 digit number. So, the second digit is 4 or 8. If the second digit is 4, then the first is 1 and if the second digit is 8 then the first digit is 5.

Therefore the numbers are 141 and 582.

**REMEDIAL EXERCISES**

1. Write the place value of the underlined digits in the given number.

(a) 1 3 9      (b) 9 9 9      (c) 1 0 4

2. Write in short form:

(a)  $200 + 90 + 1$       (b)  $60 + 7$

3. Write in expanded form:

(a) 905      (b) 645      (c) 91

4. Use the correct sign  $>$ ,  $<$  or  $=$

(a)  $8 \times 100$             721

(b) 53             $7 \times 1$

(c) 50             $50 \times 1$

5. Find the place value of each digit in the given number.

1 9 2

**ADDITIONAL NOTE**

- Explain the place value using the abacus.
- Encourage the learners to do the activities sincerely.
- Give chance to learners with special educational needs (SEN) to compare the numbers.

## Sub-unit 3 Addition, Subtraction, Multiplication, Division of Whole Numbers

*Number of periods: 13*

*Total time for each period: 40 minutes*

### **SPECIFIC OBJECTIVES**

By the end of this topic the learner should be able to do and perform addition and subtraction of whole numbers as well as multiplication and division of whole numbers by two digit number.

### **BACKGROUND KNOWLEDGE**

To understand this topic, learners must be able:

- To arrange numbers when adding numbers.
- To carry in addition.
- To borrow during subtraction.

### **TEACHING METHODS**

- Demonstration method: Introduce the concepts of addition, subtraction multiplication and division.
- Question Answer: Ask the learners to add or subtract the numbers.

### **VOCABULARY**

Addition, subtraction, multiplication and division

### **MATERIALS REQUIRED**

Pencils, crayons, black coloured pencils, geometry set, chalk, black-board, abacus, etc.

### **PROCEDURE (Teaching Steps):**

**Step 1:** Encourage learners to bring and use counters and form 4 and 5 digit numbers.

**Step 2:** Let them add and subtract.

**Step 3:** Encourage learners to form and read, and then solve the word problems carefully and correctly.

**Step 4:** Give learners more mental mathematics. Simple computation games may be of great help to enhance learning of multiplication and division.

**THINK (Page 17, Mathematics Pupil Book 4)**

Using only addition, how do you add eight 8s and get the number 1 000?

**ANSWER**

The largest 3 digit number consisting only 8 is 888.

Another 2 digit number consisting only 8 is 88.

So,  $888 + 88 = 976$ .

The answer is  $888 + 88 + 8 + 8 + 8 = 1000$ .

**Activity 1.6 (Page No. 18)**

For this class activity, take 2 groups of learners.

1. Take a box made up of tin.
2. Help them to count and put 256 beans in the box.
3. Remove 75 beans from the box.
4. Let them count the number of seeds remained in the box.

**SUGGESTED ANSWER OF ACTIVITY 1.6**

256 beans – 75 beans = 181 beans

**REMEDIAL EXERCISES**

1. Add the following:
 

(a) 201 and 50	(b) 950 and 5
----------------	---------------
2. Subtract the following:
 

(a) 1 120 – 15	(b) 300 – 2	(c) 1 500 – 50
----------------	-------------	----------------
3. Okello have 950 Frw and Agalli have 50 Frw. How much amount of money do both have?
4. There are total 20 classrooms in a school in Kigali. Each classroom have 10 tables. How many total tables are there in the school?
5. Work out the following:
 

(a) $900 \div 3$	(b) $92 \div 2$	(c) $1\,500 \div 5$
------------------	-----------------	---------------------

**ADDITIONAL NOTE**

- Addition, subtraction, multiplication and division must be done on the blackboard before working in student's notebooks.
- Give learners some problems to the learners to solve.



- Short easy problems to slow learners and SEN learners and guide them if they are unable to perform well.

## **ANSWERS OF EXERCISES**

### **EXERCISE 1.1**

- (a) 309, 319, 329, 339, 349, 359, 369, 379, 389  
 (b) 98  
 (c) 10

### **EXERCISE 1.2**

1. (a) One hundred eleven.  
 (b) One thousand eleven.  
 (c) Fifty-four thousand seven hundred.  
 (d) One thousand.  
 (e) Seventy-eight thousand nine hundred ninety-nine.  
 (f) Fifteen thousand.
2. (a) 19                                      (b) 90                                      (c) 99  
 (d) 999                                      (e) 501                                      (f) 3 001

### **EXERCISE 1.3**

1. 200      2. 400      3. 7 000      4. 20      5. 400      6. 4 000  
 7. 300      8. 7      9. 20

### **EXERCISE 1.4**

1. (a)  $4\ 624 = 4\ 000 + 600 + 20 + 4$   
 (b)  $984 = 900 + 80 + 4$   
 (c)  $44\ 484 = 40\ 000 + 4\ 000 + 400 + 80 + 4$   
 (d)  $93\ 428 = 90\ 000 + 3\ 000 + 400 + 20 + 8$   
 (e)  $76\ 709 = 70\ 000 + 6\ 000 + 700 + 00 + 9$
2. (a) 7 383      (b) 98 376      (c) 39 867

### **EXERCISE 1.5**

1. (a)  $2\ 000 < 20\ 000$       (b)  $3\ 214 < 3\ 241$       (c)  $99\ 999 > 9\ 999$   
 (d)  $70\ 001 < 71\ 000$       (e)  $624 < 642$       (f)  $881 > 818$   
 (g)  $440 > 404$
2. Bakure has more acres of land as  $120\ \text{acres} > 102\ \text{acres}$ .

**EXERCISE 1.6**

- (a) 4 759 = Four thousand seven hundred fifty-nine.  
(b) 9 759 = Nine thousand seven hundred fifty-nine.  
(c) 3 965 = Three thousand nine hundred sixty-five.  
(d) 1 009 = One thousand nine.
- (a) 460 (b) 53 796 (c) 21 459 (d) 770
- 10 500 Frw 4. 666 cars

**EXERCISE 1.7**

- (a) 85 738 (b) 1 000 (c) 11 353  
(d) 1 110 (e) 2 109
- (a) 12 507 mm (b) 44 063 mm  
(c) Ninety six thousand four hundred thirty-two.  
(d) Sum of the least and greatest amount of rainfall  
= 1 742 + 96 432 = 98 174 mm

**EXERCISE 1.8**

- (a) 4 789 (b) 23 262 (c) 70 000  
(d) 374 (e) 33 027 (f) 16 037  
(g) 16 090 (h) 53 457 (i) 64 787  
(j) 89 999
- 1001 Frw 3. 234 eggs 4. 1350 Frw
- 430 Frw 6. 5 7. 1037 km
- 11 167 males.
- (a) 55 328 Frw (b) 33 685 Frw
- 28 495 buildings

**EXERCISE 1.9**

1.

×	2	3	4	5	6	7	8	9	10	11	12	13
1	2	3	4	5	6	7	8	9	10	11	12	13
2	4	6	8	10	12	14	16	18	20	22	24	26
3	6	9	12	15	18	21	24	27	30	33	36	39
4	8	12	16	20	24	28	32	36	40	44	48	52
5	10	15	20	25	30	35	40	45	50	55	60	65
6	12	18	24	30	36	42	48	54	60	66	72	78
7	14	21	28	35	42	49	56	63	70	77	84	91
8	16	24	32	40	48	56	64	72	80	88	96	104
9	18	27	36	45	54	63	72	81	90	99	108	117
10	20	30	40	50	60	70	80	90	100	110	120	130
11	22	33	44	55	66	77	88	99	110	121	132	143
12	24	36	48	60	72	84	96	108	120	132	144	156

2.

$1 \times 25 = 25$	$1 \times 45 = 45$	$1 \times 5\,000 = 5\,000$	$200 \times 500 = 100\,000$
$2 \times 25 = 50$	$2 \times 45 = 90$	$15 \times 15 = 225$	$250 \times 250 = 62\,500$
$8 \times 25 = 200$	$8 \times 45 = 360$	$500 \times 50 = 25\,000$	$34 \times 50 = 1\,700$
$5 \times 15 = 75$	$80 \times 15 = 1\,200$	$100 \times 340 = 34\,000$	$50 \times 10 \times 10 = 5\,000$
$24 \times 10 = 240$	$150 \times 8 = 1\,200$	$480 \times 2 = 960$	$20 \times 3 \times 10 = 600$
$24 \times 15 = 360$	$1\,350 \times 4 = 5\,400$	$899 \times 3 = 2\,697$	$9\,000 \times 10 = 90\,000$
$12 \times 25 = 300$	$45 \times 2 \times 5 = 450$	$216 \times 4 = 864$	$5\,002 \times 2 = 10\,004$
$20 \times 30 = 600$	$2 \times 4 \times 60 = 480$	$278 \times 3 = 834$	$11 \times 1\,000 = 11\,000$

3. (a)  $164 \times 6 = 984$  (b)  $40 \times 9 = 360$   
 (c)  $78 \times 7 = 546$  (d)  $217 \times 5 = 1\,085$   
 (e)  $450 \times 5 = 2\,250$  (f)  $897 \times 5 = 4\,485$   
 (g)  $575 \times 3 = 1\,725$  (h)  $349 \times 8 = 2\,792$   
 (i)  $999 \times 9 = 8\,991$  (j)  $35 \times 21 = 735$   
 (k)  $34 \times 12 = 408$  (l)  $56 \times 23 = 1\,288$   
 (m)  $75 \times 25 = 1\,875$  (n)  $55 \times 60 = 3\,300$   
 (o)  $39 \times 13 = 507$

**EXERCISE 1.10**

1. 390 tiles      2. 280 students  
 3. 40 000 nails      4. 3 240 boxes of chalk  
 5.

Item	Price per unit	Quantity needed	Total cost for item
Chicken	\$ 40	10	\$ 400
Soda	\$ 65	15 crates	\$ 975
Wedding cake	\$ 305	1 piece	\$ 305
Wedding gown	\$ 850	2	\$ 1 700
Shoes	\$ 370	2 pairs	\$ 740

Total cost = \$ 400 + \$ 975 + \$ 305 + \$ 1 700 + \$ 740 = \$ 4 120

**EXERCISE 1.11**

1. (a) 2      (b) 45      (c) 30      (d) 150  
 (e) 84      (f) 453      (g) 321      (h) 851  
 (i) 453      (j) 23      (k) 23      (l) 630  
 2. (a) 68 bags      (b) 45 sweets      (c) 108 cows      (d) 100 schools

**ASSESSMENT EXERCISE**

1. 543 210

2. (a) 24 707

(b) 124 770

(c) 34 777

3. (a) 4 273

(b) 50 532

4. Uwimana Christa obtained the greatest number of votes.

5. (a) 137 giraffes and zebras

(b) 168 wild animals

6. (a)

	TH	H	T	O
	2	3	2	1
+	4	0	0	3
	6	3	2	4

(b)

	TH	H	T	O
	3	0	0	0
+	4	7	7	7
	7	7	7	7

(c)

	TH	H	T	O
	4	4	4	4
	2	2	1	3
+	3	3	4	2
	9	9	9	9

(d)

	TH	H	T	O
	2	0	1	1
	3	2	0	1
+	3	7	5	4
	8	9	6	6

7. (a) 24 750 Frw

(b) 64 765 Frw

(c) 74 100 Frw

8. 20 000 litres

9. 22 091

10. (a) 2 387

(b) 21 060

(c) 24 150

(d) 11 300

(e) 17 680

(f) 6 150

(g) 18 975

(h) 18 600

(i) 50 000

(j) 89 500

(k) 29 640

11. 660 eggs

12. (a) quotient = 9, remainder = 0

(b) quotient = 57, remainder = 3

(c) quotient = 1399, remainder = 10

(d) quotient = 339, remainder = 1

(e) quotient = 22, remainder = 0

(f) quotient = 125, remainder = 7

(g) quotient = 4238, remainder = 6

13. (a) 5 sweets

(b) 3 sweets

14. (a) 16 groups

(b) 3 students

**THINK ANSWER : 2.**

## 2 UNIT

# Positive and Negative Integers

### INTRODUCTION

In the previous unit, learners have learnt about numbers to carry out of addition and subtraction of numbers. These are called positive numbers.

In this topic we extend the number line to left hand side to introduce negative numbers called negative integers. The number line will be used to compare, add and subtract integers.

### KEY UNIT COMPETENCE

A learner should be able to solve problems related to comparing, ordering and finding distance between negative and positive integers.

### ATTITUDES AND VALUES

Appreciate the importance of using positive and negative numbers in practical contexts.

### LINKS TO OTHER SUBJECTS

**Science and Geography:** context of negative numbers in terms of temperature in different locations of the world.

### REFERENCES

P4 Mathematics curriculum and Mathematics Pupil Book 4.

### ASSESSMENT CRITERIA

The learners can carry out the addition and subtraction of number. He/She can compare/add/subtract the integers.

## Sub-unit 1 Integer: Positive and Negative Integers

*Number of periods: 9*

*Total time for each period: 40 minutes*

### SPECIFIC OBJECTIVES

By the end of this topic, the learners will be able to draw number lines, identify

positive and negative integers. Use  $=$ ,  $>$ ,  $<$  to compare integers, add and subtract integers, solves simple word problems involving integers.

### BACKGROUND KNOWLEDGE

To perform well in this topic, learners must be able to:

- Describe the role of integers
- Differentiate between of negative and positive integers.

### TEACHING METHODS

- Demonstration method: Introduce integers using real life examples as temperature, profit, loss etc.
- Question Answer: Ask the learners to write the statements in terms of integers.
- Group work: Make groups of 5 learners to do the given activities.

### VOCABULARY

Integers, number line, positive, negative integers.

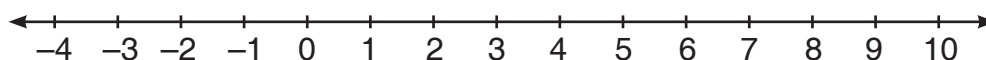
### MATERIALS REQUIRED

Manila paper, pencils, crayons, coloured pencils, geometry set, flash cards, scissors, chalk, black-board, etc.

### PROCEDURE (Teaching Steps):

**Step 1:** Begin with the set of counting numbers (1, 2, 3, 4, 5, 6, 7 ...)

**Step 2:** Show the set of integers on the number line. The arrow head shows that the integers do not end.



**Step 3:** Positive integers are found on the right side of zero on the number line and negative integers are found on the left side of zero on the number line.

### Activity 2.1 (Page No. 31)

In this class activity, you will guide the learners to understand positive and real numbers and situations under which they are used.

Explain the key words: forward and backward, promotion and demotion, rising and falling, profit and loss and let learners relate them to positive and negative numbers.

In this class activity you will discuss positive and negative numbers with your group members. You should discuss positive and negative numbers in relation to the following:

- (a) Falling into a hole gives negative number and climbing a tree gives positive number 0 is at the surface where the tree is fixed.
- (b) Profit shown by positive number and loss is shown by negative number in business.
- (c) Sinking in to water shows negative number and rising above water shows positive number.
- (d) Promotion is shown by positive number and demotion is shown by negative number at work place.
- (e) Moving forward is positive number and reverse is negative number in driving.

### Activity 2.2 (Page No. 34)

In this activity, your learners will learn how to locate the positions of positive and negative numbers on the number line.

**Learning aids:** Long string (about 10 m), cotton thread, Manila paper of different colours (red, green and yellow), a pair of scissor, two 6 inch nails, hammer, large cardboard box and a black marker pen.

- (i) Using a hammer, fix two nails in the opposite walls of the classroom.
- (ii) Make loops on the string and tie the string on the nails across the classroom.
- (iii) Cut about 10 pieces of red manila papers, 10 pieces of green Manila papers and 1 of yellow Manila paper (each paper should be about 15cm by 15cm.)
- (iv) The teacher will guide you to write integers from -10 to +10 on the 21 pieces of manila papers. The red papers should be used for negatives, yellow for zero and green for positives.
- (v) Place all the cards in the box.
- (vi) Each pupil picks a cardboard from the box at random, make a small hole in the paper and ties it with about 30 cm of cotton thread.
- (vii) The pupils will stand in groups according to the colour of papers they have picked. There is only one pupil with a yellow paper on which 0 is written.

- (viii) The pupil with the yellow paper ties his/her paper to hang exactly in the middle of the string.
- (ix) The other pupils also hang their papers on the correct side of the yellow paper and at the correct positions.

### Activity 2.3 (Page No. 34)

In this class activity, your learners will play a game that will enable them to locate integers on a number line and also know how to find the distance between two integers.

**Learning aids:** Large play area, strings, flash cards, markers.

Take the students to a large play area such as a field or school playground.

Guide the students through the following instructions:

- (i) Using dry sand, ash or any suitable material, draw a number line on the ground and mark integers on it so that each pupil has a point to stand on the number line. The distance between the integers can be about 60cm.
- (ii) Write negative integers on the red papers, 0 on the yellow paper and positive on the green papers.
- (iii) Pick the papers at random and tie a loop on the paper so that you are able to wear it around your neck.
- (iv) Move to the position on the number line which has the same number on your card.
- (v) During this activity, your name is the number that you are wearing on your neck.
- (vi) Listen carefully as the teacher calls your "name" and follow the instructions well.
- (vii) Everyone should be able to know how far he/she has moved and in which direction (positive or negative) he/she has moved.

### REMEDIAL EXERCISES

1. Show these expressions using integers:
  - (a) A pupil got no marks in a Maths test \_\_\_\_\_.
  - (b) A stone is dropped into a pit which is 10 m deep \_\_\_\_\_.
  - (c) A book seller made a loss of 50 Frw \_\_\_\_\_.
2. Name the inverse of the following integers.
  - (a)  $-250$       (b)  $+45$



3. Find the distance between
  - (a)  $+ 2$  and  $+ 3$
  - (b)  $- 8$  and  $- 2$
  - (c)  $+ 9$  and  $+ 5$
4. Draw a number line and mark all the integers from  $-5$  and  $+5$ .
5. Which integer is 5 steps to the left of 1?

### ADDITIONAL NOTE

- Explain integers by giving real life examples.
- Explain the opposite or inverse of integers by using number lines.
- Care for slow learners and guide them.
- Check the active participation of the SEN learners in this class activity.

## Sub-unit 2 Comparing and Ordering Integers

*Number of periods: 5*

*Total time for each period: 40 minutes*

### SPECIFIC OBJECTIVES

By the end of this topic, the learner will be able to compare integers and arrange them in ascending or descending orders.

### BACKGROUND KNOWLEDGE

To perform well in this topic, learners must be able to:

- Compare numbers.
- Differentiate between ascending and descending order.

### TEACHING METHODS

- Demonstration method: Demonstrate the method of comparing and ordering integers.
- Question answer: Ask the learners to compare few positive integers.
- Explain how to compare and order integers.
- Group work: Make groups of learners and ask them to conduct the activities.
- Observe and assess the learners.

### VOCABULARY

Compare, less, more, equal, ascending, descending.

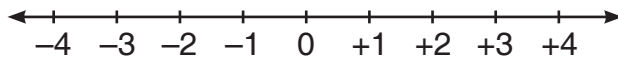
### MATERIALS REQUIRED

Manila paper, pencils, crayons/ coloured pencils, geometry set, scissors, chalk, black-board, etc.

**PROCEDURE (Teaching Steps):**

**Step 1:** Guide learners to compare integers using appropriate signs: < (less than), > (greater than), = (equal to) signs.

**Step 2:** Guide them that they can use the number line to compare the integers.



**Step 3:** Tell learners that the numbers on the left side of the other number is always less than the one on the right side or a number line.

**Step 4:** Let the learners arrange the following integers in ascending and descending order, eg. 8, 6, 1, 0, -2, 8, -6.

Ascending order - 8, -6, -2, 0, 1, 6, 8.

Descending order 8, 6, 1, 0, -2, -6, -8.

**REMEDIAL EXERCISES**

- Show these expression using integers:
  - 5 metres above the ground.
  - 2 steps backward.
- Arrange these integers from biggest to smallest (descending order).  
-26, +5, +45, 0, 2, -21, 1.
- Arrange these integers from smallest to biggest (ascending order).  
+3, +5, -8, -1, 2
- Which integer is smaller in 0 and -5?
- Which integer is greater in +3 and -9?

**ADDITIONAL NOTE**

- Guide learners to compare integers using a number line.
- They can also order integers using a number line.
- Explain the concept of ascending and descending order.
- Slow and SEN learners should be particularly helped.

**ANSWERS OF EXERCISES****EXERCISE 2.1**

- (a) 0                      (b) +2 points      (c) +10 m  
(d) -2 m                  (e) +2 000 Frw    (f) -300 Frw

**EXERCISE 2.2**

1. (a) + 8                      (b) - 5                      (c) - 5                      (d) - 9                      (e) + 12  
 3. (a) -12                      (b) - 45                      (c) + 34  
     (d) + 20                      (e) + 240                      (f) + 500

**EXERCISE 2.3**

- (a) 3 points to the right side of zero.  
 (b) 3 points to the left side of zero.  
 (c) Initially 2 points to the right side of zero then 2 points to the left of 0.  
 (d) Initially 1 point to the left of zero then 1 point to the right of 0.

**ASSESSMENT EXERCISE**

1. (a) -3 m                      (b) +5 steps                      (c) -10 steps  
 2. (a) +5 890                      (b) -100 000                      (c) +20 000  
 3. (a) Initially 3 points to the right of zero then 1 point to the left of 0.  
     (b) Initially 2 points to the left of zero then 10 points to the right of 0.  
     (c) Initially 10 points to the left of zero then 10 points to the right of 0.  
     (d) Initially 10 points to the left of zero then 4 points to the right of -10.  
         We reach at - 6, distance between - 10 and - 6 is 4 (units).  
 4. +310, +301, +31, +13, +4, 0, -3, -7, -13, -31, -301  
 5. -8, -5, 0, 1, 2, 3, 5, 6, 8

**THINK!!! (Page 37, Mathematics Pupil Book 4)**



A chameleon wants to move from point A to point B, 10 metres apart. It walks in a very funny way such that within 1 minute, it moves 3 metres forward followed by 1 metre backward. How long does the chameleon take to complete its journey to point B?

**ANSWER**

The chameleon takes 5 minutes.

# 3 UNIT

## Classifying Numbers by their Properties

### INTRODUCTION

This unit deals with counting, reading and writing whole numbers, odd and even numbers.

### KEY UNIT COMPETENCE

A learner should be able to classify numbers and appreciate that one number may belong to various families of numbers.

### ATTITUDE AND VALUES

Appreciate the importance of using square roots, being cooperative and displaying a teamwork spirit.

### REFERENCES

P4 Mathematics curriculum and Mathematics Pupil Book 4

#### Additional References

1. Visit [http://www.softschools.com/math/games/odd\\_even\\_game.jsp](http://www.softschools.com/math/games/odd_even_game.jsp)
2. This link enables you to access online games on odd and even numbers.
3. <http://www.math-play.com/Factors-and-Multiples-Jeopardy/Factors-and-Multiples-Jeopardy.html>
4. Visit <https://www.superteacherworksheets.com/least-common-multiple.htm>

### ASSESSMENT CRITERIA

The learner can distinguish and identify odd and even numbers, can find the square root, and L.C.M. (Lowest Common factor) of any numbers.

### Sub-unit 1 Classifying Numbers

*Number of periods: 10*

*Total time for each period: 40 minutes*

### SPECIFIC OBJECTIVES

By the end of this topic, the learner will be able to distinguish whole numbers

from and natural numbers, even and odd numbers and to find square roots of a number. He/She will also be able to find the L.C.M of any number.

## BACKGROUND KNOWLEDGE

To perform well in this topic, learners must be able to:

- Distinguish counting numbers from digits
- Use and interpret the concept of 0

## TEACHING METHODS

- Demonstration method: Introduce natural numbers, whole numbers, odd numbers, even numbers, etc.
- Question answer method: Ask the question to find prime numbers.
- Explain about prime and composite numbers.
- Group work: Make groups of learners and conduct the activities.

## VOCABULARY

Whole numbers, natural numbers, odd numbers, prime numbers, square numbers etc.

## MATERIALS REQUIRED

Manila paper, pencils, crayons, coloured pencils, geometry set, scissors, chalk, black-board, etc.

## PROCEDURE (Teaching steps):

**Step 1:** Guide the learners about the concept of whole numbers 0, 1, 2, 3 ...

**Step 2:** Let them distinguish and classify the odd and even numbers,  
eg. 2, 3, 4, 5, 6 ...

**Step 3:** Explain the concept of square roots of the numbers to the learners,  
eg.  $\sqrt{4} = 2$ ,  $\sqrt{16} = 4$ ,  $\sqrt{25} = 5$

**Step 4:** Guide the learners about the difference between prime and composite numbers.

**Step 5:** Explain the concept of L.C.M. (Lowest common factor) and let them find the L.C.M of various numbers such as 3, 6, 9, 12, ...

## Activity 3.1 (Page No. 39)

**Learning aids:** Flash cards or Manila papers and a pair of scissors, markers, ash or sand or ribbon.

In this class activity, your pupils are going to play a game which will help them to learn how to classify numbers as whole, natural, odd and even numbers. The

activity can be best done outside the class room such as in the field. Draw a long visible line on the pitch. You can use any suitable material for marking the line including ash, sand, paper, tape, ribbon etc.

1. Prepare flash cards enough for every learner in your class.
2. Write different numbers on the flash cards, with one flash card having only one number written on it. Make sure some of the numbers are square, eg. 1, 4, 6, 8, 64, 100,....., whole numbers, eg. 0, 2, 7, 9, 24, 123,...odd numbers, eg. 1, 3,7,11,39,109,....., and even numbers like 2,4 6,20,48,...
3. Distribute the flash cards to the learners such that each learner gets one.
4. Let learners stand away from the line and tell them that you will call out a group of numbers. If your number belongs to that group of numbers, you will run and stand on the line. If the group of numbers to which your number belongs has not been called, you do not run to the line.
5. Call out loudly a group of numbers, eg. shout “even numbers”. Observe learners running to the line. Check the numbers on their flash cards and verify that they belong to even numbers.
6. Tell learners to go back to the rest. Shout another group of numbers, for example square numbers and repeat the process as you assess learners' progress.

### **THINK!!! (Page 39, Mathematics Pupil Book 4)**

I am an odd number. Take away one letter and I become even. What number am I?

### **ANSWER**

I am “seven”. When “s” is removed from me, I become “even”!.

### **Activity 3.2 (Page No. 40)**

Instruct learners to work together in groups and list all the square numbers between 0 and 410.

Encourage learners to use their multiplication tables.

### **SUGGESTED ANSWERS OF CLASS ACTIVITY 3.2**

1,4,9,16,25,36,49,64,81,100,121,144,169,196,225,256,289,324,361,400.

### **Activity 3.3 (Page No. 41)**

Arrange your learners in groups of 4. Instruct them to list all the prime numbers between 100 and 150.

### **SUGGESTED ANSWERS OF CLASS ACTIVITY 3.3**

101, 103, 107, 109, 113, 127, 131, 137, 139, 143, 149.

For struggling learners, identify them and instruct them to write down all the prime numbers less than 30.

**Activity 3.4 (Page No. 42)**

In this class activity, instruct the learner to work together in groups. Let them write numbers between 1 and 30.

**MIND GAME**

**ANSWER** 2,  $22 = 2 \times 2 = 4$

**SUGGESTED ANSWERS OF CLASS ACTIVITY 3.4**

(2)	3	(4)	(5)	6	(7)	(8)	9	(10)	
(11)	12	(13)	(14)	15	(16)	(17)	18	(19)	(20)
21	(22)	(23)	24	(25)	(26)	27	(28)	(29)	

**REMEDIAL EXERCISES**

- List all the even numbers from 0 to 50.
- Find the square root of the following numbers:
  - $\sqrt{49}$
  - $\sqrt{36}$
- Find first 5 multiples of the following numbers:
  - 2
  - 5
- Find the L.C.M. of the following numbers:
  - 5 and 10
  - 20 and 40
- Find the H.C.F. of the following numbers:
  - 2 and 10
  - 12 and 6

**ADDITIONAL NOTE**

- Help learners identify different types of numbers and their differences.
- Help learners to discover the method of finding the prime and composite number from 1 to 100.
- The learners should be taught in a friendly manner.
- Give homework to calculate the LCM of numbers.
- Encourage the learners to complete the activity before the enabled learners.

**ANSWERS OF EXERCISES**

**EXERCISE 3.1**

- 1, 3, 5, 7, 9, 11, 13, 15, 17, 19, 21, 23, 25, 27, 29, 31, 33, 35, 37, 39, 41, 43, 45, 47, 49, 51, 53, 55, 57, 59, 61, 63, 65, 67, 69, 71, 73, 75, 77, 79, 81, 83, 85, 87, 89, 91, 93, 95, 97, 99.
- 0, 2, 4, 6, 8, 10, 12, 14, 16, 18, 20, 22, 24, 26, 28, 30, 32, 34, 36, 38, 40, 42, 44, 46, 48, 50, 52, 54, 56, 58, 60, 62, 64, 66, 68, 70, 72, 74, 76, 78, 80, 82, 84, 86, 88, 90, 92, 94, 96, 98, 100.

**EXERCISE 3.2**

- (a) 1      (b) 4      (c) 7      (d) 9      (e) 8      (f) 10  
 (g) 8      (h) 5

**EXERCISE 3.3**

1	2	3	4	5	6	7	8	9	10
2	4	6	8	10	12	14	16	18	20
3	6	9	12	15	18	21	24	27	30
4	8	12	16	20	24	28	32	36	40
5	10	15	20	25	30	35	40	45	50
6	12	18	24	30	36	42	48	54	60
7	14	21	28	35	42	49	56	63	70
8	16	24	32	40	48	56	64	72	80
9	18	27	36	45	54	63	72	81	90
10	20	30	40	50	60	70	80	90	100

**EXERCISE 3.4**

- 2                      2. 2
- 3                      4. 4, 6, 8, 9, 10, 12, 14, 15, 16, 18

**EXERCISE 3.5**

- (a) 4, 8, 12, 16, 20, 24, 28, 32, 36, 40  
 (b) 6, 12, 18, 24, 30, 36, 42, 48, 54, 60  
 (c) 7, 14, 21, 28, 35, 42, 49, 56, 63, 70  
 (d) 8, 16, 24, 32, 40, 48, 56, 64, 72, 80  
 (e) 9, 18, 27, 36, 45, 54, 63, 72, 81, 90  
 (f) 11, 22, 33, 44, 55, 66, 77, 88, 99, 110  
 (g) 12, 24, 36, 48, 60, 72, 84, 96, 108, 120

**EXERCISE 3.6**

- (a) 1, 2, 4, 8  
 (b) 1, 2, 3, 4, 6, 12  
 (c) 1, 2, 3, 4, 6, 12, 24



- (d) 1, 2, 3, 4, 6, 9, 12, 18, 36
  - (e) 1, 2, 3, 4, 6, 8, 12, 16, 24, 48
  - (f) 1, 2, 4, 8, 16, 32, 64
  - (g) 1, 3, 5, 9, 15, 45
  - (h) 1, 23
  - (i) 1, 2, 3, 4, 6, 8, 12, 16, 24, 32, 48, 96
  - (j) 1, 2, 4, 5, 10, 20, 25, 50, 100
2. 10

**ASSESSMENT EXERCISE**

1. (a) 6      (b) 8      (c) 10      (d) 3
2. 3, 6, 9, 12, 15  
 6, 12, 18, 24, 30  
 5, 10, 15, 20, 25  
 9, 18, 27, 36, 45  
 10, 20, 30, 40, 50
3. Prime numbers – 2, 3, 5, 7, 11, 13, 17, 19, 23, 29  
 (a) No square number                      (b) no composite numbers
4. H.C.F.  
 (a) 2      (b) 1      (c) 3      (d) 2      (e) 2      (f) 23  
 L.C.M.  
 (a) 4      (b) 20      (c) 6      (d) 20      (e) 84      (f) 46

# 4 UNIT

## Fractions of the same Denominator

### INTRODUCTION

This unit deals with the basic concepts involved in fraction as well as addition, subtraction, multiplication and division of fractions.

### KEY UNIT COMPETENCE

By the end of this unit, a learner should be able to explain the fractions, add and subtract same denominator fractions, multiply and divide fractions accurately.

### ATTITUDE AND VALUES

Appreciate the importance of accuracy in carrying out operations on fractions and develop the spirit of sharing with others.

### REFERENCES

P4 Mathematics curriculum and Mathematics Pupil Book 4.

#### Additional references:

For more online support visit: [www.maths-play.com/fraction](http://www.maths-play.com/fraction).

### LINKS TO OTHER SUBJECTS

**Geography:** representation of fractions when calculating scales of maps.

### ASSESSMENT CRITERIA

The learner should be able to identify and draw the different types of fraction.

### Sub-unit 1 Addition, Subtraction of Fraction with the same denominator

*Number of periods: 16*

*Total time for each period: 40 minutes*

### SPECIFIC OBJECTIVES

By the end of this topic the learner will be able to read and write fractions as well as to add and subtract fractions with the same denominators.

## BACKGROUND KNOWLEDGE

To perform in this topic, learners should be able to:

- define a fraction
- distinguish numerator from the denominator
- To use  $<$ ,  $>$  and  $=$  sign appropriately while comparing fractions.

## TEACHING METHODS

- Demonstration method: Introduce the fractions with same denominators.
- Question answer method: Ask the questions to check the previous knowledge of learners.
- Help learners discover the process of adding or subtracting fractions.
- Engage the learners in group activities on addition and subtracting fraction.
- Note down the final outputs of the learners.

## VOCABULARY

Fraction, numerator, denominator

## MATERIALS REQUIRED

Manila paper, pencils, crayons/ coloured pencils, geometry set, pair of scissors, chalk, Black-board, etc.

## PROCEDURE (Teaching Steps):

**Step 1:** Guide learners to read and write different types of fractions.

**Step 2:** Guide the learners to add, subtract the fraction with the same denominators.

**Step 3:** Help them to multiply the fractions by natural numbers.

**Step 4:** Let learners learn with real objects in order to notice that when half orange is divided further in 2 parts: Each part will be  $\frac{1}{2} + \frac{1}{2}$ .

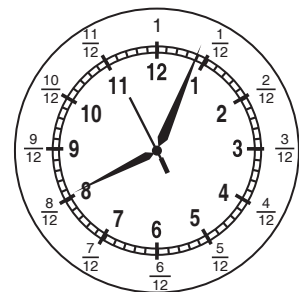
**Step 5:** Lead learners to solve various word problems involving addition and subtraction of fractions.

### Activity 4.1 (Page No. 47)

In this class activity, you will put your learners in groups of 4 and instruct them to identify the fractions shown on the clock face.

The fractions shown are

$$\frac{1}{12}, \frac{2}{12}, \frac{3}{12}, \frac{4}{12}, \frac{5}{12}, \frac{6}{12}, \frac{7}{12}, \frac{8}{12}, \frac{9}{12}, \frac{10}{12}, \frac{11}{12}$$



**Activity 4.2 (Page No. 47)**

Tell your learners to copy and complete the table provided in the pupil's book in their own exercise books. You should encourage them to work in groups and discuss possible answers.

Mark the answers and record the marks for their assessment.

**SUGGESTED ANSWERS OF ACTIVITY 4.2**

Numerator	One	Two	Three	Four	Five	Ninety	One hundred and twenty one	Seventy nine	Nine
Denominator	Three	Five	Seventy	Five	Three	Forty three	One hundred and twenty two	Seventy nine	Ninety nine
Fraction	$\frac{1}{3}$	$\frac{2}{5}$	$\frac{3}{70}$	$\frac{4}{5}$	$\frac{5}{3}$	$\frac{90}{43}$	$\frac{121}{122}$	$\frac{79}{79}$	$\frac{9}{99}$

**THINK!!! (Page 48, Mathematics Pupil Book 4)**

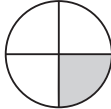
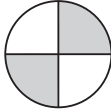
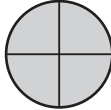
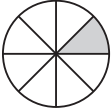
A farmer has a bag of popcorn, a hen and a fox. He wants to cross a river in a boat. The boat can only take him and only one of the three items he has. The problem is that the hen can eat popcorn and the fox can eat the hen. How does he cross the river without anything getting eaten up?

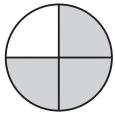
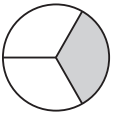
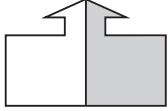
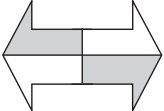
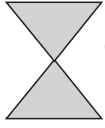
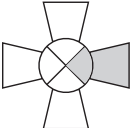
**ANSWER**

The farmer crosses the river with the hen, leaving the fox and popcorn on one side. He leaves the hen there and crosses back. He takes the fox across the river and comes back with the hen. He leaves the hen on this side and takes the popcorn to the other side where there is a fox. He leaves the fox and popcorn on the other side, crosses the river to take the hen. He crosses the river with the hen to join the fox and popcorn on the other side of the river!!!

**Activity 4.3 (Page No. 48)**

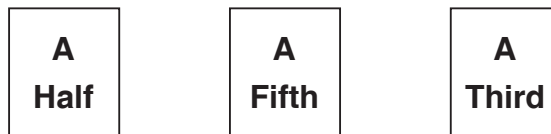
Ensure that your learners have coloured pencils or crayons. Instruct them to shade the following parts shown:

 (Colour 1 part): $\frac{1}{4}$	 (Colour any 2 parts): $\frac{2}{4}$
 (Colour all the 4 parts): $\frac{4}{4}$	 (Colour 1 part only): $\frac{1}{8}$

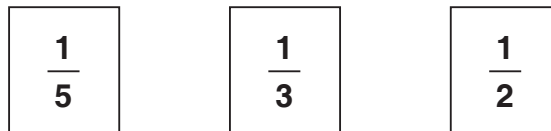
 (Colour 3 parts): $\frac{3}{4}$	 (Colour only 1 part): $\frac{1}{3}$
 (Colour 1 part): $\frac{1}{2}$	 (Colour any 2 parts): $\frac{2}{4}$
 (Colour the whole figure): $\frac{2}{2}$	 (Colour 1 of the 4 parts): $\frac{1}{4}$

**Activity 4.4 (Page No. 49)**

- (a) In this class activity, guide the learners to work in groups of 6 learners.  
 (b) Three of them will write a half, a fifth and a third on their respective cards as shown below.



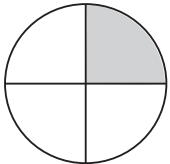
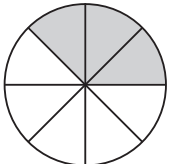
- (c) Remaining three will write  $\frac{1}{2}$ ,  $\frac{1}{5}$  and  $\frac{1}{3}$  on their respective cards as shown below.

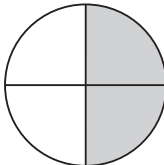
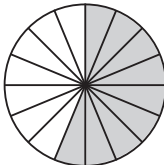
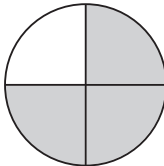
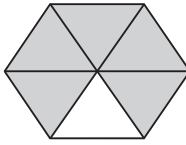


- (d) Now, guide them to make pairs of similar values of cards.  
 (e) Help the learners to check their result.

**Activity 4.5 (Page No. 49)**

Ensure that the learners have coloured pencils or crayons. Instruct them to shade the following parts.

 (Shade 1 sector red)  One quarter shaded.	 (Shade 3 sectors blue)  Three eighth shaded.
---	--

 <p>(Shade 2 sectors green)</p> <p>Two quarters shaded.</p>	 <p>(Shade 9 sectors yellow)</p> <p>Nine-sixteenth shaded.</p>
 <p>(Shade 3 sectors black)</p> <p>Three quarters shaded.</p>	 <p>(Shade 5 triangles)</p> <p>Five-sixths shaded.</p>

### Activity 4.6 (Page No. 50)

**Learning aids:** Kitchen knife, oranges, tray, clean water.

In this class activity, the learners will cut an orange to show how fractions arise. Tell them to cut the orange into two halves. Let them divide each half so that they now have four parts. Each part is a quarter.

Ask them to count the number of slices. They should obtain 4 slices. Using the slices, let them show the fractions  $\frac{1}{4}$ ,  $\frac{2}{4}$ ,  $\frac{3}{4}$ , and  $\frac{4}{4}$ .

### SUGGESTED ANSWERS OF ACTIVITY 4.6

(c) The fraction representing all the slices is  $\frac{4}{4}$ .

(e)

Group	A	B	C
Fraction	$\frac{1}{4}$	$\frac{2}{4}$	$\frac{1}{4}$

(f) Group B has the greatest number of slices.

(g) Groups A and C have only 1 slice each.

(h)  $\frac{2}{4}$  is bigger than  $\frac{1}{4}$  because  $\frac{2}{4}$  has 2 slices out of 4 while  $\frac{1}{4}$  has only 1 slice out of 4.

### Activity 4.7 (Page No. 51)

Let the learners compare the fractions by using the symbols “less than”  $<$ , “greater than”  $>$  or “equal to”  $=$ . Mark the answers and record the marks for assessment of learners’ progress. You may give them more exercises on comparing fractions of the same denominators.

**SUGGESTED ANSWERS OF ACTIVITY 4.7**

- a. >      b. >      c. >      d. =      e. <      f. >  
 g. >      h. <      i. >      j. <      k. <      l. <  
 m. <      n. <      o. >      p. <

**Activity 4.8 (Page No. 53)**

**Learning aids:** Manila paper, a pair of compass, pencil, marker, 3 small boxes (empty chalk boxes), pair of scissors.

In this class activity, the learners will learn and prove that  $\frac{1}{4} + \frac{2}{4} = \frac{3}{4}$ . Guide the learners into the class activity by telling them to follow the following instructions:

- (a) Draw a circle of radius 10 cm on a manila paper.
- (b) Mark the centre of the circle using letter O.
- (c) Draw two lines through the centre of the circle to divide the circle into four equal parts. Each of these parts is called a sector.
- (d) Label the three boxes A, B and C.
- (e) Cut out the outline of the circle along the lines drawn.
- (f) What fraction does each sector represent? (Expected answer is  $\frac{1}{4}$ .)
- (g) In box A put one sector, put two sectors in B and one sector in C.
- (h) What fraction is represented by the sectors in boxes A, B and C?  
(Answer: A =  $\frac{1}{4}$ , B =  $\frac{2}{4}$ , C =  $\frac{1}{4}$ )
- (i) Pick the sectors in box A and box B. Add them together. What total fraction do you get? (Answer:  $\frac{3}{4}$ )
- (j) Add the sectors in A and C together. What fraction do you get?  
(Answer:  $\frac{2}{4}$  or  $\frac{1}{2}$ )
- (k) Is  $\frac{1}{4} + \frac{2}{4} = \frac{3}{4}$ ? Is  $\frac{1}{4} + \frac{1}{4} = \frac{2}{4}$ ? (Answer: Yes)

After completing the class activity above, ask learners to add:  $\frac{1}{2} + \frac{1}{2} + \frac{1}{2}$  and let them show that this equals  $\frac{3}{2}$  or  $1\frac{1}{2}$ .

**THINK!!! (Page 54, Mathematics Pupil's Book 4)**

Both sons got equal number of apples.

**Activity 4.9 (Page No. 54)**

**Learning aids:** Manila paper, pair of compass, pencil, marker, 3 small boxes (empty chalk boxes), pair of scissors.

In this class activity,

guide the learners to show that  $\frac{3}{4} - \frac{1}{4} = \frac{2}{4}$ .

Give them the following instructions:

- (a) Draw a circle of radius 10 cm on a manila paper.
- (b) Mark the centre of the circle using letter O.
- (c) Draw two lines through the centre of the circle to divide the circle into four equal parts. Each of these parts is called a sector.
- (d) Label the two boxes A and B.
- (e) Cut out the outline of the circle along the lines drawn.
- (f) What fraction does each sector represent? (Answer:  $\frac{1}{4}$ )
- (g) In box A, put 3 sectors and put 1 sector in box B.
- (h) What fraction is represented by the sectors in boxes A and B? (fraction in A =  $\frac{3}{4}$  and in B =  $\frac{1}{4}$ ).
- (i) Pick 1 sector from box A. Does this represent  $\frac{3}{4} - \frac{1}{4}$ ? (Explain why the answer is yes)
- (j) If yes, what fraction is represented by the sectors left in box A? (Expected answer is  $\frac{2}{4}$ . Explain to the learners why the answer is  $\frac{2}{4}$ )
- (k) Is  $\frac{3}{4} - \frac{1}{4} = \frac{2}{4}$ ? (Yes)



### REMEDIAL EXERCISES

- Find the numerator of the following numbers.  
 (a)  $\frac{1}{17}$       (b)  $\frac{5}{21}$       (c)  $\frac{3}{38}$       (d)  $\frac{15}{11}$
- Find the denominator of the following numbers.  
 (a)  $\frac{7}{11}$       (b)  $\frac{1}{9}$       (c)  $\frac{2}{3}$       (d)  $\frac{6}{9}$
- Which one is smaller?  
 (a)  $\frac{1}{2}$  or  $\frac{3}{2}$       (b)  $\frac{1}{9}$  or  $\frac{3}{9}$
- Which one is greater?  
 (a)  $\frac{5}{9}$  or  $\frac{2}{9}$       (b)  $\frac{10}{11}$  or  $\frac{5}{11}$
- Add the following:  
 (a)  $\frac{1}{4} + \frac{2}{4}$       (b)  $\frac{3}{9} + \frac{1}{9}$       (c)  $\frac{1}{3} + \frac{2}{3}$
- Subtract the following:  
 (a)  $\frac{9}{6} - \frac{3}{6}$       (b)  $\frac{6}{7} - \frac{3}{7}$       (c)  $\frac{5}{10} - \frac{2}{10}$

### ADDITIONAL NOTE

- Illustrate the fraction by using the figures.
- Help learners understand the concept of numerator and denominator.
- Teach the comparison of fraction by using figures.
- Addition and subtraction of fractions can be applied in solving problems from real life situations.
- Involve learners with special educational needs (SEN) and encourage them.

## Sub-unit 2 Multiplication and Division of fraction by whole Numbers

Number of periods: 10

Total time for each period: 40 minutes

### SPECIFIC OBJECTIVES

By the end of this topic, the learner will be able to apply multiplication and division of fraction by a whole number in solving real life problems.

**BACKGROUND KNOWLEDGE**

To perform well in this topic, learners should be able to:

- multiply 2 numbers
- Divide a number by a whole number
- Illustrate the concept of multiplication and division

**TEACHING METHODS**

- Demonstration method: Demonstrate the multiplication and division of fractions by whole numbers.
- Ask the learners few questions to check their previous knowledge.
- Help learners how to multiply and divide the fractions by whole numbers.
- Provide group activities to learners.

**VOCABULARY**

Fractions, numerator, denominator.

**MATERIALS REQUIRED**

Manila paper, pencils, crayons, coloured pencils, geometry set, scissors, chalk, board, etc.

**PROCEDURE (Teaching steps):**

**Step 1:** Provide learners with opportunity to do more examples using practical approach.

**Step 2:** Through this, learners will develop the concept of multiplication of a common fraction by a common fraction.

**Step 3:** Guide learners to solve word problems involving multiplication and division of fraction.

**Step 4:** Let learners read the problems, interpret and workout with the teacher's guidance on multiplication and division of fraction by whole numbers.

**Activity 4.10 (Page No. 56)**

In this activity make a group of 4 learners. Ask them to collect 8 bottle tops.

- Help them to arrange in 4 equal groups.
- Guide them to calculate one quarter of eight =  $\frac{1}{4} \times 8 = 2$

**REMEDIAL EXERCISES**

1. Find the value of  $\frac{1}{2} \times \frac{4}{1}$ .
2. Work out for the following:
  - (a)  $\frac{2}{3} \div 3$     (b)  $\frac{3}{5} \div 3$
3. Divide  $\frac{8}{2}$  by 8.
4. Find the product of  $\frac{2}{4}$  and  $\frac{4}{4}$ .
5. In a class of twenty students, two-third are girls. Find the number of girls.

**ADDITIONAL NOTE**

- Use addition fact to illustrate the multiplication of a fraction by a whole number.
- Division of fractions can be taught using real life situations.
- Help learners discover that division is the opposite process of multiplication.

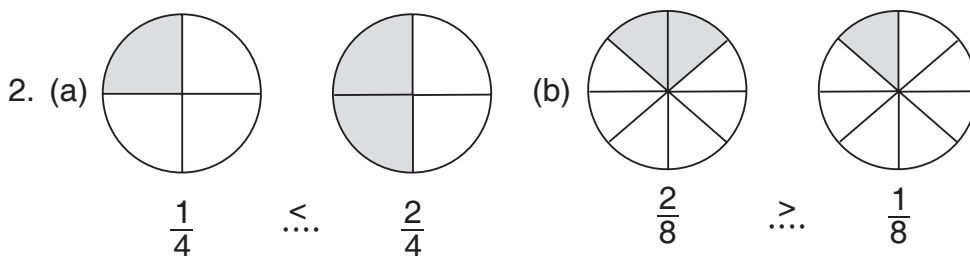
**ANSWERS OF EXERCISES**

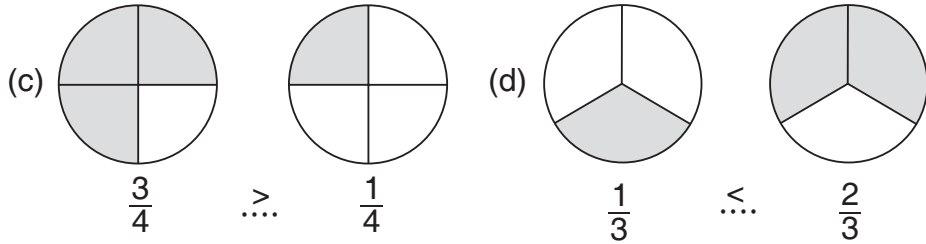
**EXERCISE 4.1**

1. numerator, denominator
2. denominator, numerator
3. denominator, numerator

**EXERCISE 4.2**

1. (a) is greater than            (b) is less than            (c) is greater than  
 (d) is greater than            (e) is less than            (f) is greater than  
 (g) is greater than            (h) is less than            (i) is less than  
 (j) is greater than            (k) is less than            (l) is greater than





**EXERCISE 4.3**

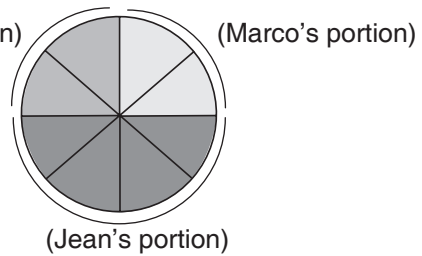
- (a)  $\frac{3}{4}$  (b)  $\frac{6}{7}$  (c)  $\frac{7}{12}$  (d)  $\frac{5}{9}$  (e)  $\frac{3}{10}$  (f)  $\frac{4}{5}$   
 (g)  $\frac{8}{9}$  (h)  $\frac{7}{10}$

**EXERCISE 4.4**

- (a)  $\frac{3}{6}$  (b)  $\frac{7}{10}$  (c)  $\frac{1}{4}$  (d)  $\frac{1}{3}$  (e)  $\frac{10}{40}$  (f)  $\frac{1}{12}$

**EXERCISE 4.5**

- (a)  $\frac{1}{4}$  (b)  $\frac{1}{3}$  (c)  $\frac{2}{8}$  (Bella's Portion) (d)  $\frac{5}{5}$



**EXERCISE 4.6**

- (a)  $\frac{40}{10}$  (b)  $\frac{10}{3}$  (c)  $\frac{30}{5}$  (d)  $\frac{108}{10}$  (e)  $\frac{2}{2}$  (f)  $\frac{5}{2}$

**EXERCISE 4.7**

1. (a)  $\frac{1}{12}$  (b)  $\frac{2}{9}$  (c)  $\frac{4}{35}$  (d)  $\frac{2}{35}$  (e)  $\frac{3}{16}$  (f)  $\frac{20}{55}$   
 (g)  $\frac{3}{24}$  (h)  $\frac{24}{45}$  (i)  $\frac{42}{84}$  (j)  $\frac{2}{27}$

**EXERCISE 4.8**

- (a)  $\frac{1}{42}$  (b)  $\frac{2}{21}$  (c)  $\frac{1}{54}$  (d)  $\frac{4}{10}$  (e)  $\frac{8}{18}$  (f)  $\frac{1}{40}$   
 (g)  $\frac{2}{15}$

**ASSESSMENT EXERCISE**

1. (i)  $\frac{1}{2}$       (ii)  $\frac{2}{4}$       (iii)  $\frac{2}{4}$       (iv)  $\frac{3}{7}$       (v)  $\frac{3}{6}$       (vi)  $\frac{2}{4}$

(vii)  $\frac{5}{10}$       (viii)  $\frac{4}{8}$       (ix)  $\frac{3}{4}$       (x)  $\frac{3}{3}$

2. denominator, numerator

3. denominator, numerator

4. (a)  $\frac{4}{8}, \frac{3}{8}, \frac{1}{8}$       (b)  $\frac{5}{9}, \frac{4}{9}, \frac{2}{9}$

(c)  $\frac{6}{12}, \frac{5}{12}, \frac{1}{12}$       (d)  $\frac{7}{10}, \frac{5}{10}, \frac{3}{10}$

5. (a)  $\frac{7}{10}$       (b)  $\frac{4}{5}$       (c)  $\frac{5}{9}$       (d)  $\frac{40}{4}$

6. (a)  $\frac{3}{5}$       (b)  $\frac{1}{7}$       (c)  $\frac{2}{15}$       (d)  $\frac{5}{125}$

7.  $\frac{20}{24}$       8.  $\frac{4}{5}$

9. (a)  $\frac{15}{4}$       (b)  $\frac{3}{8}$       (c)  $\frac{9}{2}$       (d)  $\frac{8}{4}$

10.  $\frac{8}{45}$       11.  $\frac{26}{60}$       12.  $\frac{52}{100}$       13.  $\frac{24}{36}$       14.  $\frac{56}{7}$       15.  $\frac{9}{33}$

16. (a)  $\frac{3}{112}$       (b)  $\frac{45}{400}$       (c)  $\frac{65}{2\,000\,000}$

17.  $\frac{1}{5}$       18.  $\frac{1}{4}$       19. 20      20. 10 000      21.  $\frac{9}{18}$

22. (a) 50 000 Frw      (b)  $\frac{1}{5}$       (c) 50 000 Frw

23.  $\frac{2}{8}$       24. 10 000 Frw      25. 5 minutes      26. 10 litres

# 5 UNIT

## Decimal Fractions/Numbers

### INTRODUCTION

This unit deals with the decimal point which is used to separate the ones place from the tens place in decimal.

### KEY UNIT COMPETENCE

A learner should be able to add, subtract and compare decimal numbers using place values of decimals up to 2 decimal places.

### ATTITUDES AND VALUES

Develop personal confidence in the use of decimal numbers and appreciate the importance of decimal fractions in comparing and sharing.

### REFERENCES

P4 Mathematics curriculum and P4 Mathematics Pupil Book.

#### Additional references

For more online support visit [www.funbrain.com](http://www.funbrain.com)

### LINKS TO OTHER SUBJECTS

Science; air components, mass of an atom, History; decimals are linked to time line, Geography; decimals are used in scales.

### ASSESSMENT CRITERIA

By the end of this unit, the learner can add, subtract and compare decimal numbers.

### Sub-unit 1

### Comparing Decimal, Place Value of Decimal Fraction

*Number of periods: 9*

*Total time for each period: 40 minutes*

### SPECIFIC OBJECTIVES

By the end of this topic, the learner will be able to understand and use the concept of decimals.

## BACKGROUND KNOWLEDGE

To perform well in this topic, learners should be able to:

- Recognise the concept of decimal point.
- Establish the relationship between decimals and fractions.

## TEACHING METHODS

- Demonstration method: Demonstrate fractions initially then relate it to decimals.
- Ask learners to convert fractions into decimals.
- Guide learners to convert from fractions to decimals and vice-versa
- Provide group activities to learners.
- Note down the outcome of learners by assessing them.

## VOCABULARY

Fraction, decimal, compare

## MATERIALS REQUIRED

Manila paper, pencils, crayons, coloured pencils, geometry set, scissors, chalk, black-board, etc.

## PROCEDURE (Teaching Steps):

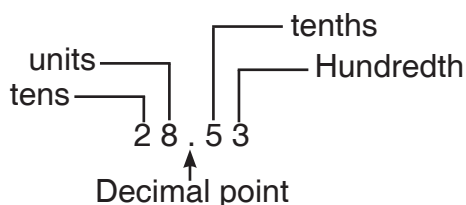
**Step 1:** Guide the learners to identify place value of digits of decimals upto hundredth while emphasizing the correct pronunciation and spelling of the place value names.

**Step 2:** Ask learners to discuss the place value of decimals.

**Step 3:** Let learners draw lines, represent various decimals on the number line and compare them.

**Step 4:** In groups, let the learners draw a number line. Give some decimal numbers and ask them to estimate the position of these decimal numbers on the number line.

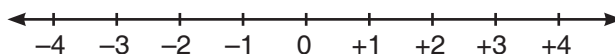
For example:



### Activity 5.1 (Page No. 64)

Let learners draw a horizontal line of 12 cm using a ruler and a pencil, and guide

them to show the following numbers on the number line.  $-4, -3, -2, -1, 0, +1, +2, +3, +4$ .



### Activity 5.2 (Page No. 65)

Guide your learners through this class activity.

1. Divide the following number by 10:

14

Let learners discover that  $14 \div 10 = 1.4$ . It is greater than 1 but less than 2. Explain the idea of 'zooming in' to learners. When we zoom in to a number line between any two integers, we create 10 equal sized intervals. Nine new numbers are created as a result. If we zoom into the number line between 2 and 3, we create nine more numbers namely 2.1, 2.2, 2.3, 2.4, 2.5, 2.6, 2.7, 2.8 and 2.9. If we zoom into the space between 2.4 and 2.5, we create nine new numbers namely; 2.41, 2.42, 2.43, 2.44, 2.45, 2.46, 2.47, 2.48 and 2.49.

2. What number is exactly;
  - Between 0 and 100?
  - Between 0 and 10
  - Between 0 and 1

### SUGGESTED ANSWERS OF ACTIVITY 5.2

1. • 140
  - 14
  - 1.4
  - 0.14
2. • 50
  - 5
  - 0.5

### Activity 5.3 (Page No. 66)

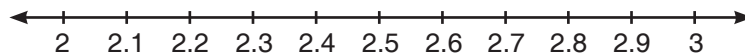
**Learning aids:** Ruler, pencil, rubber, chalk, black-board, geometrical instruments, laboratory metre rule.

- (i) Ensure that all the learners have a ruler in their hands. Show them that the space between 0 cm and 1cm is graduated into 10 equal parts called



graduations. Each graduation =  $\frac{1}{10}$  cm = 0.1 cm. Draw a horizontal line on the chalkboard and divide it into 10 equal graduations, explaining clearly to learners how it is done. Now guide learners through the class activity by giving them the following instructions:

- (i) Draw a horizontal line of about 10 cm on your book using a ruler and sharp pencil.
- (ii) Mark the start of the line with the decimal number 2.0.
- (iii) Mark the end of the line with the decimal number 3.0.
- (iv) Mark the line drawn into 10 equal parts, each 1cm long.
- (v) Show the decimal numbers 2.1, 2.2, 2.3, 2.4, 2.5, 2.6, 2.7, 2.8 and 2.9 on the number line.



For the struggling learners, you may consider doing the activity together with them on a plain paper and then asking them to transfer the diagram into their exercise books.

While learners are doing the activity, walk among the learners and offer help to those who may be getting difficulty.

### REMEDIAL EXERCISES

1. Write the places of the underlined digits.
  - (a) 8.20                      (b) 2.2                      (c) 13.56
2. Write the decimal number in words.
  - (a) 92.7                      (b) 17.46                      (c) 11.2
3. Add 5.2 and 3.5.
4. Write the following decimal numbers in figures:
  - (a) Ten point two                      (b) Twenty one point six.
5. Show the following on the number line: 0.1, 0.2, 0.3, 0.4, 0.5

### ADDITIONAL NOTE

- Tell the learners to relate between fractions and decimals.
- Explain the place values of decimals using tenths, hundredths etc.
- Explain the comparison of decimals by making them as like decimals.
- Guide the weak and SEN learners.

**Sub-unit 2 Addition and Subtraction of Decimals**

*Number of periods: 6*

*Total time for each period: 40 minutes*

**SPECIFIC OBJECTIVES**

By the end of this topic, the learners will be able to compare decimals as well as add or subtract decimal numbers.

**BACKGROUND KNOWLEDGE**

To perform well in this topic, learners should be able:

- To arrange the decimals when adding
- To arrange the decimals when subtracting
- Use the concept of carrying and borrowing during addition or subtraction

**TEACHING METHODS**

- Demonstration method: Introduce the addition and subtraction of simple numbers initially then move to decimals.
- Ask the learners to arrange decimals before addition or subtraction.
- Illustrate addition and subtraction of decimals by worked examples

**VOCABULARY**

Addition, subtraction decimals, fraction.

**MATERIALS REQUIRED**

Manila paper, pencils, crayons, coloured pencils, geometry set, scissors, chalk board, etc.

**PROCEDURE (Teaching steps):**

**Step 1:** A quick review of addition of decimals emphasizing proper arrangement of digits according to their place values.

**Step 2:** Display problem involving addition of decimals.

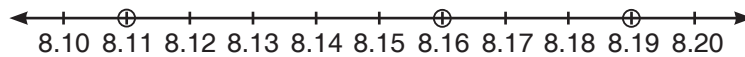
**Step 3:** Guide the learner by using relevant examples to show that subtraction of whole numbers is actually similar to the subtraction of decimals.

**Activity 5.4 (Page No. 66)**

In this class activity your learners will locate the positions of the following decimal numbers on the number line: 8.11, 8.16 and 8.19. Guide your learners through the class activity, attending to the details of each learner's graduations of the number line.

**Learning aid:** Learner's geometry set, chalk board geometry set. Direct the learners to follow the following procedure:

- Draw a horizontal line on your book using a sharp pencil. Length of the line should be 10 cm.
- Mark the line at intervals of 1cm so that the line has 10 equal parts.
- Write the decimal number 8.10 on the first mark and the decimal number 8.20 on the last mark.
- Carefully study the number line you have drawn and write the correct decimal numbers on the marks drawn.
- Show the positions of the decimal numbers 8.11, 8.16 and 8.19.
- Present your work to the teacher for evaluation.



### Activity 5.5 (Page No. 67)

- In this class activity, take the students to the playground and make a group of 4 students.
- Take two students (name them A and B) and make them stand to the right of a tree and two students (C and D) stand to the left of the tree.
- Consider tree as 'O'.
- Guide the students to mention their place (as on number line).

### Activity 5.6 (Page No. 70)

In this class activity '**given on page no. 70**', learners will find any two decimal numbers which add up to the given whole number. You may need to remind learners about the division of whole numbers by 10. Remind them that  $23 \div 10 = 2.3$ ,  $204 \div 10 = 20.4$ . Show them that since  $25 + 75 = 100$ , then  $2.5 + 7.5 = 10$ . This can be obtained by dividing every term by 10. In a similar way,  $0.25 + 0.75 = 1$ ,  $8.6 + 1.4 = 10$  etc.

### SUGGESTED ANSWERS OF ACTIVITY 5.6

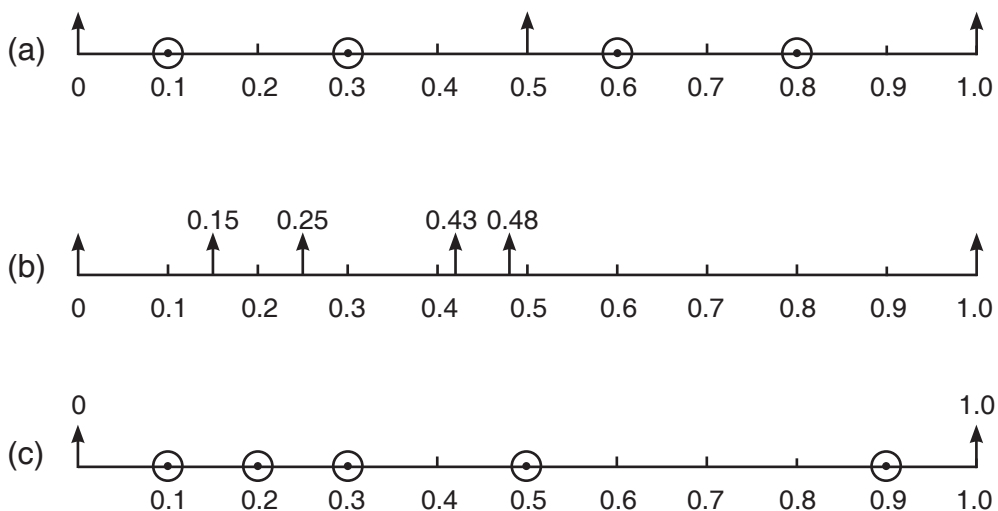
- (a) Find any 3 pairs of decimal numbers which add up to 10.  
 =  $6.50 + 3.50$ ;  $7.35 + 2.65$ ;  $5.25 + 4.75$
- (b) Find any 3 pairs of decimal numbers which add up to 1  
 =  $0.59 + 0.49$ ;  $0.45 + 0.55$ ;  $0.15 + 0.85$

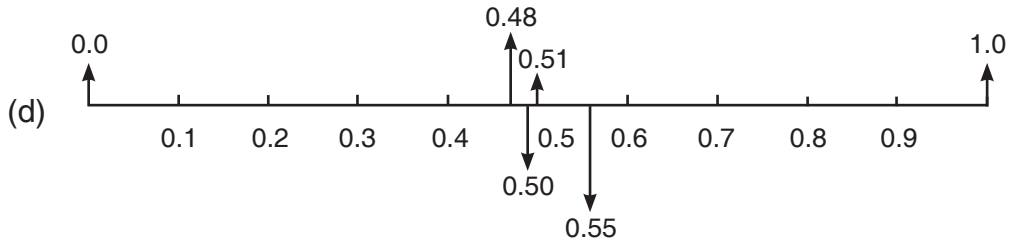
**REMEDIAL EXERCISES**

- Compare 7.2 and 9.7, which one is greater?
- Add the following:
  - 5.31 and 2.18
  - 7.71 and 0.23
- Subtract the following:
  - $2.25 - 1.25$
  - $15.5 - 10.5$
- Arrange the following decimal numbers from the smallest to largest.  
5.0, 4.5, 6.5, 8.0, 4.1
- Arrange the following decimal numbers from the largest to smallest.  
8.20, 1.5, 3, 6, 2.5

**ADDITIONAL NOTE**

- Explain how to place the decimals while adding.
- Explain their digits with same places should be aligned.
- Tell the learners that we can make decimals as like decimal to add or subtract.
- Ensure that the learners with special educational needs (SEN) are taking part in this activity.

**ANSWERS OF EXERCISES****EXERCISE 5.1**



**EXERCISE 5.2**

1. (a) 87.09 — Eighty-seven point zero nine.  
 (b) 12.2 — Twelve point two.  
 (c) 0.003 — Zero point three.  
 (d) 23.56 — Twenty-three point five six.  
 (e) 19.19 — Nineteen point one nine.  
 (f) 0.10 — Zero point one zero.  
 (g) 45.45 — Forty-five point four five.
2. (a) 144.7      (b) 12.12      (c) 7.7      (d) 80.71

**EXERCISE 5.3**

1. (a) 3.42, 3.5, 3.57, 3.62, 3.7, 3.79  
 (b) 5.4, 5.64, 5.7, 5.72, 5.79, 5.8  
 (c) 4.3, 4.7, 4.75, 4.8, 4.9, 5.0  
 (d) 1.02, 1.1, 1.12, 1.66, 1.7, 1.71  
 (e) 2.49, 2.5, 2.52, 2.8, 3.1, 3.48
2. (a)  $8.43 > 8.1 > 7.97 > 7.92 > 7.9 > 7.89$   
 (b)  $7.32 > 7.23 > 7.02 > 6.92 > 6.8 > 6.59$   
 (c)  $2.63 > 2.36 > 2.10 > 2.01 > 1.7 > 1.4$   
 (d)  $3.8 > 3.4 > 3.34 > 2.9 > 2.77 > 2.75$   
 (e)  $7.4 > 7.04 > 6.4 > 4.7 > 4.6 > 4.06$

**EXERCISE 5.4**

- |           |           |           |           |
|-----------|-----------|-----------|-----------|
| (a) 9.4   | (b) 6.4   | (c) 46.6  | (d) 60.23 |
| (e) 25.98 | (f) 800.2 | (g) 10    | (h) 4.2   |
| (i) 2     | (j) 80    | (k) 14.54 | (l) 14.55 |
| (m) 46.6  | (n) 7.1   | (o) 71.9  |           |

**ASSESSMENT EXERCISE**

- (a) 399.99      (b) 1070.70
- (a) >      (b) >      (c) >      (d) <  
 (e) =      (f) <      (g) =      (h) <  
 (i) >      (j) <      (k) >      (l) <  
 (m) <      (n) >      (o) =      (p) <  
 (q) <      (r) <      (s) >      (t) <
- (a) 163.3      (b) 3.0      (c) 30.1      (d) 72  
 (e) 8      (f) 79.8      (g) 50
- 4 km      5. 151.9 kg      6. 9.20 a.m.
- 17.9 km, 9.5 km
- (a) John, has taken least time  
 (b) Abdul, has taken more time  
 (c) 7.02 seconds
- (a) 46.46      (b) 55.55      (c) 9.09
- 3.9
- (a) 40.5 years      (b) 64 years
- 8:30 a.m.

# Length Measurement

## INTRODUCTION

This topic deals with the measurement of length of various objects, estimation of length in cm to mm, conversion from cm to mm and vice-versa. Calculation of area and perimeter of regions using grids and formula.

## KEY UNIT COMPETENCE

A learner should be able to define the length, convert between units of length and apply them in solving mathematical problems related to daily life situations.

## ATTITUDES AND VALUES

Learners should appreciate the importance of metric measures in daily life and recognise the importance of using length measuring tools correctly.

## REFERENCES

P4 Mathematics curriculum and P4 Mathematics Pupil Book

### Additional references

For more online support visit [www.kidsnumbers.com](http://www.kidsnumbers.com)

## LINKS TO OTHER SUBJECTS

Social Studies: Measurement of the distances between places on the map scale.

## ASSESSMENT CRITERIA

The learner can recognise and use standard instruments and units for measuring length i.e. metres, centimetres etc.

## Sub-unit 1 Measurement of Length and its Conversion Addition and Subtraction of Length

*Number of periods: 11*

*Total time for each period: 40 minutes*

### SPECIFIC OBJECTIVES

By the end of this topic the learner should be able to estimate and measure the length of various objects.

### BACKGROUND KNOWLEDGE

To perform well in this topic, learners should be able to:

- Give the role of measurement of length?
- Differentiate standard from non-standard units of measurement.
- Discover the relationship between units of length.

### TEACHING METHODS

- Demonstration method: Introduce the units of length and their conversion.
- Ask the learners to convert from one unit to another unit.
- Help learners to draw and use the conversion table for units of length in addition and subtraction of lengths.
- Observe the progress of the learners.

### VOCABULARY

Length, Breadth, Width, Ruler, Tape measure, Yard-stick, Micrometer, Screw gauge, Hand span, Plan, Digit, Cubit, Pace, Foot span, Arm-span

### MATERIALS REQUIRED

Manila paper, pencils, crayons, coloured pencils, geometry set, scissors, chalk, graph paper, black-board, etc.

### PROCEDURE (Teaching Steps):

**Step 1:** Guide learners to measure lengths using objects.

**Step 2:** Let them mention the objects they use to measure length.

**Step 3:** Let them mention the parts of the human body such as handspan, palm, pace, footspan, armspan, etc. Which is used as the first unit to measure length.

**Step 4:** Introduce the units commonly used in measuring length, i.e. km, m, cm, mm etc.

**Step 5:** Engage learners in using a meter ruler and a tape measure when



measuring.

**Step 6:** Let them first estimate the unknown length before measuring.

**Step 7:** Introduce the conversion in cm and mm using the pupil's rulers.

**Step 8:** Let them study the 'cm' and 'mm' on their rulers and find out their relationship.

**Step 9:** Introduce the concept of multiplication and division when finding their relationship and insist on the use of conversion table.

### Activity 6.1 (Page No. 76)

In this class activity your learners will design a stick of length 1 metre and should be able to use it to estimate distances.

#### Learning aids:

Wooden sticks (eg. from a local carpentry), tape measure/metre rule, geometry set, markers, long string (about 5 to 10 m long). If you cannot provide strings for everyone, you may provide just two strings for each group.

Ask each learner to carry the activity below:

- Stand straight up on the floor.
- Place the metre rule near your foot so that it is parallel to the side of your body.
- Mark a point on your body where the end of the metre rule touches.
- Now you have your own metre rule and be sure to tell the length of 1 metre!
- Cut the stick provided so that its length is 1m. Using a marker and a ruler, you should graduate your metre rule into 10 equal parts and mark 0 cm, 10 cm, 20 cm, 30 cm, 40 cm, 50 cm, 60 cm, 70 cm, 80 cm, 90 cm and 100 cm.
- How many times does your foot fit equals to a metre?
- You can now use your foot to measure the length of a classroom.
- Use the stick metre rule you have just made to measure the length of the string provided.
- Use the string to estimate different distances eg. length of your classroom, width of the football field, distance between your classroom to the office etc.

### Activity 6.2 (Page No. 77)

In this class activity, your learners will learn how to estimate distances using their arm's length. Ask the learners to follow the following instructions carefully.

- Hold the metre rule as shown in the diagram in the pupil's book. The zero

mark of the metre rule must be at the tip of your finger and the metre rule should run across the chest.

- Mark a point on your arm/chest where the end of the metre rule touches.
- This is the length of 1m. Now you have your own metre rule!!
- You can now use it to measure the length of your table!
- While at home, you can try to measure/estimate the height of a table, your brother, your sister, your parents/guardians, length of your bed etc.

### Activity 6.3 (Page No. 79)

**Learning aids:** Your learners need a metre rule and a flat horizontal table.

This class activity will help your learners understand the units smaller than a metre, eg. decimetre, centimetre, and millimetre. At the end of this activity, they should be able to estimate small distances in dm, cm and mm.

Ask them to go through the Class Activity in groups of 2 to 4 learners depending on the availability of metre rules.

- Place the metre rule on your work table or desk.
- Identify the 0 cm and the 100 cm marks on the metre rule.
- Confirm that the metre rule is divided into 10 equal parts. How many decimetres make up a metre? ( $10 \text{ dm} = 1 \text{ m}$ )
- Look closely at 1dm. You should be able to see that 1 dm is divided into 10 equal parts. Each part is a centimetre (cm). How many cm make up 1 dm? ( $10 \text{ cm} = 1 \text{ dm}$ )
- Look closely at 1 cm. You should be able to see that 1cm is divided into 10 equal parts. Each of these is called a millimetre (mm). How many mm make up a cm? ( $10 \text{ mm} = 1 \text{ cm}$ ).
- Now measure the length of your longest finger. Record your answer in dm, cm and mm.

### Activity 6.4 (Page No. 79)

Guide the learners to observe and estimate the length of the following objects:

#### SUGGESTED ANSWERS OF ACTIVITY 6.4

- Length of a wooden block = 3 m approx.
- Height of a refrigerator = 1.5 m approx.
- Length of a carpet = 2 m approx.

#### REMEDIAL EXERCISES

1. Check and write the heights/lengths (in cm/m) of the following objects:

- (a) Height of bucket (b) Length of table of your classroom  
 (c) Height of bed.
2. Convert the following units using a table for conversion.  
 (a) 2 km into metre. (b) 10 cm into millimetre.
3. Add the following:  
 (a) 3 km + 5 km (b) 16 m + 10 m
4. Work out for the following:  
 (a)  $20 \text{ km} + 1\,000 \text{ m} = \underline{\hspace{2cm}} \text{ m}$   
 (b)  $500 \text{ m} + 2\,800 \text{ m} = \underline{\hspace{2cm}} \text{ m}$
5. Subtract:  
 (a)  $200 \text{ cm} - 100 \text{ cm}$  (b)  $315 \text{ m} - 25 \text{ m}$

**ADDITIONAL NOTE**

- Check the background knowledge of the learners
- Explain each and every topic with example
- After explaining the topic, assess to ensure that learners have understood developed required competences.
- You should do the special care for slow and SEN learners.
- Always engage them to do some activities.
- Encourage SEN learners to measure the length tell or write answer in dm, cm and mm.

**Sub-unit 2 Perimeter**

*Number of periods: 5*

*Total time for each period: 40 minutes*

**SPECIFIC OBJECTIVES**

The learner will be able to calculate perimeter of any object whose length and breadth are given.

**BACKGROUND KNOWLEDGE**

To perform well in this topic, learners should be able to:

- Define the concept of perimeter.
- Use the table of conersion for units.

**TEACHING METHODS**

- Demonstration method: Demonstrate the perimeter of different plane shapes.
- Ask questions to check the previous knowledge.
- Help learners understand how to calculate the perimeters of different shapes.
- Provide group work activities.
- Assess the learners to verify their progress in developing competences.

**VOCABULARY**

Perimeter, Rectangle, Triangle, Pentagon

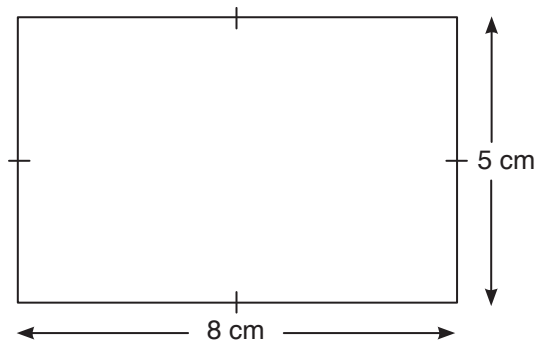
**MATERIALS REQUIRED**

Pencils, crayons, coloured pencils, geometry set, scissors, chalk, black-board, etc.

**PROCEDURE (Teaching Steps)**

Guide learners through the following example.

**Step 1:** Draw a rectangle on the chalkboard.



**Step 2:** Ask them to find its perimeter by following the procedure:

$$\begin{aligned} \text{Perimeter of rectangle} &= 2 \times (\text{length} + \text{breadth}) \\ &= 2 \times (8 + 5) = 2 \times 13 = 26 \text{ cm.} \end{aligned}$$

**Step 3:** Help learners discover the formula for calculating the perimeter of a rectangle.

**Activity 6.5 (Page No. 87)**

In this class activity, guide the learners to calculate the distance between two objects.

**SUGGESTED ANSWER OF ACTIVITY 6.5**

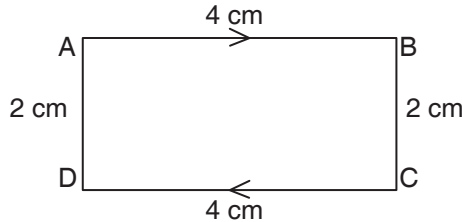
Length of each wire = 125 cm

Number of bundles required = 11

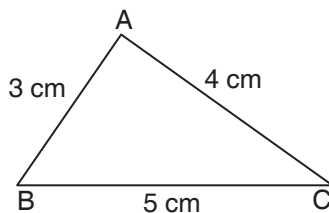
Distance between Kabuye's house from electric pole =  $125 \times 11 = 1375$  cm.

**REMEDIAL EXERCISES**

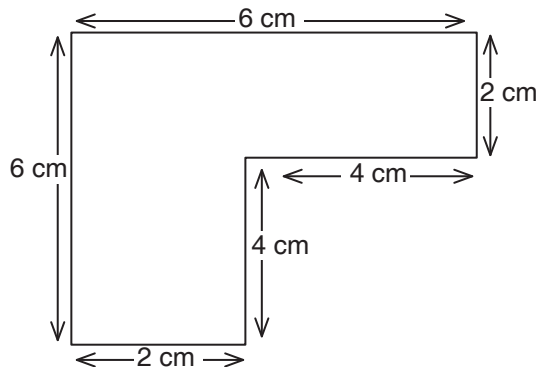
1. Find the perimeter of the rectangle:



2. Find the total length all around the figure ABC.



3. Find the perimeter of the following diagram:



4. Ten trees are planted at an interval of 5 m. Find the distance from the first to the last tree.
5. A rectangular garden 10 m by 5 m is to be fenced with poles placed at an interval of 1 m. Find the amount of money required to fence the garden at 1 000 Frw per pole.

**ADDITIONAL NOTE**

- Help or guide learners to calculate the perimeter by measuring the length and breadth of classroom, blackboard, desk, etc.
- Give some shapes and ask learners to calculate their perimeters.

- Emphasize that the units of sides of a shape should be same when calculating the perimeter.

### **ANSWERS OF EXERCISES**

#### **EXERCISE 6.1**

1. Try yourself      2. Try yourself

#### **EXERCISE 6.2**

Try yourself

#### **EXERCISE 6.3**

- |                   |                   |
|-------------------|-------------------|
| (a) 6 cm approx   | (b) 5 m approx    |
| (c) 12 cm approx  | (d) 12 cm approx  |
| (e) 100 dm approx | (f) 100 cm approx |

#### **EXERCISE 6.4**

- |                 |              |
|-----------------|--------------|
| 1. (a) 40 000 m | (b) 3 500 mm |
| (c) 300 m       | (d) 4 dm     |
| (e) 1 000 mm    | (f) 290 cm   |
| (g) 3 000 m     | (h) 500 dam  |
| 2. (a) 200 cm   | (b) 300 dam  |
| (c) 250 cm      | (d) 460 mm   |
| (e) 2 km        | (f) 5 cm     |
| (g) 45 dam      |              |

#### **EXERCISE 6.5**

- |               |                |
|---------------|----------------|
| (a) 34 000 m  | (b) 8 km       |
| (c) 6 250 m   | (d) 260 hm     |
| (e) 20 000 dm | (f) 330 000 cm |

#### **EXERCISE 6.6**

1. 68 m      2. 66 m

### **ASSESSMENT EXERCISE**

1. (a) 1.65 m approx (b) 100 m approx  
(c) 4.5 m approx (d) 10 cm
2. (a) 1 210 cm (b) 130 km  
(c) 1 111 111 mm
3. 28 m
4. 5 000 m
5. 9 poles
6. (a) 30 poles (b) 135 000 Frw
7. 7 trees
8. 100 poles
9. (a) 9 cm (b) 12.20 dm

# Capacity Measurement

## INTRODUCTION

This unit deals with the concept of capacity, conversion of the units of capacity as well as addition and subtraction of different units of capacity.

## KEY UNIT COMPETENCE

A learner should be able to understand capacity, convert between units of capacity and apply them in solving mathematical problems related to daily life situations.

## ATTITUDES AND VALUES

- Show an ability to properly use a range of materials to measure different liquids in daily life.
- Being honest and trustworthy when measuring different capacities.
- Being able to show respect for one another when working in groups.

## REFERENCES

P4 Mathematics curriculum and P4 Mathematics Pupil Book

### Additional references:

For more online support visit [www.math-play.com/capacity](http://www.math-play.com/capacity)

## LINKS TO OTHER SUBJECTS

**Physics:** measurement of volumes/capacities of different containers.

## ASSESSMENT CRITERIA

The learners can measure the capacity of any object and can be able to add or subtract different units of capacity.



## Sub-unit 1 Capacity and Measurement of capacities

Number of periods: 7

Total time for each period: 40 minutes

### SPECIFIC OBJECTIVES

After the end of this topic the learners will be able to estimate and measure the capacities of different objects.

### BACKGROUND KNOWLEDGE

To perform well in this topic, learners should be able to:

- Define the concept of capacity and volume.
- Evaluate cube and cuboid.
- Define containers and provide capacity for some containers.
- Determine the relationships between units of capacity.

### TEACHING METHODS

- Demonstration method: Introduce the concepts of capacity and volumes.
- Provide activities related to units and conversion.
- Help learners to give the capacity of few containers and their units.
- Observation method: Observe the progress of the learners.
- Make the groups of learners and give them activities to be solved.

### VOCABULARY

Volume, Capacity, Container

### MATERIALS REQUIRED

Pencils, crayons/ coloured pencils, geometry set, scissors, chalk, black-board, etc.

### PROCEDURE (Teaching Steps):

**Step 1:** Tell the learners to bring different containers which they use to measure liquid.

**Step 2:** Ask them to mention other containers which people use that they don't have.

**Step 3:** Guide them to use the containers they have brought to compare their capacities with the help of water.

**Step 4:** Introduce to them a 1 litre container and 1 000 ml container.

**Step 5:** Let them pour water in a 1 000 ml container into a 1 litre container. They will realise that has filled it.

**Step 6:** Help them to realise that one litre is equal to 1 000 millilitres.

### Activity 7.2 (Page No. 93)

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#### Learning aids:

You will put your learners in groups of 4 and provide them with 10 to 20 empty matchboxes. Each learner should have a geometry set. Take the learners through the class activity below:

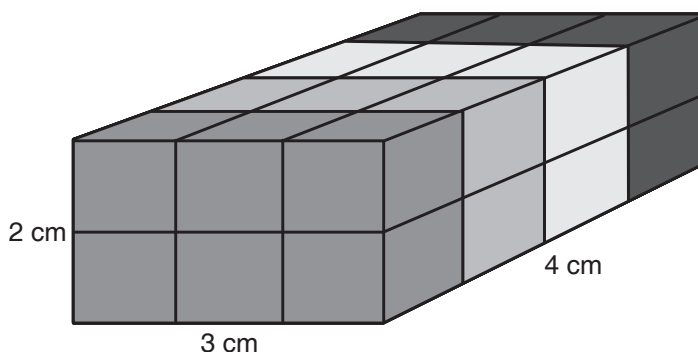
- (a) Measure the length (l), width (w), and height (h) of the matchbox provided. Record your results in millimetres (mm). Ensure that each learner gets a chance to measure the lengths of the edges of box.
- (b) Calculate the volume of one match box using the formula;  $V = l \times w \times h$ .
- (c) Pile the matchboxes so as to form a big box of matchboxes.
- (d) What is the volume of the big box you have formed?
- (e) Can you design other different big boxes using the same matchboxes? Help them discover ways of piling the same match boxes in a different way.

#### SUGGESTED ANSWERS OF CLASS ACTIVITY 7.2

- (a) Let the learner count the number of red box.
- (b) No it is not possible to see all the yellow boxes because some of them are blocked by the green boxes.
- (c) Each colour has 6 boxes, so there are  $6 \times 4 = 24$  boxes altogether.
- (d) Volume of one small box =  $1\text{cm} \times 1\text{cm} \times 1\text{cm} = 1\text{cm}^3$ .

(e) Since there are 24 small boxes,

$$\text{Volume of the big box} = 1 \text{ cm}^3 \times 24 = 24 \text{ cm}^3.$$



### Activity 7.3 (Page No. 94)

Guide the learners to discuss the statement '**given on page no. 94**' with their classmates.

In this activity, your learners will learn how to estimate volumes of some common containers.

#### Learning aids:

Provide clean water in a bucket or any suitable container, table spoons (about 5 ml), ordinary glass for drinking water (about 300 ml), plastic mug, water jug, a 5 litre jerrycan, a 20 litre jerrycan, picture of a large water tank (about 12 000 litres). Please see the pupil's copy for illustrations/photos. In addition, you may provide a measuring cylinder of about 250 ml and a filter funnel.

Ask the learners to follow the instructions below:

In this class activity you are going to discuss the statements below with your classmates. State whether you agree or not. You may experiment where possible in your classroom.

- The capacity of a teaspoon is about 5 ml or 5 cm<sup>3</sup>. The learners can carefully pour 10 spoonfull of water into a measuring cylinder. Record the total volume and divide this volume by 10 in order to estimate the volume of one teaspoon.
- The capacity of an ordinary glass for drinking water is about 300 ml or 300 cm<sup>3</sup> or 0.3 l.
- Capacity of a mug is about 0.5 litres.

- (d) The capacity of a water jug is about 2 litres.
- (e) The capacity of a small jerrycan is about 5 litres.
- (f) The capacity of a big jerrycan is about 20 litres.
- (g) A large water tank has a capacity of about 1 000 litres. You may take your class to observe the school water tank if it is available. The capacity of the school water tank may be higher than 1 000 litres.

**THINK!!! (Page 95, Mathematics Pupil Book 4)**

What is full of holes and yet it holds lots of water?

**ANSWER**

The answer is a sponge! You may try it out with a small piece of sponge from a mattress.

**Activity 7.4 (Page No. 96)**

In this class activity, guide the learners to calculate the milk produced by the cow in 3 days:

**SUGGESTED ANSWERS OF ACTIVITY 7.4**

2 litres + 5 litres + 3 litres = 10 litres

1l = 1 000 ml. So,  $10 \times 1\,000\text{ ml} = 10\,000\text{ ml}$ .

**Activity 7.5 (Page No. 97)**

In this class activity, guide the learners to measure the capacity of water in a jug, change this into litres, then measure the capacity of a bucket by pouring water using 1 litre bottle. Let them compare their capacities.

**Activity 7.6 (Page No. 98)**

1.  $24\text{ cm}^3$     2.  $12\text{ cm}^3$

**REMEDIAL EXERCISES**

1. Express the following into millilitres:
  - (a) 5 litres
  - (b) 2 litres

2. Add the following:
  - (a) 20 litres + 500 millilitres.
  - (b) 780 litres + 20 millilitres
3. Subtract the following:
  - (a) 500 millilitres – 250 millilitres.
  - (b) 400 millilitres – 100 millilitres
4. The price of petrol is 600 Frw per litre. A school bus requires 50 litres of petrol for a school trip. How much amount is spent on petrol?
5. A milkman sells 100 l of milk everyday. How much milk is sold in 3 months? (1 month = 30 days)

### ADDITIONAL NOTE

- Help learners to explain the terms volume and capacity.
- Ask the learners to give different units of capacity and their relations.
- Ask them orally to convert few volumes from one unit to another unit.
- The learners with special educational needs (SEN) should be encouraged to do this activity.

### ANSWERS OF EXERCISES

#### EXERCISE 7.1

1. Glass      2. Can

#### EXERCISE 7.2

1. (a) 26              (b) 26 cm<sup>3</sup>  
 2. (a) 12 m<sup>3</sup>        (b) 7 m<sup>3</sup>

#### EXERCISE 7.3

A measuring cylinder = 100 ml approx.

A feeding bottle = 200 ml approx.

An ordinary bottle = 500 ml approx.

A measuring jug = 1 500 ml approx.

A milk can = 10 litres approx.

**EXERCISE 7.4**

- |              |              |
|--------------|--------------|
| (a) 3 000 ml | (b) 5 000 ml |
| (c) 2 500 ml | (d) 1 200 ml |
| (e) 4 500 ml | (f) 7 500 ml |

**ASSESSMENT EXERCISE**

- |                   |              |
|-------------------|--------------|
| 1. (a) 9 l 200 ml | (b) 10 l     |
| 2. (a) 2 l 150 ml | (b) 7.75 l   |
| 3. 18 000 l       | 4. 8 000 l   |
| 5. 250 ml         | 6. 1 200 Frw |
| 7. 150 litres     | 8. 175 l     |
| 9. 90 000 Frw     |              |

# Mass Measurement

## INTRODUCTION

This unit deals with the measurement of mass of different objects, unit of mass as well as conversion of different units of mass.

## KEY UNIT COMPETENCE

By the end of this unit, a learner should be able to convert between units of mass and apply them in solving mathematical problems related to daily life situations.

## ATTITUDES AND VALUES

Appreciate the importance of mass measurement in daily life, show respect for one another, and appreciate difference in opinion while working with other people and show fairness while measuring mass.

## REFERENCES

P4 Mathematics curriculum, P4 Mathematics Pupil Book.

### Additional references:

For more online support visit [www.kidsnumbers.com](http://www.kidsnumbers.com)

## LINKS TO OTHER SUBJECTS

**Physics:** Finding densities of different objects.

**Chemistry:** determining mass when making medicines/chemicals.

## ASSESSMENT CRITERIA

The learner can be able to solve mathematical problem involving mass, convert kilograms into grams and vice-versa, litres into millilitres and vice-versa.

## Sub-unit 1 Measurement of Mass and conversion of mass

*Number of periods: 7*

*Total time for each period: 40 minutes*

## SPECIFIC OBJECTIVES

By the end of this unit, the learners will be able to solve mathematical problems involving mass, convert kilogram into gram and vice-versa.

## BACKGROUND KNOWLEDGE

To perform well in this topic, learners should be able to:

- Define the concept of mass.
- Use the instruments to measure the mass.
- Establish the relationships between units of mass.

## TEACHING METHODS

- Demonstration method: Introduce the units of mass and their conversions.
- Ask learners to convert from one unit to another unit.
- Guides learners to find how to convert mass from one unit to other unit.
- Note down the progress of the learners while developing competences.

## VOCABULARY

Mass, kilogram, gram

## MATERIALS REQUIRED

Pencils, crayons/ coloured pencils, geometry set, scissors, chalk, Black-board, weighing balance, bottle tops etc.

## PROCEDURE (Teaching Steps):

**Step 1:** Inform the learners that the mass of an object is the amount of matter it contains.

**Step 2:** Gram (g) is the metric unit for measuring the mass of light objects such as apples, potato, an orange, mango etc.

**Step 3:** Kilogram (kg) is the metric unit for measuring heavier things such as saucepan, school bag, radio etc.

**Step 4:** Guide learners to establish that 1 kg = 1 000 g.

**Step 5:** Get a weighing scale with this weigh stones and weigh some objects for them.

**Step 6:** Lead them through the following example:

Express 6 kg as gm using a table of conversion.

$$6 \text{ kg} = (6 \times 1\,000)\text{gm} = 6\,000 \text{ gm.}$$

## Activity 8.1 (Page No. 100)

In this class activity, learners will get to feel how heavy 500 g and 1kg are by holding some stones in their hands. They will also learn how to measure masses of some small objects.

**Learning aids:** Provide learners with 500 g stone and a 1kg stone.

Ask them to do the activity in groups of 4 learners.



- Feel the mass of 500g by holding the stone in your hand.
- Feel the mass of 1kg by holding the stone in your hand.
- You should repeat the experiment a number of times because this will help you estimate masses of different objects.
- Help your learners to use a balance to measure the mass of a pen, small stone, a small exercise book, a shoe, bottle top, geometry set, bottle full of water, sand in a cup etc.

### Activity 8.2 (Page No. 101)

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- In this class, guide the learners to record their mass with the help of a weighing balance.
- Let them compare their mass with their classmates.
- Help them to record the highest and lowest mass.
- Help the learners to estimate your (teacher) mass.

### THINK!!! (Page 101, Mathematics Pupil Book 4)

A butcher at a butchery in Kigali City sells meat. He is 2m tall, very fat and he puts on the biggest shoe size on market. What does he weigh?

### ANSWER

The key word in this brain teaser is the word “what”. The butcher weighs meat. Many pupils may try to guess his mass. That would be correct if they said ‘how much does he weigh’?

### Activity 8.3 (Page No. 101)

---

In this class activity, guide the learners to estimate the unit to record the mass of the following.

### SUGGESTED ANSWERS OF ACTIVITY 8.3

- Mass of a tomato (gram)
- Mass of an egg (gram)
- A radio (kilogram)
- A baby (kilogram)
- An exercise book (gram)
- A school boy (kilogram)
- A chair (kilogram)

- (h) An elephant (kilogram)
- (i) A mathematical set (gram)

### REMEDIAL EXERCISES

1. Which unit would you use to measure the mass of the following:  
(a) an apple (b) a pencil box (c) a body (d) a table.
2. Convert the following:  
(a) 1 kg into gram (b) 40 gram into milligram
3. Add the following:  
(a) 500 gram + 7 kg (b) 300 kilogram + 40 grams
4. There are 40 tins of Kerosene oil. Each tin weights 4 kg 500 g. What will be the weight of all the tins?
5. Subtract the following:  
(a) 2 500 g – 2 120 g (b) 9 600 g – 1 750 g.

### ADDITIONAL NOTE

- Guide learners to express the meaning of different units of mass and their relationship.
- Ask the learners orally to convert the unit of mass from one unit to another unit.
- Focus on the conversion method by using conversion table.
- Help learners to solve the problems based on addition and subtraction on the blackboard.
- Provide remedial exercises to slow learners.
- Check whether learners with special educational needs (SEN) are taking part in this activity or not and provide assistance.

### ANSWERS OF EXERCISES

#### EXERCISE 8.1

Check through pupils' work.

#### EXERCISE 8.2

- (a) Mass of a pencil = milligrams
- (b) Mass of a ball = grams
- (c) Mass of a cycle = kilogram
- (d) Mass of a T.V. = kilogram

**EXERCISE 8.3**

- |                 |              |               |
|-----------------|--------------|---------------|
| 1. (a) 24 000 g | (b) 8 000 g  | (c) 15 000 g  |
| (d) 12 000 g    | (e) 1 500 g  | (f) 321 000 g |
| (g) 2 800 g     |              |               |
| 2. (a) 15 kg    | (b) 2.4 kg   | (c) 7 kg      |
| (d) 0.5 kg      | (e) 0.912 kg | (f) 1.5 kg    |

**ASSESSMENT EXERCISE**

- |                  |                  |               |
|------------------|------------------|---------------|
| 1. (a) 285 000 g | (b) 19 000 g     |               |
| (c) 2 500 g      | (d) 196 000 g    |               |
| 2. (a) 2.126 kg  | (b) 9.065 kg     | (c) 0.850 kg  |
| 3. 50 kg         | 4. 3 000 kg      | 5. overloaded |
| 6. 50 kg         | 7. 500 000 books | 8. 2 000 g    |
| 9. 3 kg          | 10. 36 000 g     | 11. 3 000 g   |
| 12. 87 kg        | 13. 240 kg       |               |

# 9 UNIT

## Area and Land Measurements

### INTRODUCTION

This unit deals with the measurement of area of various (2D) spaces such as square, rectangle, triangle etc.

### KEY UNIT COMPETENCE

By the end of this unit, the learner should be able to describe or define area as the two dimensional (2D) space enclosed by a boundary. They should also be able to use square and land units in solving mathematical problems.

### ATTITUDES AND VALUES

Appreciate the need to properly and accurately use different area and land measurements in daily life situations.

### REFERENCES

P4 Mathematics curriculum, P4 Mathematics Pupil Book.

#### Additional references:

[www.mathplace.com](http://www.mathplace.com)

### LINKS TO OTHER SUBJECTS

**SST and Geography:** representation and notation of surface area.

### ASSESSMENT CRITERIA

The learner can find out the area of any 2D shapes such as square, rectangle and triangle.

## Sub-unit 1 Area and Land Measurement

*Number of periods: 20*

*Total time for each period: 40 minutes*

### SPECIFIC OBJECTIVES

By the end of this topic, the learner will be able to calculate the area of 2D space (square, rectangle and triangle)

## BACKGROUND KNOWLEDGE

To perform well in this topic, learners should be able to:

- Define an area
- Use units of area and their conversions.
- Apply concept of addition, subtraction and decimals in solving problems.

## TEACHING METHODS

- Demonstration method: Introduce the concept of area which is a measure of land.
- Question answer method: Ask the learners to find the area of some 2D shapes.
- Guide learners to calculate the area of square and rectangle.
- Assess the learners and note down their progress in developing competencies.

## VOCABULARY

Area, rectangle, square, unit.

## MATERIAL REQUIRED

Pencils, crayons/ coloured pencils, geometry set, scissors, chalk, black-board, etc.

## PROCEDURE (Teaching Steps):

**Step 1:** You may take learners outside the classroom.

**Step 2:** Guide them to draw a rectangle on the ground using a meter rule and chalk and make small equal square units.

**Step 3:** Let them count the squares in the rectangle.

**Step 4:** Guide them to realise how the 'square units' comes. For example  $5 \text{ cm} \times 6 \text{ cm} = 30 \text{ cm}^2$ .

**Step 5:** Guide them to use the correct unit of area ( $\text{m}^2$ ,  $\text{cm}^2$ ,  $\text{mm}^2$ ).

**Step 6:** Let learners explain the conversion of units using the table of conversion.

For example:  $1 \text{ km} = 1\,000 \text{ m}$

## Activity 9.1 (Page No. 108)

In this class activity, ask the learners to study the area grid in their books and answer the following questions in their exercise books. Mark their books and record the marks.

- What is the area of 1 small square?

- What is the area of the big square?
- Count the number of small squares in the big square.

### SUGGESTED ANSWERS OF ACTIVITY 9.1

- Area of 1 small square =  $1 \text{ cm} \times 1 \text{ cm} = 1 \text{ cm}^2$ .
- Area of the big square =  $6 \text{ cm} \times 6 \text{ cm} = 36 \text{ cm}^2$ .
- There are 36 small squares in the big square.

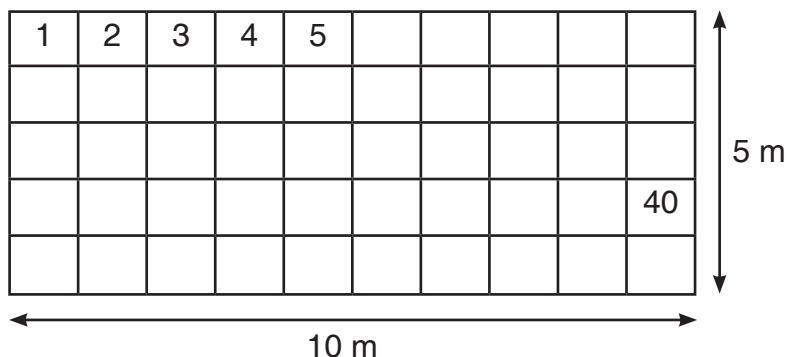
### Activity 9.2 (Page No. 111)

**Learning aid:** Geometry set

Guide your learners through the activity below. Explain them the need of using 1cm in their book to represent 1 m of land. Follow every learner's work closely and help as soon as the need arises.

In this class activity, you will find the area of a plot of land of length 10m and width 5m by counting the number of square metres in it.

- 10 m can not fit into your book, so you will use a scale of 1 cm to represent 1m. Draw a rectangle of length 10 cm and width 5 cm in your book.
- Divide the length into 10 equal parts using vertical lines. Each part should be equal to 1cm.
- Divide the width into 5 equal parts using horizontal lines as shown in the diagram below:



- Count the number of small squares formed by the lines you have drawn. You can do this by numbering all the small squares.
- Each small square represents an area of  $1 \text{ m}^2$ .
- Now answer this question: What is the area of the plot of land?

### SUGGESTED ANSWER OF ACTIVITY 9.2

- There are 50 small squares. Each small square =  $1 \text{ cm}^2$  on the book. This is equal to  $50 \text{ m}^2$  of land.

### Activity 9.3 (Page No. 114)

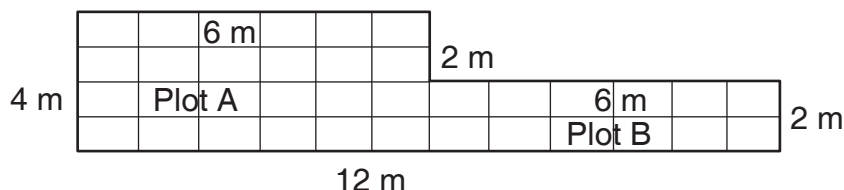
- In this class activity, make two groups of 5-5 learners.
- One group will measure the length and width of one classroom.
- Second group will measure the length and width of the another classroom.
- Guide them to calculate the area of both the classrooms by the formula:  
**A = length × width** and then let them compare the area of both the classrooms.

### Activity 9.4 (Page No. 114)

**Learning aids:** Geometry set, pencil

In this class activity, divide the learners into two groups. First group will find the area of plot A and second group will find the area of plot B. Guide them to calculate the total area of plot A and plot B.

The learners should divide the shape as shown below:



### SUGGESTED ANSWERS OF ACTIVITY 9.4

Area of Plot A =  $l \times w$

$$= 6 \times 4 = 24 \text{ m}^2$$

Area of Plot B =  $6 \times 2 = 12 \text{ m}^2$

Total Area =  $24 + 12 = 36 \text{ m}^2$

### ANSWERS OF EXERCISES

#### EXERCISE 9.1

- (a)  $1 \text{ cm}^2$                       (b) 48 small squares  
 (c)  $48 \text{ cm}^2$                     (d)  $1 \text{ cm}^2$

#### REMEDIAL EXERCISES

1. Convert the following:

- (a)  $5 \text{ m}^2$  to  $\text{cm}^2$     (b) 10 hectares to  $\text{m}^2$

2. Find the area of rectangular piece of land whose length and width are:
  - (a) 50 m and 20 m
  - (b) 100 m and 50 m.
3. The length of a floor of a classroom is 8 m and its width is 10 m. What is the area of the floor?
4. The area of the floor of a school library is  $50 \text{ m}^2$ . If the width of the floor is 10 m, find the length of the school library.
5. Calculate the area of a rectangular swimming pool if its length is 8 m and width is 5 m.

**ADDITIONAL NOTE:**

- Guide learners to measure the area of a land.
- Let them explain the units of area and the relationships between them.
- Guide learners to calculate the area of a rectangular piece of land.
- Encourage the slow learners to participate in activities.
- Encourage the learners with special educational needs (SEN) to calculate and compare the area of both classrooms and provide assistance where necessary.

**EXERCISE 9.2**

- (a) 1 000 000      (b) 100 000      (c) 2 500

**EXERCISE 9.3**

- (a)  $5\,000\,000 \text{ m}^2$     (b)  $10\,000 \text{ m}^2$     (c)  $1\,000 \text{ m}^2$

**EXERCISE 9.4**

1.  $80 \text{ m}^2$                       2. 8 m

**ASSESSMENT EXERCISE**

1. (a) 0.25                      (b) 0.8                      (c) 65 000
2. 2 cm
3. (a)  $87.60 \text{ m}^2$     (b) 2.50 ha
4. Both have same area
5. 6 000 kg
6. Peter, 6 hectares
7. Lake Victoria is bigger than Rwanda by  $69\,484 \text{ km}^2 - 26\,338 \text{ km}^2 = 43\,146 \text{ km}^2$ .



**INTRODUCTION**

Time is one of the topics that must be taught using the practical approach. Real clock or an analogue watch should be used if learners are to succeed in reading and telling the time. In this unit learners will learn the following:

- (a) Telling time on a 12 hour clock.
- (b) Telling time using a.m. or p.m.

**KEY UNIT COMPETENCE**

The learners should be able to tell, write and convert time appropriately.

**ATTITUDES AND VALUES**

Appreciate the value of time management in daily life situations.

**REFERENCES**

P4 Mathematics curriculum, P4 Mathematics Pupil Book.

**Additional references:**

For more online support visit [www.mathplayground.com](http://www.mathplayground.com)

**LINKS TO OTHER SUBJECTS**

**Geography:** telling time and conversion of time to different time zones, eg. GMT, CAT, EST.

**ASSESSMENT CRITERIA**

The learner can easily tell the time on different types of clock.

**FUN CORNER (Page 116, Mathematics Pupil Book 4)**

1. "Who has two hands but can't wave?"  
Ans. Eeeehhhh.....ahahaha....Am I not Mr. Clock?
2. "You are my friend, I am your friend. You can wait for me but I can never wait for you!" Who am I?  
Ans. Ahahaha..... I am Mr. Time.

**Sub-unit 1 Time and Calender***Number of periods: 10**Total time for each period: 40 minutes***SPECIFIC OBJECTIVES**

By the end of this topic, the learners will be able to tell the time of digital clock and wall clock. Convert bigger units of time to smaller ones and vice-versa. He/ She can read and interpret the Calender.

**BACKGROUND KNOWLEDGE**

To perform well in this topic, should be able to:

- Read the clock, watch and calendar.
- Use the clock and calendar.
- Appreciate units of time and show concern on meeting the time.

**TEACHING METHODS**

- Demonstration method: Introduce the concept of time and how to tell time.
- Ask questions about time and calendar.
- Explain the concept of A.M. or P.M.
- Make groups of learners and conduct various activities related to time.
- Observe and assess the development of competences.

**VOCABULARY**

Digital, clock, calender, Wall clock

**MATERIAL REQUIRED**

Pencils, crayons/ coloured pencils, geometry set, scissors, chalk, Blackboard, etc.

**PROCEDURE (Teaching Steps):**

**Step 1:** Revise with the learners, how to tell time using clock faces.

**Step 2:** Using the clock faces, turn the hands clockwise.

**Step 3:** Describe the relationship in the movement of the minute hand and hour hand.

**Step 4:** Introduce a.m. and p.m. using a chart.

**Step 5:** Guide them that the time between mid-night and noon is written as a.m. and from noon to mid-night it is written as p.m.

**Step 6:** Guide them to read and interpret the calendar.

**Activity 10.1 (Page No. 118)**

In this class activity, guide the learners to tell the time shown in various types of clock.

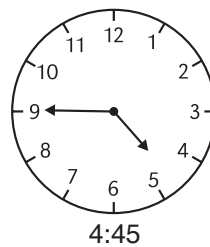
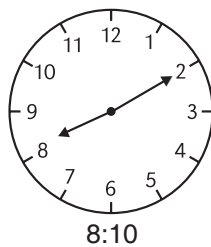
**SUGGESTED ANSWER OF ACTIVITY 10.1**

1. 4:40      2. 12:00      3. 10:07      4. 6:00

**Activity 10.2 (Page No. 120)**

In this class activity, help the learners to form a model clock and show the following time:

- (a) 8:10  
(b) 4:45



**Activity 10.3 (Page No. 121)**

**Learning aids:** Wall clock, calendar, multiplication table

In this Class Activity, ask your students to work in groups to convert units of time.

Help them to find out the number of seconds that are found in:

- (a) 1 minute                      (b) 1 hour                      (c) 1 day  
(d) 1 week

**SUGGESTED ANSWERS OF ACTIVITY 10.3**

- (a) 60 seconds                      (b) 3 600 seconds  
(c) 86 400 seconds                      (d) 604 800 seconds

**Activity 10.4 (Page No. 123)**

Guide the learners to write their daily activities, individually and compare their answers with their partner's answer.

In this activity, you will ask the learners to discuss and write down all the activities each one does on a day right from the time he/she wakes up till the

time he/she goes to sleep. For example:

- |              |                |             |
|--------------|----------------|-------------|
| 1. Breakfast | 2. School time | 3. Homework |
| 4. Playing   | 5. Dinner      |             |

## UNDERSTANDING THE CALENDAR

### Activity 10.5 (Page No. 123)

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This activity will help your learners to understand the calendar.

**Learning aids:** Current calendar for the whole year (2015).

You will display a calendar of the present year showing all the months of the year on the classroom wall. You will ask the learners some probing questions such as:

- For which year does the calendar belongs?
- Name the present month and locate it on the calendar.
- What does 'Mo' stands for in the calendar?
- On what day does the present month begins?
- On what day does it ends?
- How many week days does the present month have?

You will guide the learners through this activity. In groups of 4 learners, let them study the calendar below and answer the questions in the pupil's book.

Mark and record the performance of your learners. Use the calendar on the classroom wall to set more questions if you feel it is necessary.

### SUGGESTED ANSWERS OF ACTIVITY 10.5

- |                            |                                  |
|----------------------------|----------------------------------|
| (a) 2015                   | (b) July                         |
| (c) 'Mo' stands for Monday | (d) It begins on Wednesday       |
| (e) It ends on Friday      | (f) The month have 23 week days. |
| (g) 14400 seconds          | (h) 31 days                      |
| (i) 26                     | (j) 23 days                      |

### Activity 10.6 (Page No. 124)

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## MAKING A CALENDAR

In this class activity, form groups of 4 learners each and guide them to answer the following questions:

- For which year does this calender belong?
- How many months are found in a year?

- (c) Which months have 30 days?
- (d) Which months have 31 days?
- (e) What is the last month of the year?
- (f) In which month were you born?
- (g) In which month Rwanda celebrates independence?

**SUGGESTED ANSWERS OF ACTIVITY 10.6**

- (a) 2015
- (b) There are 12 months in a year.
- (c) The months with 30 days: April, June, September, November.
- (d) The months with 31 days: January, March, May, July, August, October, December.
- (e) December is the last month of the year.
- (f) Do it yourself.
- (g) Rwanda celebrates independence in the month of July.

**THINK!!! (Page 125, Mathematics Pupil Book 4)**

Charles' mum has three children. The first is called June. The second child is called July. What is the name of the third child?

**ANSWER**

This is a very tricky logical question. Many people may say May or August, but that isn't true. There are only three children.

The name of the third child is Charles!!!

**Activity 10.7 (Page No. 126)**

**Learning aid:** Class time table

In this class activity, your learners will understand how to read and interpret the school time table.

Display the current time table for the class on the wall. Ask learners to study the time table. Ask some probing questions like;

- (i) At what time does the Monday morning lesson begin?
- (ii) At what time is break?
- (iii) How long is lunch break?
- (iv) How many times do we study math in a week? You may ask many more questions on the time table.

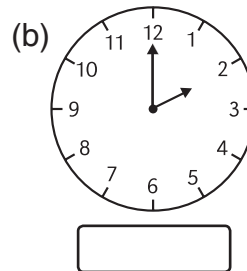
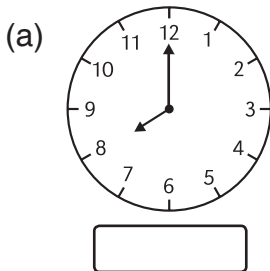
Working in groups of 4 learners, ask them to study the “*Gihugu Community Primary School, P.4 Time Table*” and answer the questions in their assignment books. Mark the answers and record the marks of learners.

### SUGGESTED ANSWERS OF ACTIVITY 10.7

- (a) 3 periods (b) Friday  
 (c) 80 minutes or 1 hour 20 minutes.  
 (d) English and Math have the greatest time. Each is given 280 minutes.  
 (e) 25 minutes.  
 (f) It ended at 4:25 pm.

### REMEDIAL EXERCISES

1. Read and tell the time indicated by the following clock faces.



2. Express 10 o' clock in the morning as a.m. or p.m.  
 3. Change 5 hours into minutes.  
 4. Our school timekeeper always rings the bell at half past 8 o' clock in the morning. Write this time using a.m. or p.m.  
 5. Agalli started his homework at 8:30 p.m. and finished at 10:00 p.m. How much time did he take to finish his homework?

### ADDITIONAL NOTE

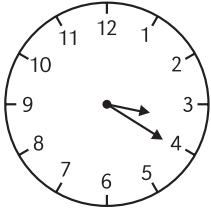
- Tell learners how to read the time on the clock.
- Explain the a.m. and p.m. and also explain 'half past', 'quarter past' and 'quarter to'.
- Guide learners to tell the units of time and the relationships between them.
- Facilitate them to establish how to convert from one unit of time to another.
- Encourage them to calculate the time duration of different events.
- Ask some questions related to the calendar to the SEN learners and let them answer. Guide them in case they are not able to answer.

**ANSWERS OF EXERCISES**

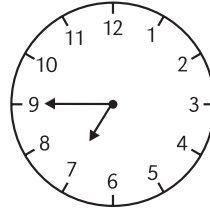
**EXERCISE 10.1**

1. A – (b)            B – (d)            C – (e)            D – (a)  
 E – (c)  
 2. (a) 04:30        (b) 07:45        (c) 08:50        (d) 09:10  
 (e) 05:40        (f) 06:15

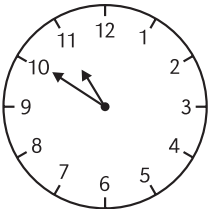
3. (a)



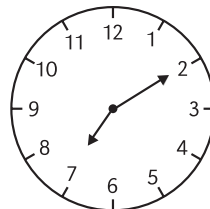
(b)



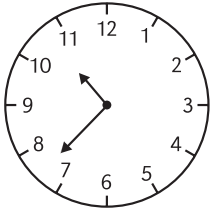
(c)



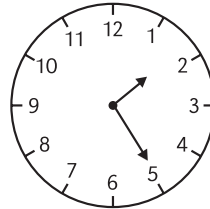
(d)



(e)



(f)



**EXERCISE 10.2**

1. 10 a.m.            2. 06:00 a.m.        3. 11:30 a.m.        4. 02:00 p.m.  
 5. 06:45 a.m.

**EXERCISE 10.3**

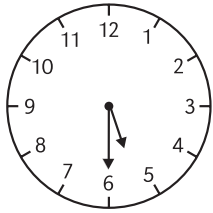
- (a) 60 minutes or 3 600 seconds        (b) 180 minutes or 10 800 seconds  
 (c) 120 minutes or 7 200 seconds        (d) 300 minutes or 18 000 seconds  
 (e) 480 minutes or 28 800 seconds        (f) 660 minutes or 39 600 seconds  
 (g) 360 minutes or 21 600 seconds        (h) 90 minutes or 5 400 seconds  
 (i) 270 minutes or 16 200 seconds

**EXERCISE 10.4**

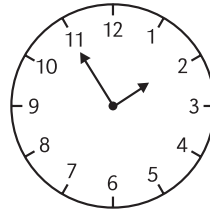
1. January – 31  
February – 28  
March – 31
2. September, June, April, November
3. January, March, May, July, August, October, December.

**ASSESSMENT EXERCISE**

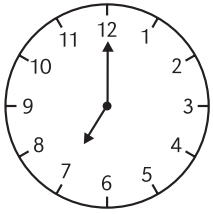
1. (a)



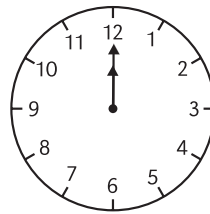
(b)



(c)



(d)



2. 10:30 a.m.

3. 06:15 p.m.

4. (a) 1 minute 20 seconds    (b) 1 minute 10 seconds    (c) 2 minutes  
(d) 2 minutes 30 seconds    (e) 2 minutes 10 seconds    (f) 8 minutes  
(g) 4 minutes    (h) 3 minutes    (i) 5 minutes  
(j) 6 minutes    (k) 12 minutes    (l) 9 minutes
5. (a) 6 000 pancakes    (b) 3 100 pancakes    (c) 9 100 pancakes
6. 1 hour 15 minutes



# 11 UNIT

## Money and its Financial Applications

### INTRODUCTION

At the end of this unit, learners will be able to recognise and identify the various denominations of Rwandan currencies, to form simple budget and will discover the different ways of using money to meet their needs.

### KEY UNIT COMPETENCE

A learner should be able to explain the money and its applications in our daily life.

### ATTITUDES AND VALUES

Appreciate the importance of money in daily life situations and show concern and the need for honesty in spending money.

### REFERENCES

P4 Mathematics curriculum, P4 Mathematics Pupil Book.

### Additional references:

For more online support visit [www.mathplayground.com](http://www.mathplayground.com)

### LINKS TO OTHER SUBJECTS

Entrepreneurship economics planning and making a budget in an economical situation.

### ASSESSMENT CRITERIA

Learners can use money in different transactions, in buying and selling, planning and budgeting.

## Sub-unit 1 Rwandan Currency : Coins and Notes

*Number of periods: 4*

*Total time for each period: 40 minutes*

### SPECIFIC OBJECTIVES

At the end of this topic, the learners will be familiar with bank notes and coins

used in Rwanda and are capable to change higher notes to smaller coins and notes.

### BACKGROUND KNOWLEDGE

To perform well in this topic, learners should be able to:

- Define what are currencies and give examples.
- Use notes and coins in buying and selling.
- currencies of different countries.

### TEACHING METHODS

- Demonstration method: Demonstrate Rwandan currency-notes or coins to the learners.
- Ask learners to identify the different Rwandan currencies and relationship.
- Group activity: Make a group of learners and conduct various activities related to money.
- Observe and assess the work of the learners to verify the development of competences.

### VOCABULARY

Currency, coins, notes, budget, buying, selling.

### MATERIALS REQUIRED

Real money, pictures and drawings of Rwandan currency, empty tins, boxes, soap and pens.

### PROCEDURE (Teaching Steps):

**Step 1:** Divide learners into groups and introduce different denominations of Rwandan coins and notes.

**Step 2:** Show different denominations of Rwandan coins of 1, 5, 10, 20, 50 and 100 Frw.

**Step 3:** List out some items that can be bought by each coin denomination.

**Step 4:** Give learners few word problems to solve.

**Step 5:** Let learners orally discuss profit and identify conditions that lead to profit and loss.

### Activity 11.1 (Page No. 129)

In this class activity, your learners will be able to recognise the different Rwandan currency coins.

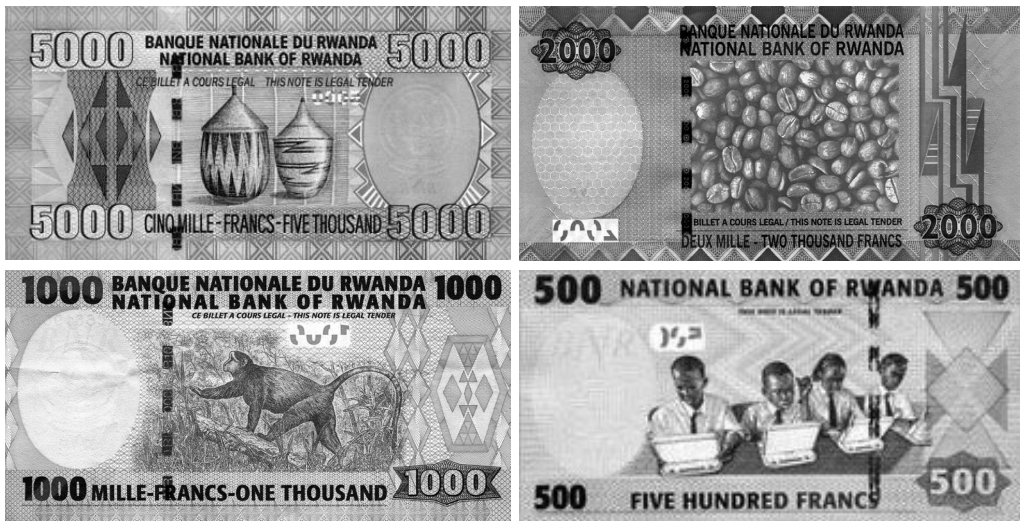
**Learning aids:** Rwandan denomination coins of 1, 5, 10, 20, 50 and 100 Frw. In this class activity you are provided with 6 different Rwandan coins.

- (a) Identify the 1, 5, 10, 20, 50 and 100 Frw coins.
- (b) Ask your learners to list some items that can be bought by each coin denomination.

### Activity 11.2 (Page No. 130)

In this class activity, the learners are provided with four Rwandan currency notes.

- (a) Identify the following notes: 500, 1 000, 2 000 and 5 000 Frw.
- (b) Discuss with your friends what item each currency note can buy in Rwanda.



### REMEDIAL EXERCISE

1. What do you call the currency of Rwanda?
2. Five children shared 25 000 Frw equally. How much money did each child get?
3. Michael bought pencils from a shop. He paid 100 Frw by using coins of 10 Frw. How many coins did he give to the shopkeeper?
4. Add:
  - (a)  $20 \text{ Frw} + 18 \text{ Frw} + 2 \text{ Frw}$
5. Subtract:
  - (a)  $900 \text{ Frw} - 150 \text{ Frw}$ .

**ADDITIONAL NOTES**

- Show learners all coins and notes that are used in Rwanda.
- Tell the learners that each country has its own currency.
- Engage the learners in doing some activities in groups or individually.
- Guide learners with special educational needs and provide assistance where necessary.

**Sub-unit 2 Planning according to Needs and Wants***Number of periods: 2**Total time for each period: 40 minutes***SPECIFIC OBJECTIVES**

By the end of this topic, the learners will be familiar with sources of money, use of money and will be capable to make simple budget and plan according to needs and wants.

**BACKGROUND KNOWLEDGE**

To perform well in this topic, learners should be able to:

- Explain why we need money.
- Demonstrate and explain how to save and spend money.

**TEACHING METHODS**

- Demonstration method: Demonstrate Rwandan currency to the learners.
- Guide learners to introduce different denominations of Rwandan currency.
- Guide learners to discover and explain how to plan according to the needs and wants.
- Observe and assess the work of the learners and provide assistance where necessary.

**VOCABULARY**

Simple budget, planning, needs, wants, money, sources.

**MATERIAL REQUIRED**

Various item/things used in day to day life.

**PROCEDURE (Teaching Steps):**

**Step 1:** Guide them to prepare a list of things, they need and use in day to day life.

**Step 2:** Help them to write the amount of each item.

**Step 3:** Ask them to make a budget of how many items they can purchase with 5 000 Frw.

**Activity 11.3 (Page No. 132)**

In this class activity, guide the learners in solving the problems given below:

Need/want	Price
Buying food	5 000 Frw
Ice cream	3 000 Frw
Toy car	3 000 Frw
Malaria treatment	1 550 Frw
Blanket	1 450 Frw
Shelter	25 000 Frw
Watching football match	5 000 Frw
School fees	6 500 Frw
Watching wild animals in a zoo	10 000 Frw

- Identify the basic needs from the above list.
- Plan your budget according to your priorities. How will you spend Frw 5 000?

**SUGGESTED ANSWERS OF ACTIVITY 11.3**

(a)

Need/Wants	Price
Malaria treatment	1 550 Frw
School fees	6 500 Frw
Buying food	5 000 Frw
Shelter	25 000 Frw

- Do it yourself.

**ADDITIONAL NOTE**

- Explain the learners about needs and wants.
- Tell them they should prepare their budget according the needs and wants.
- In case of scarcity of money the learners should buy those things which are needed really.

## Sub-unit 3 Buying and Selling

Number of periods: 2

Total time for each period: 40 minutes

### SPECIFIC OBJECTIVES

At the end of this topic, learners will be capable to buy and sell things, they will be familiar with the cost price and selling price of the things. They will be able to calculate profit and loss by buying and selling items.

### BACKGROUND KNOWLEDGE

To succeed in this topic, learners should be able to:

- Explain why we buy and sell things.
- Determine the role of money in buying and selling.

### TEACHING METHODS

- Demonstration method: Demonstrate the method of buying and selling.
- Guide to explain the concept of profit and loss with examples.
- Observe and assess the work of the learners and provide assistance where necessary.

### VOCABULARY

Boxes, items, classroom, profit, loss, cost price, selling price, buying, selling.

### MATERIAL REQUIRED

Pictures of Rwandan currency, soap, pen, empty boxes of items.

### PROCEDURE (Teaching Steps):

**Step 1:** Guide the learners to discuss different ways of gaining money.

**Step 2:** Organise a classroom shop, ask one group to play role model as a shopkeeper.

**Step 3:** Ask one group to go to a shop and purchase things.

**Step 4:** Ask both groups to make a list of things and calculate how much gain or loss they have realized.

### Activity 11.4 (Page No. 134)

In this class activity, guide the learners solve the following problem:

- (a) You will do this activity in pairs, suppose a shopkeeper purchases goods at 2 500 Frw and sells the goods at 3 000 Frw. What extra money does the shopkeeper get? Discuss with your partner.

- (b) Shina went to the market and bought a dress at 5 000 Frw. The dress was too big and so she decided to sell it at 6 000 Frw. Did she gain from the sale of her dress? Discuss with your partner.

#### SUGGESTED ANSWERS OF ACTIVITY 11.4

(a) Cost price = 2 500 Frw  
 Selling price = 3 000 Frw  
 Profit = Selling price – Cost price  
 = 3 000 Frw – 2 500 Frw = 500 Frw

(b) Cost price of dress = 5 000 Frw  
 Selling price of dress = 6 000 Frw  
 Gain = Selling price – Cost price  
 = 6 000 – 5 000 = 1 000 Frw

She gained 1 000 Frw by selling the dress.

#### REMEDIAL EXERCISE

1. A trader bought a goat for 10 000 Frw and sells at 7 000 Frw. How much profit or loss did he get?
2. Gisslle bought a pen at 50 Frw, a notebook at 100 Frw. How much money did he spend altogether?
3. If the cost of one pen is 100 Frw, then what will be the cost of 5 pens?
4. Kazo has 500 Frw. She buys an eraser at 200 Frw and one pencil at 100 Frw. How much amount is left with her?
5. Maria brought a Television set at 15 000 Frw and sells the television set at a profit of 1 500 Frw. Calculate the selling price of Television set.

#### ADDITIONAL NOTE

Guide learners to:

- Tell why we need buying and selling things.
- Explain cost price, selling price, profit and loss.
- Solve some real life problems to calculate profit and loss and provide the special guidance to learners with special educational needs (SEN).

**ANSWERS OF EXERCISES****EXERCISE 11.1**

- |                        |               |              |
|------------------------|---------------|--------------|
| 1. Rwandan franc (Frw) | 2. 10 000 Frw | 3. 3 250 Frw |
| 4. 5 000 Frw           |               |              |

**ASSESSMENT EXERCISE**

- |                |                 |                |
|----------------|-----------------|----------------|
| 1. 2 000 Frw   | 2. 75 Frw       | 3. 1 800 Frw   |
| 4. Kshs 25 500 | 5. 24 000 Frw   | 6. 120 000 Frw |
| 7. 20 minutes  | 8. \$ 680       | 9. 76 000 Frw  |
| 10. 3 600 Frw  | 11. 250 000 Frw |                |



# Number Patterns

## INTRODUCTION

In this unit, the learners will learn to arrange whole numbers in increasing and decreasing order, and to form arithmetic and geometric progressions.

## KEY UNIT COMPETENCE

A learner should be able to describe and generate number patterns.

## ATTITUDES AND VALUES

Appreciate the importance of orderliness in daily life. Learners should be made to realise the need for orderliness in places such as bus, park, banks, markets, schools, hospitals and other places in daily life situations.

## REFERENCES

P4 Mathematics curriculum, P4 Mathematics Pupil Book.

### Additional references:

For more online support visit [www.kidsites.com](http://www.kidsites.com)

## LINKS TO OTHER SUBJECTS

Geography: Rainbow patterns

## ASSESSMENT CRITERIA

Learners can arrange whole numbers (in increasing and decreasing order) or generate number patterns following a rule.

## Sub-unit 1 Number Patterns

*Number of periods: 7*

*Total time for each period: 40 minutes*

## SPECIFIC OBJECTIVES

By the end of this topic the learners will be able to use the concept of arithmetic and geometric series patterns to solve problems.

**BACKGROUND KNOWLEDGE**

To perform well in this topic, learners should be able to:

- Define a pattern, a series.
- Describe a sequence or order and give examples.

**TEACHING METHODS**

- Demonstration method: Demonstrate the concept of number pattern.
- Ask questions, related to number pattern.
- Guide learners to find explanation of the concept of number patterns.
- Make groups of learners and conduct various activities related to number pattern.
- Observe and assess the work of the learners and provide assistance where necessary.

**VOCABULARY**

Whole numbers, ascending, descending, number order, arithmetic, geometric, progression.

**MATERIALS REQUIRED**

Scissors, markers, charts, chalk, black-board, pencils etc.

**PROCEDURE (Teaching Steps):**

**Step 1:** Give learners a few examples of 2-digit numbers such as 10, 13, 14, 18...

**Step 2:** Guide learners to identify the numbers, which form a pattern,

eg., multiple of 2, multiple of 5, multiple of 10 etc.

*i.e.*, 2, 4, 6, 8, 10 .....

5, 10, 15, 20, 25 .....

10, 20, 30, 40 .....

**Step 3:** Help learners to form arithmetic and geometric progression,

eg. 3, 5, 7, 9, 11, 13, ..... is an example of an arithmetic progression.

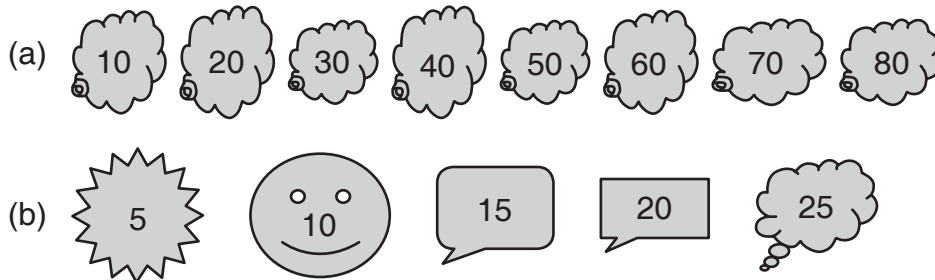
1, 2, 4, 8, 16, 32, 64, ..... is an example of geometric progression.

**Activity 12.1 (Page No. 138)**

In this class activity, instruct learners to work in groups to find the missing numbers in the arithmetic progression. Each picture has a number on its face.

Ask learners to work out the number patterns and fill out the missing numbers. Let your learners to compare their answers with the answers of their classmates from the other groups.

**SUGGESTED ANSWERS OF ACTIVITY 12.1**



**Activity 12.2 (Page No. 139)**

In this activity, instruct the learners to do the procedure as 'given on page no. 139' 'what to do' section. They should repeat the process till they reach at box F and record the number of beans in box F on the manila paper.

**SUGGESTED ANSWERS OF ACTIVITY 12.2**

Arithmetic progression: 1,3,5,7,9,11.

**REMEDIAL EXERCISES**

1. Complete the number pattern:  
1, 5, 9, 13, 17, \_\_\_\_\_
2. Write the next two numbers in the following sequences:  
10, 20, 30, 40, \_\_\_\_\_, \_\_\_\_\_
3. Shina eats 1 ice-cream on Tuesday, 2 on Wednesday, 3 on Thursday. If these sequence continues, how many ice-cream will she eat on Saturday?
4. Complete the sequence given below:  
1, 3, 6, 10, 15, \_\_\_\_\_
5. Complete the pattern given below:  
. ∴ ∴. \_\_\_\_\_

**ADDITIONAL NOTE**

Guide learners to:

- Explain the sequence and order of the numbers.

- Tell how the number patterns are formed.
- Explain and give examples arithmetic and geometric series.
- Give few number patterns to be completed. and then guide the slow learners, and motivate SEN learners to be engaged in this activity.

## **ANSWERS OF EXERCISES**

### **EXERCISE 12.1**

1. (a) 28    (b) 19    (c) 24    (d) 175    (e) 11
2. 19, 52, 53, 54, 56, 58, 59, 63, 65, 75, 79, 82, 88, 90, 93  
3rd highest—88

### **EXERCISE 12.2**

- (a) 62, 61    (b) 2, -1    (c) 70, 80    (d) 28, 31

### **ASSESSMENT EXERCISE**

1. (a) 39    (b) 44    (c) 55
2. (a) +2, 0    (b) 200, 240
3. 972 dots
4. 12 onions
5. 18 papers

# 13 UNIT

## Filling in the Missing Numbers

### INTRODUCTION

Learners are familiar with properties of whole numbers and number patterns. In this unit they will learn to fill missing numbers in some logical pattern and follow the mathematical fact. They will introduce with arithmagon (a number pattern followed by mathematical fact).

### KEY UNIT COMPETENCE

By the end of this unit, a learner should be able to solve missing number problems involving addition and subtraction.

### ATTITUDES AND VALUES

Appreciate the importance of inverse operations when solving missing number problems and checking answers.

### REFERENCES

P4 Mathematics curriculum and P4 Mathematics Pupil Book.

#### Additional references:

Visit: <http://www.sheppardsoftware.com/math.htm>

### ASSESSMENT CRITERIA

Learners can solve simple missing number problems which involve addition and subtraction.

### Sub-unit 1 Arithmagon

*Number of periods: 14*

*Total time for each period: 40 minutes*

### SPECIFIC OBJECTIVES

By the end of this unit, the learners should be able to use relationship between

numbers to fill missing number problems as well as create missing number problems.

## BACKGROUND KNOWLEDGE

To perform well in this topic, learners should be able to:

- Read examples of different types of polygons and show how arithmagon is formed.

## TEACHING METHODS

- Demonstration method: Demonstrate the concept of missing numbers on the chalkboard.
- Ask various questions to the learners on missing numbers.
- Guide learners to the introduction of the concept of arithmagon.
- Make groups of learners and conduct various activities.
- Observe and assess the work of learners and provide assistance where necessary.

## VOCABULARY

Arithmagon, missing number, addition, subtraction.

## MATERIALS REQUIRED

Text book, pencils, crayons, coloured pencils, geometry set, scissors, chalk board, flash cards, etc.

## PROCEDURE (Teaching Steps):

**Step 1:** Divide the learners into groups.

**Step 2:** Introduce the concept of arithmagon to the learners.

**Step 3:** Explain the concept of arithmagon (a polygon with numbers at its vertices and sum of these numbers determine the numbers written on its edges).

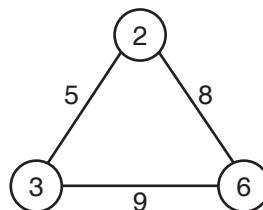
**Step 4:** Guide them to add the numbers written on 2 consecutive vertices, the sum will be on the edge between two vertices.

For example:

$$\text{Here, } 3 + 2 = 5$$

$$6 + 3 = 9$$

$$2 + 6 = 8$$

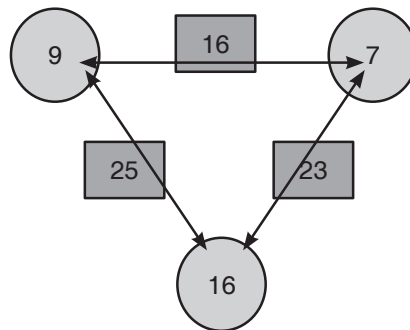


**Activity 13.1 (Page No. 142)**

In this activity, guide the learners to calculate the value of a, b and c.

**SUGGESTED ANSWERS OF ACTIVITY 13.1**

We know that  $a + b = 16$ ,  $a + c = 25$  and  $b + c = 23$ . In the third equation, we can see that  $b = 23 - c$ . Substituting,  $23 - c$  for  $b$  in  $a + b = 16$ , we get  $a - c = -7$ . Now we have two equations:  $a - c = -7$  and  $a + c = 25$ . Adding the two equations, we find that  $a = 9$ ,  $c = 16$  and putting value of  $a$  in  $a + b = 16$ , we get  $b = 7$



**THINK!!! (Page 144, Mathematics Pupil Book 4)**

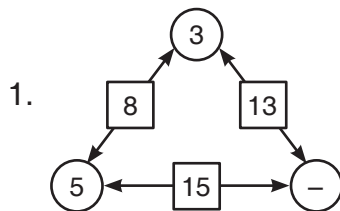
If you were running a race and you run past the one in second position, what position would you be in now?

**ANSWERS**

You are now in the first position since you have gone past the one in second.

**REMEDIAL EXERCISES**

Complete the following arithmagon:

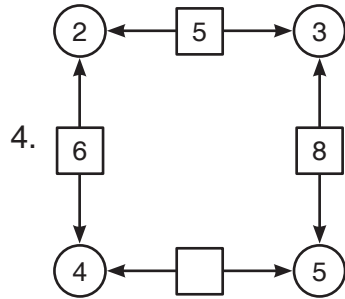


2. Fill in the box:

(a)  $9 + \square = 19$

3. Work out for the following:

(a)  $15 - 9 = \square$



5. Complete the following:

$$50 \times \square = 50$$

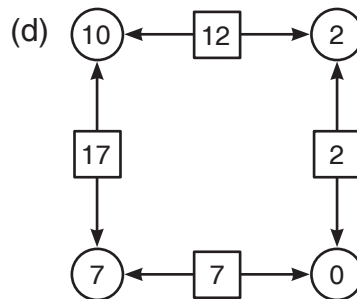
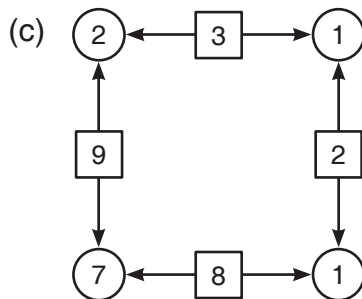
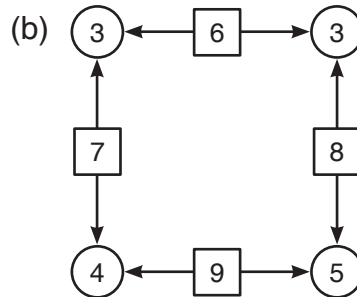
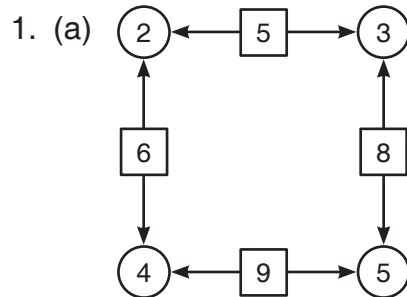
**ADDITIONAL NOTE**

Guide learners to:

- Explain the concept of arithmagon.
- Explain how to form patterns in arithmagon.
- Solve some arithmagon on the blackboard.
- Do their homework and help the SEN learners to solve arithmagon if they are feeling some problems.

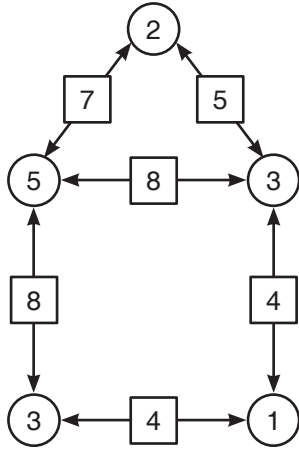
**ANSWERS OF EXERCISES**

**ASSESSMENT EXERCISE**

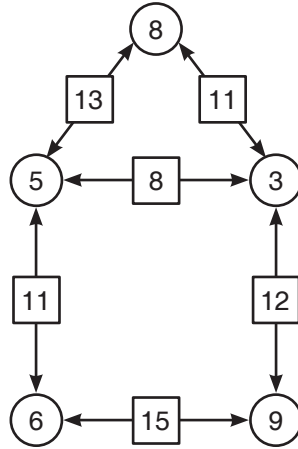




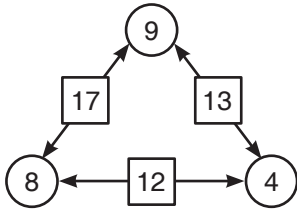
2. (a)



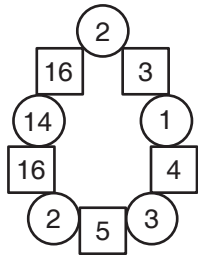
(b)



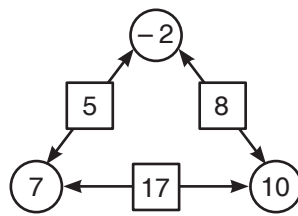
3.



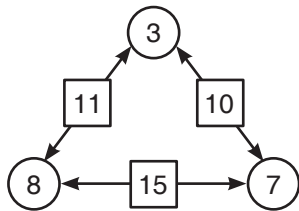
4. (a)



(b)



(c)



5. 4

6. 13

# 14 UNIT

## Types of Lines and Angles

### INTRODUCTION

In the previous class learners have learnt drawing, modelling and use of geometrical instruments. In this unit we extend the basic concepts of geometry, better understanding of lines and angles, and identify objects that have various shapes / figures.

### KEY UNIT COMPETENCE

A learner should be able to identify types of lines and angles and use a protractor to measure angles.

### ATTITUDES AND VALUES

Appreciate the importance of lines and angles in daily life activities, being confident and accurate when measuring lines and angles.

### REFERENCES

P4 Mathematics curriculum, P4 Mathematics Pupil Book.

### LINKS TO OTHER SUBJECTS

**Fine Arts:** Lines are used in drawing shapes.

**Science:** Lines are used in architecture and engineering.

**Geography/SST:** Lines are used to tell bearings.

### ASSESSMENT CRITERIA

The learners can draw lines and angles. They can identify and draw various types of lines such as parallel lines, oblique lines, horizontal lines, vertical lines and various types of angles such as obtuse, acute, right, straight and reflex angles.

## Sub-unit 1 Lines and Angles

*Number of periods: 7*

*Total time for each period: 40 minutes*

### SPECIFIC OBJECTIVES

By the end of this topic learners will be able to classify different types of lines vertical

lines, horizontal lines, oblique lines and two intersecting lines. They will also be able to identify angles such as supplementary and complementary angles.

### BACKGROUND KNOWLEDGE

To perform well in this topic, learners should be able to:

- Differentiate point, a ray from a line segment.
- Use compass and ruler to draw lines.

### TEACHING METHODS

- Demonstration method: Demonstrate the concept of lines and angles to the learners.
- Ask different questions on angles.
- Guide learners to explain the concept of angles to the learners.
- Observe and assess the work of learners and provide assistance where necessary.

### VOCABULARY

Acute, obtuse, supplementary, complementary, vertical, horizontal, oblique, intersecting.

### MATERIALS REQUIRED

Complete geometry set, pencil, chalk, blackboard, textbook.

### PROCEDURE (Teaching Steps):

**Step 1:** Introduce the geometrical instruments such as scale, compass, protractor, set squares etc.

**Step 2:** Guide them how to measure different line segment by using scale.

**Step 3:** Let learners also use their rulers to draw parallel lines.

**Step 4:** Guide the learners about different types of angles i.e. acute, obtuse and right and how to measure the angles using protractor.

### Activity 14.1 (Page No. 146)

In this class activity, you will guide the learners to discuss and understand the types of lines. Explain the key words such as horizontal lines, vertical lines, intersecting lines, perpendicular lines, oblique lines, parallel lines.

### Activity 14.2 (Page No. 149)

In this class activity, you will guide the learners to discuss and understand the types of angles. Explain the key words such as acute, obtuse, reflex, right, straight, complementary and supplementary. Note that we use anti-clock wise direction when drawing a given angle.

**Learning aids:**

Protractor, compass, pencil etc.

- (a) By using a pencil and scale draw a line segment AB.
- (b) By using the scale, mark point X in the middle of the line segment.
- (c) By using protractor, measure the angle made by AXB.  
 $\angle AXB = 180^\circ$  in the clockwise direction.

**Activity 14.3 (Page No. 151)**

In this class activity, you will help the learners to identify various shapes and figures in their classroom that form right angles such as edges of blackboard.

**Activity 14.4 (Page No. 154)**

In this class activity you will guide the learners to make their own protractor.

**Learning aids:**

- Manila paper
- Pencil
- Markers
- Pair of scissors
- Math set
- Paper glue
- Protractor

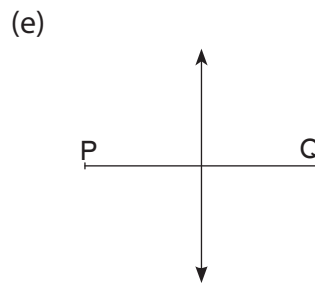
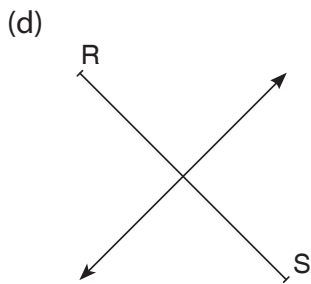
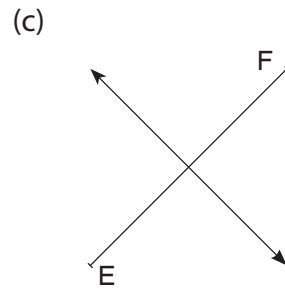
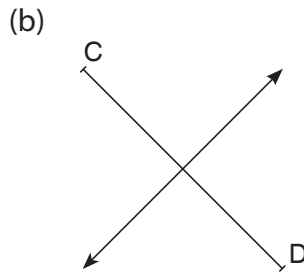
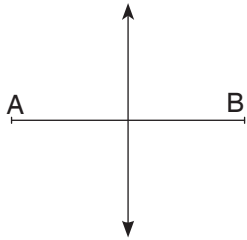
Instruct the learners to follow the complete procedures. Help your learners throughout the activity.

1. Place the Manila paper on a large table and spread it flat on the table.
2. Place the protractor in the middle of the Manila paper.
3. Trace the outline of the protractor on the Manila paper using a pencil.
4. Draw short marks on the Manila paper corresponding to the following angles:  $0^\circ, 10^\circ, 20^\circ, 30^\circ, 40^\circ, 50^\circ, 60^\circ, 70^\circ, 80^\circ, 90^\circ, 100^\circ, 110^\circ, 120^\circ, 130^\circ, 140^\circ, 150^\circ, 160^\circ, 170^\circ$  and  $180^\circ$ .
5. Remove the protractor and mark a point which represents the point where all lines meet on a protractor.
6. Redraw the lines using a marker.
7. Carefully cut your Manila paper using a scissor or any other necessary tool.
8. Cut another piece of Manila paper which is identical to your Manila paper. Use paper glue to attach this Manila paper under your Manila protractor. You now have a strong Manila protractor.
9. Use your manila paper to measure different angles in your classroom including the angles at the edges of your table, book etc.

**ANSWERS OF EXERCISES**

**EXERCISE 14.1**

1. (a) 8.1 cm (b) 1.8 cm  
 (c) 3.5 cm (d) 8.1 cm  
 (e) 8.3 cm
2. (a)

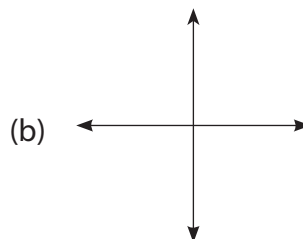
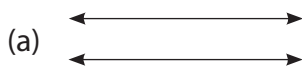


**EXERCISE 14.2**

1. (a) Straight angle (b) Acute angle  
 (c) Obtuse angle (d) Right angle
2. In this question, the teacher will guide to the learners that how to use set square to draw perpendicular line to the given line.

**REMEDIAL EXERCISES**

1. Name the following lines.



2. Measure the following line segments with the help of a ruler.



3. Name the angles:

- (a)  $90^\circ$                       (b)  $65^\circ$                       (c)  $105^\circ$                       (d)  $180^\circ$

4. Write the complementary angle of  $50^\circ$ .

5. Write the supplementary angle of  $70^\circ$ .

### ADDITIONAL NOTE

Guide learners to:

- Explain a point, a ray and a line segment.
- Tell how to measure a line segment.
- Give some examples of parallel lines, perpendicular lines, horizontal line, vertical line and intersecting lines.
- Explain different types of angles.
- Measure the angles with a protractor in a standard direction and then, help learners with special educational needs (SEN) to identify the different shapes using appropriate way.

### ASSESSMENT EXERCISE

1. (a) Acute angle

(b) Obtuse angle

(c) Obtuse angle

2.  $127^\circ$

3. (a)  $140^\circ$

(b)  $20^\circ$

(c)  $90^\circ$

(d)  $90^\circ$

4. (a)  $42^\circ$

(b)  $70^\circ$

(c)  $140^\circ$

(d)  $140^\circ$

(e)  $36^\circ$

(f)  $41^\circ$

5. (a) 6.3 cm

(b) 7 cm

# 2D Shapes and their Properties

## INTRODUCTION

In the previous unit, the learners have learnt measurement of lines and angles. In this unit, the learners will learn, understand and discuss a variety of polygons, symmetrical properties of shapes and properties of 2-dimensional (2D) shapes.

## KEY UNIT COMPETENCE

A learner should be able to use geometric properties to classify shapes.

## ATTITUDES AND VALUES

Appreciate the use of properties to distinguish shapes and recognise that special quadrilaterals are a subset of all quadrilaterals.

## REFERENCES

P4 Mathematics curriculum, P4 Mathematics Pupil Book.

## LINKS TO OTHER SUBJECTS

Used in Art and Science to design different objects.

## ASSESSMENT CRITERIA

The learners will be able to recognise and classify different types of shapes such as triangle, rectangle, square, rhombus, parallelogram etc.

### **Sub-unit 1** 2D shapes and their Properties

*Number of periods: 14*

*Total time for each period: 40 minutes*

## SPECIFIC OBJECTIVES

By the end of this topic, learners will be able to distinguish triangles from

quadrilaterals. They will get the idea of lines of symmetry and order of rotation. Few games will be played on the basis of geometric figures.

### BACKGROUND KNOWLEDGE

To perform well in this topic, learners will be able to:

- Separate the plane shapes from solid shapes.
- Select and define different types of shapes.
- Choose symmetrical and non-symmetrical figures.

### TEACHING METHODS

- Demonstration method: Demonstrate the concept of 2-D shapes by showing real objects.
- Ask various questions on 2-D shapes.
- Guide learners to explain the various 2-D shapes.
- Make groups of learners and conduct various activities.
- Observe and assess the work of the learners and provide assistance where necessary.

### VOCABULARY

Equilateral, isosceles, scalene, acute, obtuse, bisect, perpendicular, rhombus, parallelogram, trapezium, symmetry.

### MATERIALS REQUIRED

Pair of scissors, geometry set, chalk, Blackboard, pencil, textbook.

### PROCEDURE (Teaching Steps):

**Step 1:** Guide the learners to draw all regular and irregular shapes on the board like rectangle, parallelogram, rhombus, kite, trapezium, pentagon, triangle, etc.

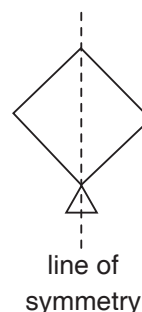
**Step 2:** Ask the pupils to identify the shapes and name them. For example: triangle, square etc.

**Step 3:** Help them to draw a few angles bisect them and make diagonals and explain this to learners.

**Step 4:** Fold papers to explain the lines of symmetry.

**Step 5:** Use few everyday objects for better understanding of geometric figures.

**Step 6:** Help learners to explain about lines of symmetry and rotational symmetry.





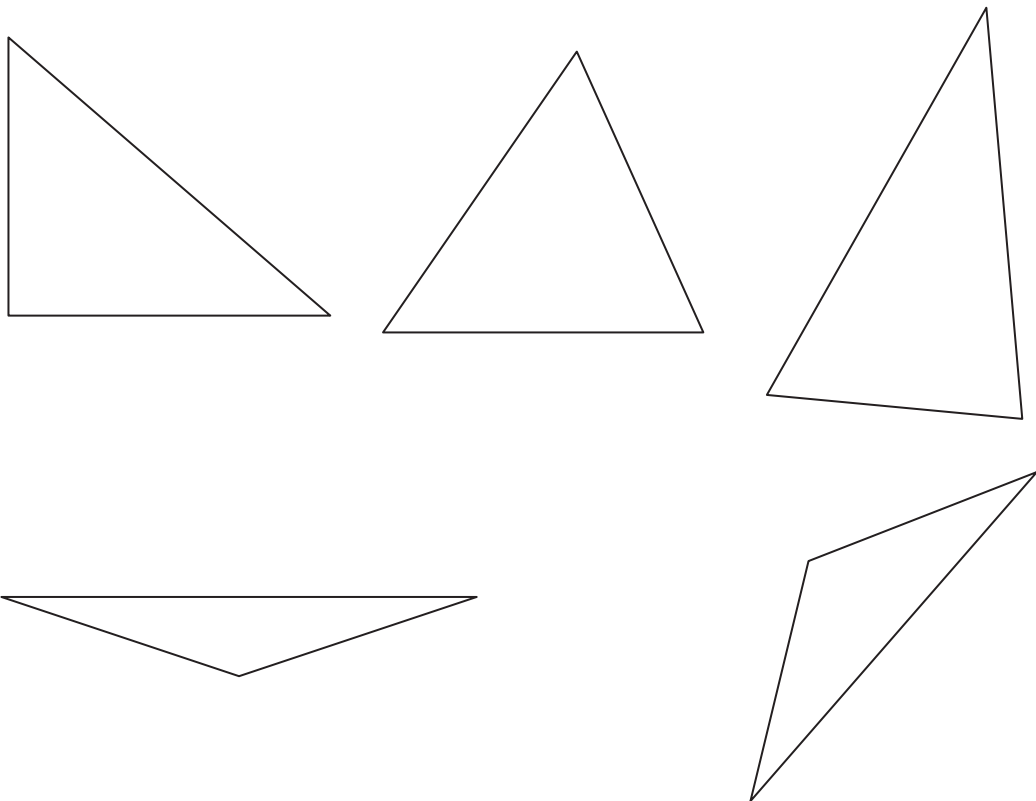
**Activity 15.1 (Page No. 158)**

In this class activity, you will guide the learners to identify some 2D shapes cut out of paper.

Using a pair of scissors and geometry set, cut out the shapes shown in the pupil's book Class Activity 15.1. They should be large enough for all learners to be able to see when pinned on the wall or glued on the board.

Ask them to identify the 2D shapes by writing the name of each shape.

**SUGGESTED ANSWERS OF ACTIVITY 15.1**



- 3
- 3
- 3

**Activity 15.3 (Page No. 162)**

In this Class Activity, you will take your learners to the school premises. Encourage them to identify real life objects with 2D shapes. For example,

library, books, paper, chair, school playground. Guide the learners through following instructions:

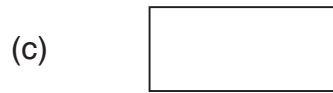
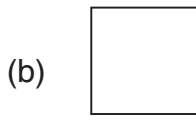
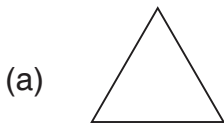
- Move around in your classroom, library and the whole school compound. Identify at least 10 objects which have two dimensional (2D) shapes.
- With reasons, explain to your classmates whether the object is a square, rectangle, rhombus, trapezium, triangle etc.

### SUGGESTED ANSWERS OF ACTIVITY 15.3

The objects could be a wall, table top, door, basket ball court, roof, blackboard, books, notebooks etc.

### REMEDIAL EXERCISES

- Identify the following figures and write their names.

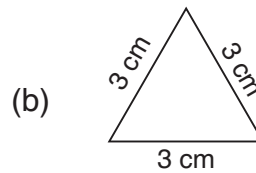
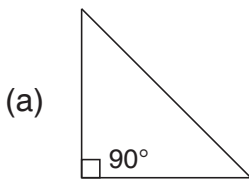


\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

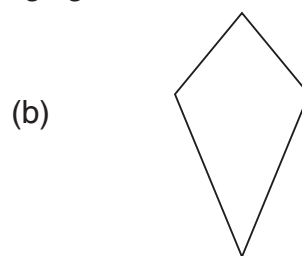
- Write the name of the following triangles.



\_\_\_\_\_

\_\_\_\_\_

- How many vertices are there in a triangle?
- How many sides are there in a square?
- Draw the lines of symmetry in the following figures:



### ADDITIONAL NOTE

- Help learners to explain 2D-shapes like triangle, square, rectangle, rhombus, parallelogram, trapezium, kite, etc.

- Explain the properties and types of triangle, using few real life example of triangles.
- Give examples of the symmetrical figures and their lines of symmetry.
- Explain in brief the order of rotational symmetry then, encourage the SEN learners to take active participation in this class activity.

### **ANSWERS OF EXERCISES**

#### **EXERCISE 15.1**

- |                              |                          |
|------------------------------|--------------------------|
| 1. (a) Equilateral triangle  | (b) Scalene triangle     |
| (c) Isosceles triangle       |                          |
| 2. (a) Right angled triangle | (b) Acute angle triangle |
| (c) Obtuse angle triangle    |                          |

#### **ASSESSMENT EXERCISE**

- |                             |                      |       |       |
|-----------------------------|----------------------|-------|-------|
| 1. (a) Equilateral triangle | (b) Scalene triangle |       |       |
| (c) Isosceles triangle      |                      |       |       |
| 2. (a) Rectangle            | (b) Triangle         |       |       |
| (c) Square                  | (d) Trapezium        |       |       |
| (e) Rhombus                 | (f) Parallelogram    |       |       |
| (g) Kite                    |                      |       |       |
| 3. (a) 0                    | (b) 4                | (c) 2 | (d) 0 |
| 4. (a) 4                    | (b) 2                | (c) 2 | (d) 2 |

# 16 UNIT

## Area and Perimeter of 2D Shapes

### INTRODUCTION

In previous unit, learners have learnt 2-dimensional figures such as rectangle, triangle etc. In this unit they will learn how to calculate the perimeter and area of 2-dimensional (2D) figures.

### KEY UNIT COMPETENCE

By the end of this unit, a learner should be able to use area of rectangle to determine the area of a triangle and special quadrilaterals.

### ATTITUDES AND VALUES

Appreciate that the relationship between area and perimeter is simple.

### REFERENCES

P4 Mathematics curriculum, P4 Mathematics Pupil Book.

#### Additional references:

<http://www.sheppardsoftware.com/math.htm>

### LINKS TO OTHER SUBJECTS

**Geography:** Finding area of land.

### ASSESSMENT CRITERIA

The learners can find the perimeter and area of 2-dimensional (2D) figures.

### Sub-unit 1 Area of 2D Shapes

*Number of periods: 14*

*Total time for each period: 40 minutes*

### SPECIFIC OBJECTIVES

By the end of this topic learners should be able to draw 2-dimensional figures,

find the area of triangles, quadrilaterals and other 2-dimensional figures that can be related to rectangles.

### BACKGROUND KNOWLEDGE

To perform well in this topic, learners should be able to:

- Define the 2D-shapes and give examples:  
Triangle, rectangle, square, rhombus, parallelogram and trapezium.

### TEACHING METHODS

- Demonstration method: Demonstrate various 2-D shapes such as triangle, square, trapezium etc.
- Ask questions on various 2-D shapes to the learners.
- Guide learners to explain the concept of shapes and give examples.
- Make group of learners and give them various activities.
- Observe and assess the work of learners and provide assistance where necessary.

### VOCABULARY

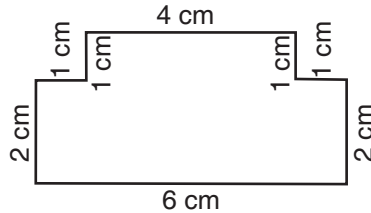
Area, perimeter, base, height, diagonals, etc.

### MATERIALS REQUIRED

Complete geometry set, text book, manila paper, pencils, crayons, graph papers, scissors, chalk, board, flash cards etc.

### PROCEDURE (Teaching steps):

- Step 1:** Remind the learners about 2-dimensional (2D) figures they have already learnt in the previous unit.
- Step 2:** Guide learners to draw a triangle and a quadrilateral (rectangle) on the board.
- Step 3:** Explain the area of both figures, show them how to find the perimeter and area of both figures.
- Step 4:** Use real life examples like book, board etc. and tell them how to find out the area of those objects.
- Step 5:** Guide learners to calculate the perimeter of various shapes. For example:



$$\begin{aligned} \text{Perimeter} &= 4 \text{ cm} + 1 \text{ cm} + 1 \text{ cm} + 2 \text{ cm} + 6 \text{ cm} + 2 \text{ cm} + 1 \text{ cm} + 1 \text{ cm} \\ &= 18 \text{ cm.} \end{aligned}$$

### Activity 16.1 (Page No. 164)

Learners encountered the idea of dividing a plot of land into square grids each of  $1 \text{ cm}^2$  in Unit 9. Begin this activity by reminding the learners that how a rectangle can be divided into grids and how this can be used to find the area.

In this class activity, you will guide the learners how to determine the area of a rectangle by counting the number of square grids in the rectangle. Ask them to follow the instructions below:

1. Draw a rectangle of length 6 cm and width 4 cm on a graph paper.
2. Divide the rectangle into grids by dividing the length into 6 equal parts and width into 4 equal parts.
3. Count the total number of grids formed in the rectangle. This is equal to the area of the rectangle.

### SUGGESTED ANSWERS OF ACTIVITY 16.1

Area of Rectangle = Length  $\times$  Width

$$6 \text{ cm} \times 4 \text{ cm} = 24 \text{ cm}^2$$

### Activity 16.2 (Page No. 165)

In this class activity the learners will find the area of a triangle from a rectangle.

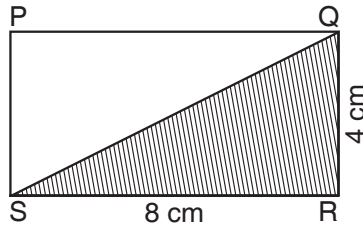
**Learning aids:** Scissor, graph paper, complete geometry set, pencil, eraser

Learners will complete the activity by following the procedures below:

1. Draw a rectangle of length 8 cm by 4 cm on a graph paper.
2. Divide this rectangle into Thirty-two  $1 \text{ cm}^2$  grids. The area of this rectangle is  $32 \text{ cm}^2$ .
3. Cut out the rectangle using a pair of scissor.
4. Fold this rectangle along one of its diagonal. This forms two equal triangles.
5. Find out the area of each triangle?
6. How does the area of the triangle related to the area of the rectangle?

$$\text{Area of triangle} = \frac{1}{2} (\text{area of rectangle})$$

**SUGGESTED ANSWERS OF ACTIVITY 16.2**



Geometrically, shapes are named in the anti-clockwise direction.

PSRQ is a rectangle

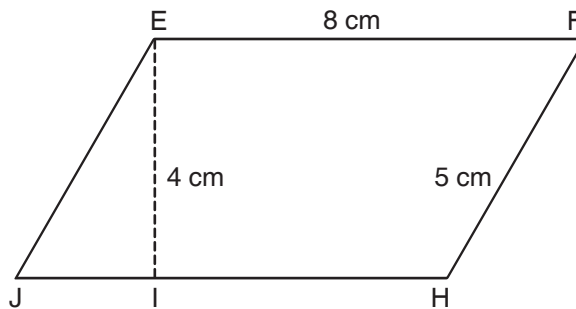
- Area of rectangle = length  $\times$  width  
 $= 8 \times 4 = 32 \text{ cm}^2$

The shaded part is a triangle QSR

- Area of DQSR  $= \frac{1}{2} \times \text{base} \times \text{height} = \frac{1}{2} \times 8 \times 4 = \frac{32}{2} = 16 \text{ cm}^2$

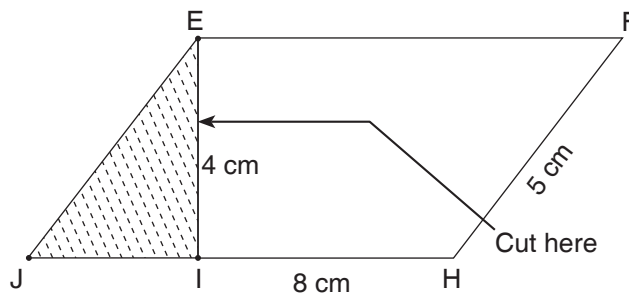
**Activity 16.3 (Page No. 167)**

In this activity you will guide the learners to understand the area of a parallelogram.



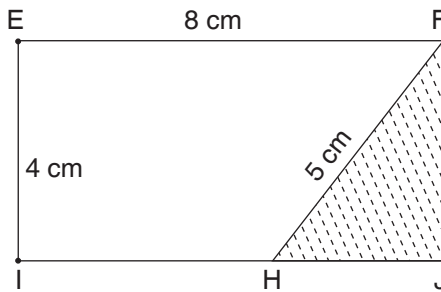
**SUGGESTED ANSWERS OF ACTIVITY 16.3**

Consider a parallelogram JHFE of base 8 cm, height 4 cm and width 5 cm.



If we cut the parallelogram along the height EI, we get shaded part EJI we can paste the shaded part to the right hand side of HF.

The new figure formed is EIJF as shown in the figure below:



- Figure EIJF is a rectangle of length 8 cm and breadth 4 cm.

So, the area of the parallelogram EIJF =  $8 \times 4 = 32 \text{ cm}^2$

Area of parallelogram = base $\times$ height
--

### Activity 16.6 (Page No. 172)

In this class activity, help the learners to use straws to form a triangular frame and find its perimeter.

**Learning aids:** Ordinary drinking straw and a complete geometry set.

Guide your learners in completing the Class Activity in groups of 4 by following the procedure below:

- You are provided with ordinary drinking straws.
- Cut three straws such that each one has a length of 8 cm.
- Join these straws to form a triangle.
- What will be perimeter of the triangle?

### SUGGESTED ANSWERS OF ACTIVITY 16.6

Perimeter of triangle = sum of 3 sides =  $8 + 8 + 8 = 24 \text{ cm}$ .

### Activity 16.7 (Page No. 172)

In this activity, guide the learners to design a square, rectangle, rhombus, parallelogram and trapezium whose perimeter = 24 cm. Working in groups of 4, let learners design and model the above named polygons using the straws you have provided.

- 4 straws each 4 cm long
- 4 straws each 8 m long
- 9 straws each 6 cm long
- 1 straw of length 3 cm

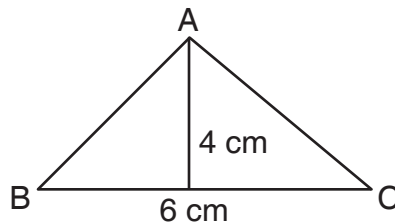


- 1 straw of length 5 cm
- 1 straw of length 10 cm.

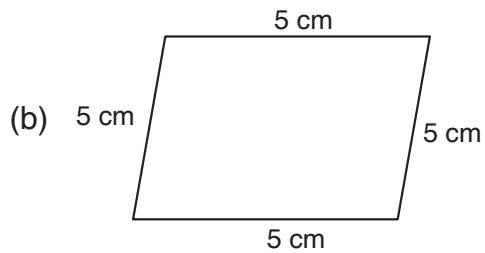
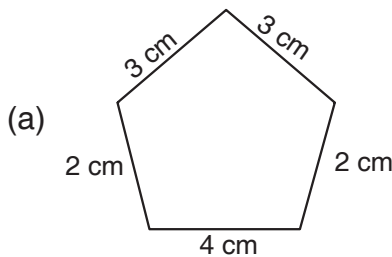
Note: For a square (and rhombus) use four 6 cm straws, for a rectangle (and parallelogram) use two 8 cm and two 4 cm straws and for a trapezium use one 6 cm straw, one 3 cm, one 5 cm and one 10 cm straw.

### REMEDIAL EXERCISES

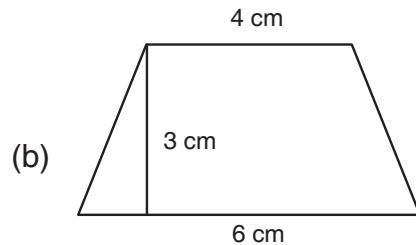
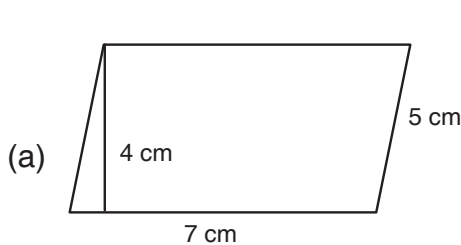
1. Calculate the area of a square whose one side is 4 cm.
2. Find the area of a rectangle whose length and breadth are 8 cm and 5 cm respectively.
3. Find the area of the given triangle.



4. Calculate the perimeters of the following figures:



5. Calculate the area of the following figures:



### ADDITIONAL NOTE:

- Ask some questions to check background knowledge of the learners.
- Explain the related terms to the slow learners.
- Help learners to determine the formula to calculate the area of different 2D-shapes.

- Help them to solve problems related to area on the blackboard.
- Motivate the SEN learners to be engaged in this activity by their own and guide them.

### **ANSWERS OF EXERCISES**

#### **EXERCISE 16.1**

- (i)  $50 \text{ cm}^2$       (ii)  $25 \text{ cm}^2$       (iii)  $49 \text{ cm}^2$       (iv)  $15 \text{ cm}^2$

#### **EXERCISE 16.2**

- (a) 40      (b)  $120 \text{ cm}^2$

#### **EXERCISE 16.3**

- (a)  $45 \text{ cm}^2$       (b)  $40 \text{ cm}^2$

#### **ASSESSMENT EXERCISE**

1. (a)  $289 \text{ cm}^2$       (b)  $90 \text{ cm}^2$   
(c)  $150 \text{ cm}^2$
2. (a) 26 cm      (b) 28 cm  
(c) 20 cm      (d) 20 cm  
(e) 55 cm      (f) 32 cm  
(g) 44 cm      (h) 64 cm

# Elementary Statistics

## INTRODUCTION

In the previous unit, learners have already learnt data handling through bar graph and tables. In this unit learners will learn to collect data and interpret it on tables and graphs. The learners will also discuss the difference between quantitative and qualitative data.

## KEY UNIT COMPETENCE

By the end of this unit, a learner should be able to collect, represent and interpret data.

## ATTITUDES AND VALUES

- Appreciate the importance of data collection in daily life situations.
- Appreciate the importance of interpreting and extracting information from tables.
- Appreciate the importance of statistics tables and graphs in daily life situations

## REFERENCES

P4 Mathematics curriculum, P4 Mathematics Pupil Book.

### Additional references:

<http://www.sheppardsoftware.com/math.htm>

## LINKS TO OTHER SUBJECTS

**Geography:** Grouping population according to ages.

## ASSESSMENT CRITERIA

The learners can extract information from tables and bar graphs.

**Sub-unit 1 Elementary Statistics**

*Number of periods: 14*

*Total time for each period: 40 minutes*

**SPECIFIC OBJECTIVES**

In the previous unit learners have already learnt graphs and tables. In this unit, learners will present data using bar graphs and tables. They differentiate quantitative from qualitative data.

**BACKGROUND KNOWLEDGE**

To perform well in this topic, learners should be able to:

- Define information.
- Describe raw data.
- Establishing the difference between tables and graphs.

**TEACHING METHODS**

- Demonstration method: Demonstrate the bar graph and tables to the learners.
- Ask questions on bar graph.
- Guide learners to explain the concept of statistics.
- Make groups of learners and conduct various activities.
- Observe and assess the work of the learners and provide assistance where necessary.

**VOCABULARY**

Quantitative, qualitative, graph, statistics, census, survey, interview.

**MATERIALS REQUIRED**

Manila charts, Manila paper, books, pen, pencils etc.

**PROCEDURE (Teaching Steps)**

**Step 1:** Guide learners to discover that graphs, where pictures are used for the information, are called pictographs.

**Step 2:** Explain the procedure of drawing a pictograph.

**Step 3:** Use pre-prepared charts and tables to discuss various questions about bar graphs and tables.

**Step 4:** Refer to the learner's book and guide learners to discuss the examples 'given on pages 178, 179, 180 and 181'.

**Activity 17.1 (Page No. 179)**

In this class activity, the learners will learn about the representation of data in a table.

Ask the learners to collect data from each other and make the table with two separate columns. First column will represent the name of the pupils and other will represent the age (in years) of the pupil.

For example:

Name	Age (in years)
1. Shina	9
2. Maria	10
3. Akiki	9
4. Michael	9
5. Nimmo	8

**Activity 17.2 (Page No. 181)**

In this class activity, the learners will learn to observe the data from table and remodel it through bar graphs.

Favourite fruit	Number of students
Apple	8
Orange	10
Pineapple	3
Banana	6

Guide the learners to draw bar graph on the basis of the table given above.

A few questions can be asked, like

- (a) How many pupils like apples?
- (b) How many pupils like oranges?
- (c) How many pupils like bananas
- (d) How many pupils like oranges and bananas both?

**REMEDIAL EXERCISE**

1. Look at the table given below which shows the marks of 5 pupils in Mathematics.

Name	Marks
Olio	65
Maria	96
Mwiza	54
Michael	92
Sheena	80

Now, answer the following questions.

- Who got the maximum marks?
- Who got the minimum marks?
- How many marks did Sheena get?
- How many marks did Michael get?
- Find the sum of the marks obtained by all the learners.

**ADDITIONAL NOTE**

- First of all, explain guide learners to data and information.
- Differentiate quantitative from qualitative data.
- Summarize the ways of collecting data.
- Explain how data is presented by using tables and graphs.
- Make few bar graphs on the blackboard, and then give chance to SEN learners to answer to questions and provide assistance where necessary.

**ANSWERS OF EXERCISES****EXERCISE 17.1**

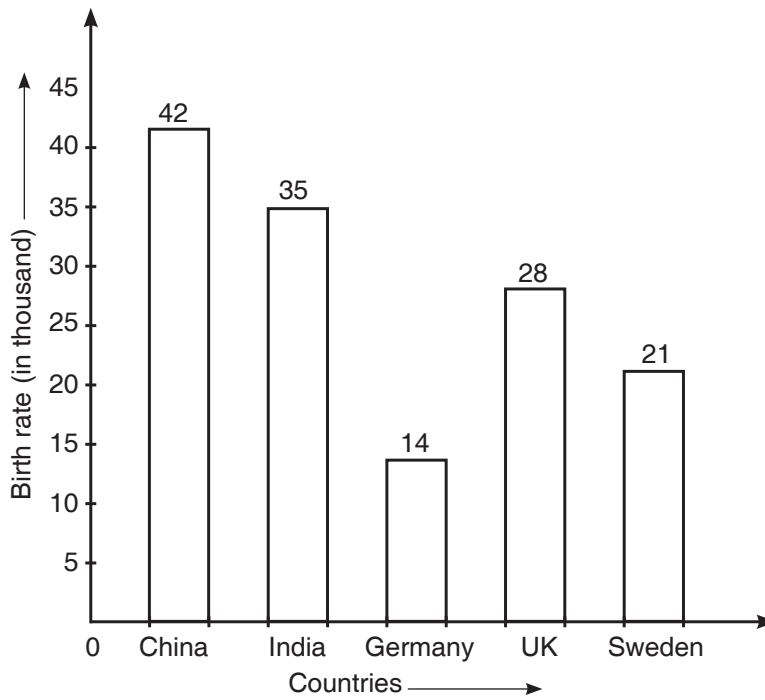
(a)

Colour	No. of pupils
Red	5
Blue	3
Black	3
Green	3
Pink	4
Yellow	2

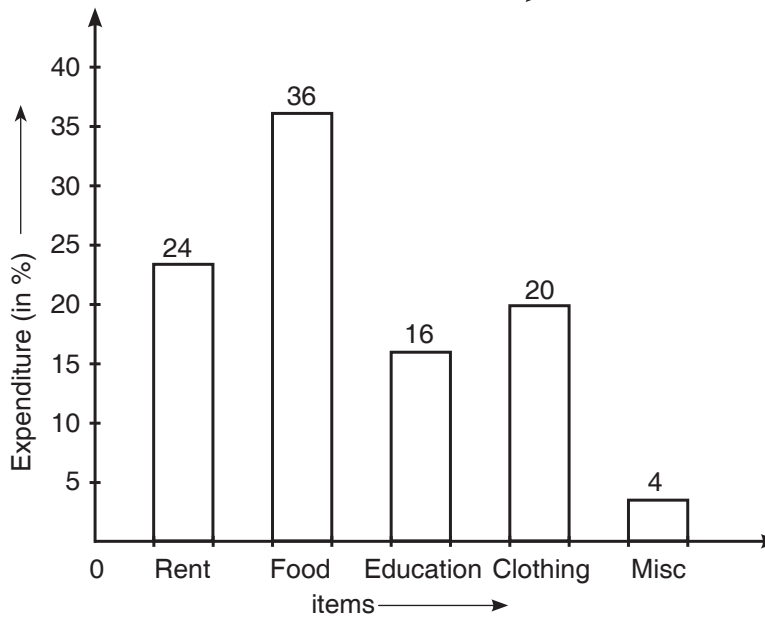
- (b) Red colour is liked by the most number of pupils.
- (c) Yellow colour is liked by the least number of pupils.

**ASSESSMENT EXERCISE**

1.



2.



3. (a) Ann	–	200 000 Frw
Julie	–	250 000 Frw
Safina	–	300 000 Frw
Jamila	–	350 000 Frw
Rose	–	400 000 Frw

(b) Safina's Salary + Ann's Salary = 300 000 + 200 000 = 500 000 Frw

(c) Average Salary =  $\frac{250\,000 + 300\,000 + 400\,000}{3}$   
 $= \frac{950\,000}{3} = 316\,666.66$  Frw



# 18 UNIT

## Introduction to Probability

### INTRODUCTION

Probability is a new concept. Learners will discuss strategies, chance, turn, etc. through various games like ludo and Bingo. Learners will also learn how to decide whether games with coin, dice and card games are fair or not.

### KEY UNIT COMPETENCE

Play games of chance and decide whether or not they are fair.

### ATTITUDES AND VALUES

Appreciate the importance of respecting the rules and taking turns when playing games of cards, coins, throwing dice, snakes and ladders, and bingo in probability.

### REFERENCES

P4 Mathematics curriculum, P4 Mathematics Pupil Book.

### Additional references:

<http://www.sheppardsoftware.com>

### LINKS TO OTHER SUBJECTS

Creative art and sports

### ASSESSMENT CRITERIA

The learners can explain the concept of probability. They will also be able to relate games like tossing a coin, cards, throwing dice, snakes and ladders and bingo with probability.

## Sub-unit 1 Introduction to Probability

*Number of periods: 7*

*Total time for each period: 40 minutes*

### SPECIFIC OBJECTIVES

By the end of this topic learners will be able to play games based on probability and decide whether or not they are fair.

## BACKGROUND KNOWLEDGE

To perform well in this topic, learners should be able to:

- Define the chance, possibility and outcomes
- Play games of tossing coins and throwing dice.

## TEACHING METHODS

- Demonstration method: Demonstrate the concept of probability by showing real objects such as dice or cars.
- Ask learners questions on probability.
- Guide learners to explain the concept of probability.
- Make Groups of learners and give them activities related to probability.
- Observe and assess the work of the learners and provide assistance where necessary.

## VOCABULARY

Chance, turn, toss, strategy, combination, deal, fair, unfair, pack, shuffle, etc.

## MATERIALS REQUIRED

Rwandan currency coin (preferably the 100 francs), board games, cards, dice etc.

## PROCEDURE (Teaching Steps):

**Step 1:** Explain the basic concept of probability to the learners with an example of tossing a coin.

**Step 2:** Explain another example of card game.

**Step 3:** Lead them through activities given in the unit.

**Step 4:** Let the pupils play board game, cards, ludo, snakes and ladders and dice throwing, ask them what they observe and let them come to their own conclusion.

**Step 5:** Guide them through the exercises (if necessary).

## Activity 18.1 (Page No. 183)

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### Tossing a coin

In this activity, the learners will take turns in tossing a coin to discover the likelihood of getting a head or a tail when a coin is tossed. Guide the learners through the following steps:

- Pair up with one of your classmates.
- Together with your friend, you will decide which side of the coin is the head and which one is the tail. Confirm with the teacher.

- You will toss the coin, allow it to fall on the floor and note down the side facing up. If the head is facing up in the 1st toss, then write H on the table. Otherwise, write T for a tail facing up.
- Repeat the experiment 9 more times and record your results honestly in the table.
- Each one of you will draw a table like the one shown below in your book.

Number of throw	1st	2nd	3rd	4th	5th	6th	7th	8th	9th	10th
Side facing up										

Let your friend also repeat what you have done and help him/her record his/her results in a table.

Compare your results and see who has more heads than the other.

Help them to discuss the following questions:

- Was the game fair?
- Are there some winning strategies for getting a head up?
- Some people believe that girls will get more “heads” up than “tails”. Do you agree?
- Some people think that tossing the coin first makes you get “tails” only. Is this true?

### Activity 18.2 (Page No. 184)

#### Tossing 3 coins at once

Allow learners to work in groups and provide each group with three 100 Rwandan franc coins.

- In this activity, you will pair up with a classmate.
- Carefully observe the coin faces and decide which are the heads?
- You will be required to toss all the three coins at the same time and note the sides of the coin facing up. It is good to decide on a winning combination before starting the game. For instance, the winning combination may be getting 2 heads and 1 tail. If you get anything else, then you have lost.
- Toss the three coins at once and note the sides facing up. Record your result as a win or a loss.
- Give the three coins to your friend and let him/her toss.
- Repeat the experiment several times and see who gets 10 wins first.

Discuss the following questions:

- (a) Were we very sincere while doing the experiment?
- (b) Is it possible to get 2 heads and a tail?
- (c) Some people believe that small coins show heads only and big coins show tails only. Do you agree with this?

### Activity 18.3 (Page No. 184)

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In this class activity, the learners will play a game of cards and discover how lucky they are!!!!

**Learning aid:** A pack of playing cards

**Key words:**

- Dealing cards = distributing cards to friends
- Shuffling = mixing the cards
- Picture cards = the cards with J, Q and K.
- Suit = each of the set of cards distinguished by emblem and colour. Identify them as spades, clubs, hearts and diamond.

Guide the learners through following instructions:

- (a) Open the pack of playing cards. Count the total number of cards and record your answer.
- (b) Group the cards of the same type together. You should have 5 groups of cards namely; hearts, spades, clubs, diamonds and jokers.
- (c) Count and record the number of each suit of cards.
- (d) How many picture cards are there altogether?
- (e) Shuffle the pack of playing cards very well. Deal 5 cards to your neighbour.
- (f) Open the cards so that everybody can see. Count the number of aces he/she has got and record the number.
- (g) Repeat the shuffling and dealing for everybody in the group.
- (h) Play the game for a number of times, each time recording the number of aces each pupil has got.
- (i) The pupil who gets 10 aces first is the winner of this game.
- (j) Let them discuss: Is the game fair? If you think it is unfair, discuss how you could make it fair for everyone.

**REMEDIAL EXERCISES**

1. How many faces does a coin have?
2. How many faces does a die have?
3. How many cards are there in a pack of cards?
4. What are the faces of a coin called?
5. Can you get a coin of 3 faces?

**ADDITIONAL NOTE**

Guide learners to:

- Explain general terms like tossing a coin, throwing a dice.
- Explain dice games and their outcomes when throwing.
- Give and explain games related to probability. and then give chance to the learners with special educational needs (SEN) to toss the coin and record the result in the table.

**Assessment Exercise**

Do it yourself.

# Glossary

**Abacus:** a table or frame used for performing arithmetical calculations.

**Acre:** a unit of land measure equivalent to 4046 square metres.

**Addends:** the numbers being added together.

**Angle:** circular measure of the space between two intersecting lines.

**Acute angle:** Angle measures less than  $90^\circ$ .

**A.M:** Ante Meridien, time before mid-day.

**Architect:** person who designs and constructs buildings.

**Area:** measurement of the 2D space surrounded by lines.

**Arithmagon:** a polygon with numbers at its vertices which determine the numbers written on its edges.

**Arithmetic:** branch of math that deals with calculations of sums.

**Calculator:** instrument used to help adding, subtracting, multiplying and dividing numbers.

**Calendar:** an arrangement of dates, days and months of the year.

**Capacity:** the amount of liquid a given container can carry.

**Circle:** closed figure with all points at equal distance from the centre.

**Circumference:** distance all round a circle.

**Cube:** closed figure with six equal faces.

**Coin:** metallic money in the form of a small disc.

**Compass:** device for telling the direction.

**Data:** any information collected for statistics.

**Denominator:** the lower number in a fraction.

**Diagonal:** a line (which is not a side) joining any two vertices of a polygon.

**Diameter:** distance from one point on a circumference to the other through the centre. It is twice the radius of a circle.

**Digit:** a numeral or number.

**Edge:** the boundary line of a surface.

**Even number:** a number which is divisible by 2.

**Equivalent fractions:** two fractions which have the same numerical value.

**Estimate:** to approximate something.

**Face:** any of the flat surface of a solid figure.

**Factors:** any two numbers multiplied together to form another number.

**Fraction:** ratio of two numbers; the numerator and the denominator.

**Gram:** a unit of mass equivalent to 0.001kg.

**Graph:** a diagram displaying data showing the relation between two quantities.

**GCD:** Greatest Common Divisor.

**H.C.F:** Highest Common Factor.

**Intersect:** for lines, to meet at a point.

**L.C.M:** Lowest Common Multiple

**Line:** a straight path passing through two or more points.

**Litre:** the unit of capacity equivalent to 1000 cm<sup>3</sup>.

**Multiple:** a number that may be divided by another number leaves no remainder.

**Numerator:** the lower number of a fraction.

**Oblique line:** a line which is neither horizontal nor vertical. It is a sloping/ slanting line.

**Pair of compasses:** a tool consisting of two arms used to draw circles.

**Parallel lines:** these are lines which do not meet at all.

**Pentagon:** a 5-sided closed figure.

**Perimeter:** the distance all round a closed 2D figure.

**Perpendicular lines:** two or more lines which intersect at an angle of 90°.

**Plane:** a flat surface.

**Point:** a small dot used to represent the location of something.

**Polygon:** a closed figure bounded by straight or curved edges.

**Prime number:** a number with only two factors. One factor being 1 and the other one is itself.

**Probability:** this is the chance or likelihood of something happening.

**Protractor:** This is a geometrical instrument used for measuring angles.

**Quadrilateral:** This is any 4-sided closed figure.

**Radius:** this is the distance from the centre of a circle to any point on the circumference of the circle. It is half the diameter.

**Range:** this is the difference between the largest and smallest numbers in a data.

**Ratio:** it refers to the division of two numbers.

**Remainder:** a number which is left when two numbers are divided.

**Right angle:** an angle which is equal to 90°.

**Square:** a closed 4-sided figure with all sides equal.

**Symmetrical shape:** A shape that can be separated in to two exactly equal parts which can overlap.

**Tossing a coin:** An event of throwing a coin in air so that it falls with one side facing upwards.

**Triangle:** a closed figure with three sides, three angles and three vertices.

**Vertex:** a point on a polygon where two lines meet.

**Volume:** the space occupied by an object.

**X-axis:** the horizontal line on the Cartesian plane.

**Y-axis:** the vertical line on the Cartesian plane.