



KENYA INSTITUTE OF CURRICULUM DEVELOPMENT
A skilled and Ethical Society

PRIMARY SCHOOL CURRICULUM DESIGN

MATHEMATICS

GRADE 6

First Published 2017

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NATIONAL GOALS OF EDUCATION

1. Foster nationalism, patriotism, and promote national unity

Kenya's people belong to different communities, races and religions and should be able to live and interact as one people. Education should enable the learner acquire a sense of nationhood and patriotism. It should also promote peace and mutual respect for harmonious co-existence.

2. Promote social, economic, technological and industrial needs for national development

Education should prepare the learner to play an effective and productive role in the nation.

a) Social Needs

Education should instill social and adaptive skills in the learner for effective participation in community and national development.

b) Economic Needs

Education should prepare a learner with requisite competences that support a modern and independent growing economy. This should translate into high standards of living for every individual.

c) Technological and Industrial Needs

Education should provide the learner with necessary competences for technological and industrial development in tandem with changing global trends.

3. Promote individual development and self-fulfillment

Education should provide opportunities for the learner to develop to the fullest potential. This includes development of one's interests, talents and character for positive contribution to the society.

4 Promote sound moral and religious values

Education should promote acquisition of national values as enshrined in the Constitution. It should be geared towards developing a self-disciplined and ethical citizen with sound moral and religious values.

5. Promote social equity and responsibility

Education should promote social equity and responsibility. It should provide inclusive and equitable access to quality and differentiated education; including learners with special educational needs and disabilities. Education should also provide the learner with opportunities for shared responsibility and accountability through service learning.

6. Promote respect for and development of Kenya's rich and varied cultures

Education should instil in the learner appreciation of Kenya's rich and diverse cultural heritage. The learner should value own and respect other people's culture as well as embrace positive cultural practices in a dynamic society.

7. Promote international consciousness and foster positive attitudes towards other nations

Kenya is part of the interdependent network of diverse peoples and nations. Education should therefore enable the learner to respect, appreciate and participate in the opportunities within the international community. Education should also facilitate the learner to operate within the international community with full knowledge of the obligations, responsibilities, rights and benefits that this membership entails.

8. Good health and environmental protection

Education should inculcate in the learner the value of physical and psychological well-being for self and others. It should promote environmental preservation and conservation, including animal welfare for sustainable development.

LESSON ALLOCATION AT UPPER PRIMARY

S/No	Learning Area	Number of Lessons
1.	English	5
2.	Kiswahili / Kenya Sign Language	4
3.	Mathematics	5
4.	Religious Education	3
5.	Science & Technology	4
6.	Agriculture and Nutrition	4
7.	Social Studies	3
8.	Creative Arts	6
9.	Pastoral/Religious Instruction Programme	1
Total		35

LEVEL LEARNING OUTCOMES

By the end of the Primary Education, the learner should be able to:

- a) Communicate appropriately using verbal and or non-verbal modes in a variety of contexts.
- b) Demonstrate mastery of number concepts to solve problems in day to day life
- c) Demonstrate social skills, moral and religious values for positive contribution to society
- d) Develop one's interests and talents for personal fulfilment
- e) Make informed decisions as local and global citizens of a diverse, democratic society in an interdependent world.
- f) Explore, manipulate, manage and conserve the environment effectively for learning and sustainable development
- g) Acquire digital literacy skills for learning and enjoyment.
- h) Appreciate the country's rich, diverse cultural heritage for harmonious living

ESSENCE STATEMENT

Mathematics is a learning area that involves computation in numbers and arithmetic, shapes, spatial relations and information processing in the form of data. It is a vehicle of development and improvement of a country's economic development. By learning mathematics, learners develop a understanding of numbers, logical thinking skills and problem solving skills. Mathematics is applied in business, social and political worlds. At this level mathematics will build on the competencies acquired by the learner in the early years of education. Learning mathematics will also enhance the learner' competencies in numeracy as a foundation of STEM at the higher levels of Education cycle. Mathematics is also a subject of enjoyment and excitement a it gives learners opportunities for creative work and fun.

SUBJECT GENERAL LEARNING OUTCOMES

By the end of Primary Education, the learner should be able to:

- a) Demonstrate mastery of number concepts by working out problems in day-to-day life.
- b) Apply measurement skills to find solutions to problems in a variety of contexts.
- c) Apply properties of geometrical shapes and spatial relationships in real life experiences.
- d) Apply data handling skills to solve problems in day-to-day life.
- e) Analyze information using algebraic expressions in real life situations.
- f) Apply mathematical ideas and concepts to other learning areas or subjects and in real life contexts.
- g) Develop confidence and interest in mathematics for further learning and enjoyment.
- h) Develop values and competencies for a cohesive harmonious living in the society.
- i) Manage pertinent and contemporary issues for enhanced inter-personal relationships.

STRAND 1.0: NUMBERS

Strand	Sub Strand	Specific Learning Outcomes	Suggested Learning Experiences	Suggested Key Inquiry question
1.0 Numbers	1.1 Whole Numbers (20 Lessons)	<p>By the end of the Sub Strand, the learner should be able to:</p> <ol style="list-style-type: none"> use place value and total value of digits upto millions in real life, use numbers up to millions in symbols in real life, read and write numbers up to 100,000 in words in real life, order numbers up to 100,000 in real life situations, round off numbers up to 100,000 to the nearest thousand in different situations, 	<p>Learner is guided to:</p> <ul style="list-style-type: none"> work in pairs/groups or as individuals to identify place value of digits up to millions using place value apparatus. work in pairs/groups or as individuals to read numbers up to millions in symbols from number charts/ cards. work in pairs/groups or as individuals to read write numbers up to hundred thousand in words from number charts/ cards. work in pairs/groups or as individuals to read numbers up to millions in symbols from number charts/ cards. discuss in pairs/groups and form different numbers by rearranging digits of a number up to 100,000. discuss in pairs/groups and round off numbers up to hundred thousand to the 	<p>How do we read and write numbers in symbols and in words?</p>

		<p>f) apply squares of wholenumbers up to 100 in different situations,</p> <p>g) apply square roots of perfect squares upto 10,000 in differentsituations</p> <p>h) appreciate use of wholenumbers in real life situations.</p>	<p>nearest 1,000 from number cards and share with other groups.</p> <ul style="list-style-type: none"> • in pairs/groups or as individuals to multiply a given number by itself and identify the answer as the square of the number. • work out the square root of a given number and recognize the value which when multiplied by itself results in the given number. • play games involving whole number using digital devices or other resources. 	
<p>Core competencies to be developed: Critical thinking and problem solving; learners form different numbers by rearranging digits of a given number.</p>				
<p>Values: Unity: learners in pairs or groups harmoniously identify total value of digits up to millions using place value apparatus.</p>				
<p>PCIs: Learners in groups or pairs work cohesively and identify the square root of a given number as a value which when multiplied by itself results in the given number to enhance Social cohesion.</p>				
<p>Link to other subjects: Learners read and write numbers in words which they can use in compositions in languages Work in pairs/groups or as individuals to read numbers up to millions insymbols from number charts/ cards.</p>				

Strand	Sub Strand	Specific Learning Outcomes	Suggested Learning Experiences	Suggested Key Inquiry Questions
1.0 Numbers	1.2 Multiplication (6 Lessons)	<p>By the end of the Sub Strand, the learner should be able to;</p> <p>a) multiply up to a 4-digit number by a 2-digit number in real life situations,</p> <p>b) estimate products by rounding off numbers being multiplied to the nearest ten in real life situations,</p> <p>c) make patterns involving multiplication of numbers not exceeding 1,000 in different situations,</p> <p>d) appreciate use of multiplication in real life.</p>	<p>Learner is guided to:</p> <ul style="list-style-type: none"> • multiply up to a 4-digit number by a 2-digit number using; <ul style="list-style-type: none"> - fact families - skip counting - multiplication chart - expanded form - digital devices. • estimate products using; <ul style="list-style-type: none"> - rounding off factors - compatibility of numbers • make patterns involving multiplication with products not exceeding 1,000 using number cards. • learners in pairs/groups or as individuals play games using digital or other resources involving multiplication. 	<p>How do we multiply numbers?</p>

Core Competencies to be developed:

Creativity and imagination; learners make patterns involving multiplication with products not exceeding 1,000 using number cards.

Values:

Learners multiply up to a 4-digit number by a 2-digit number using skip counting and demonstrate honesty in their results.

PCIs:

Learners develop confidence as they estimate products using rounding off factors which builds self-esteem.

Link to other subjects:

Learners estimate quantities of seeds or fertilizer required for sowing different crops as part of Agriculture and nutrition.

Strand	Sub Strand	Specific Learning Outcomes	Suggested Learning Experiences	Suggested Key Inquiry Questions
1.0 Numbers	1.3 Division (6 Lessons)	<p>By the end of the Sub Strand the learner should be able to;</p> <p>a) Divide up to a 4-digit number by up to a 3-digit number where the dividend is greater than the divisor in real life situations,</p> <p>b) Estimate quotients by rounding off the dividend and divisor to the nearest ten in real life situations,</p> <p>c) Perform combined operations involving addition, subtraction, multiplication and division up to 3-digit number</p> <p>d) appreciate use of division of whole numbers in real life.</p>	<p>Learner is guided to:</p> <ul style="list-style-type: none"> • divide up to a 4-digit number by up to a 3-digit number and share the answers where the dividend is greater than the divisor using; <ul style="list-style-type: none"> - relationship between multiplication and division - long method. • work out quotients by rounding off the dividend and divisor to the nearest ten. • work out questions involving two, three or four operations up to 3 digit numbers. • divide whole numbers using digital devices or other resources. 	Where is division used in real life?
<p>Core Competencies to be developed: Communication and collaboration; learners in pairs/groups discuss the relationship between multiplication and division.</p>				
<p>Values:</p>				

Unity; learners in pairs/groups work together amicably to divide up to a 4-digit number by up to a 3 digit number and share answers

PCIs:

Learners divide whole numbers using digital devices or other resources as they observe safety.

Link to other subjects:

Learners divide quantities such as seeds or seedlings when planting crops in learning session of Agriculture and nutrition.

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Strand	Sub-Strand	Specific Learning Outcome	Suggested Learning Experiences	Suggested Key Inquiry Questions
1.0 Numbers	1.4 Fractions (12 Lessons)	<p>By the end of the sub-strand the learner should be able to;</p> <p>a) add fractions using LCM in different situations,</p> <p>b) subtract fractions using LCM in different situations,</p> <p>c) add mixed numbers in different situations,</p> <p>d) subtract mixed numbers in different situations,</p> <p>e) identify reciprocal of proper fractions up to a 2-digit number in different situations,</p> <p>f) work out squares of fractions with a numerator of one digit and denominator of a 2-digit number in different situations,</p> <p>g) express a fraction as a percentage in different</p>	<p>Learner is guided to:</p> <ul style="list-style-type: none"> • identify LCM of numbers given from number cards. • add and subtract fractions using LCM by listing multiples. • add and subtract mixed fractions by converting the fractions to improper fractions. • add and subtract mixed fractions by adding and subtracting whole number and fraction parts separately. • list the inverse of numbers between 1 and 10 • calculate the reciprocal by dividing the one by the number. They should always start by working out the reciprocal of whole numbers before solving the reciprocal of proper fractions up to a 2-digit number. • discuss the various reciprocals of a proper fraction. • calculate squares of fractions through 	<ol style="list-style-type: none"> 1. How do we add or subtract fractions? 2. Where is percentage used in day to day life?

		<p>situations,</p> <p>h) convert percentage to fractions in different situations,</p> <p>i) appreciate use of fractions in real life.</p>	<p>multiplication / practically.</p> <ul style="list-style-type: none"> • change fractions to equivalent fractions with denominator 100 through multiplication. • identify a percentage as a fraction with denominator 100 • Learners in pairs/groups or as individuals to change fractions to percentages and vice versa. • Learners to play digital games involving fractions 	
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Core Competencies to be developed:

Learning to learn; learners work out the reciprocal of whole numbers before solving the reciprocal of proper fractions.

Values:

Unity; learners in groups/pairs work together harmoniously and discuss the various reciprocals of a proper fraction.

PCIs:

Learners in groups/pairs cohesively work together to calculate squares of fractions through multiplication to enhance social cohesion.

Link to other subjects:

Learners use fractional parts of a canvas or drawing materials to draw different patterns in Creative Arts.

Strand	Sub Strand	Specific Learning Outcomes	Suggested Learning Experiences	Suggested Key Inquiry Question
1.0 Numbers	1.5 Decimals (12 Lessons)	By the end of the Sub Strand, the learner should be able to; a) identify decimals upto ten thousandths in different situations, b) round off decimals up to 3 decimal places in different situations, c) convert decimals to fractions and fractions to decimals in different situations, d) convert decimals to percentages and percentages to decimals in different situations, e) add decimals up to 4-decimal places in different situations, f) subtract decimals up to 4-decimal places in different situations, g) appreciate use of decimals in	The learner is guided to: <ul style="list-style-type: none"> • work out place value of decimals up to ten thousandths using place value apparatus. • relate place value of decimals up to ten thousandths to number of decimal places. • Discuss and round off decimals up to 3 decimal places. • change decimals to fractions using a square/rectangular grid. • change fractions to decimals using a square/rectangular grid. • add decimals up to 4-decimal places using shared place value apparatus. • subtract decimals up to 4-decimal places using place value apparatus. • Play gms involving decimals using 	Where are decimals applicable in real life?

		real lifesituations.	digital devices or other resources.	
<p>Core Competencies to be developed:</p> <p>Communication and collaboration; learners discuss and relate place value of decimals up to ten thousandths to number of decimal places.</p>				
<p>Values:</p> <p>Responsibility: Learners add decimals up to 4-decimal places using place value apparatus and show responsibility by taking care of the apparatus.</p>				
<p>PCIs:</p> <p>Learners add decimals up to 4-decimal places using place value apparatus and share answers or working strategies with one another as part of Peer education.</p>				
<p>Link to other subjects:</p> <p>Learners acquire new mathematical terms as they discuss and round off decimals up to 3 decimal places as part of Languages.</p>				

Strand	Sub Strand	Specific Learning Outcomes	Suggested Learning Experiences	Suggested Key Inquiry Question
1.0 Numbers	1.6 Inequalities (8 Lessons)	By the end of the Sub Strand, the learner should be able to; a) Form simple inequalities in one unknown involving real life situations, b) Simplify inequalities in one unknown involving real life situations, c) Solve simple inequalities in one unknown involving real life situations, d) Appreciate use of inequalities in real life situations.	The learner is guided to: <ul style="list-style-type: none"> • discuss meaning of inequality symbols '$>$' and '$<$' • form inequalities in one unknown using different operations. • simplify inequalities in one unknown using cards or charts. • working out simple inequalities involving one unknown • play games involving inequalities using digital devices or other resources 	How do we solve simple inequalities?
<p>Core Competencies to be developed: Self-efficacy; learners in groups or pairs confidently work out simple inequalities involving one unknown.</p>				
<p>Values: Responsibility; as learners in pairs or groups use IT devices carefully to simplify inequalities.</p>				
<p>PCIs: Learners in groups or pairs work together harmoniously to form inequalities in one unknown using different to enhance Social cohesion.</p>				

Link to other subjects:

Learners use new terms used in inequalities to enhance vocabulary in **Languages**.

ASSESSMENT RUBRIC

Level Indicator	Exceeds Expectations	Meets Expectations	Approaches Expectations	Below Expectations
Ability to use place value and total value of digits up to millions	Uses place value and total value of digits up to millions correctly and systematically	Uses place value and total value of digits up to millions correctly	Uses place value or total value of digits up to millions	Uses place value or total value of digits up to hundreds of thousands
Ability to read and write numbers in symbols and in words	Reads and writes numbers in symbols and in words accurately and fluently.	Reads and writes numbers in symbols and in words accurately	Reads or writes numbers in symbols and in words accurately	Reads or writes numbers in symbols or in words accurately
Ability to order and round off numbers up to 100,000	Order and round off numbers up to 100,000 correctly and systematically.	orders and rounds off numbers up to 100,000 correctly	orders or rounds off numbers up to 100,000 correctly	orders or rounds off numbers up to 50,000 correctly
Ability to apply squares and square roots of whole numbers up to 100	Applies squares and square roots of whole numbers up to 100 correctly and consistently	Applies squares and square roots of whole numbers up to 100 correctly	Applies squares or square roots of whole numbers up to 100	Applies squares or square roots of whole numbers up to 70

Ability to Multiply up to a 4-digit number by a 2-digit number	Multiplies up to a 4 digit number by a 2 digit number correctly and consistently	Multiplies up to a 4-digit number by a 2 digit number correctly	Multiplies up to a 2-digit number by a 2 digit number	Multiplies up to a 2-digit number by a 1 digit number
Ability to round off decimals up to 3 decimal places	Rounds off decimals up to 3 decimal places correctly and logically	Rounds off decimals up to 3 decimal places correctly	Rounds off decimals up to 2 decimal places correctly	Rounds off decimals to 1 decimal place correctly
Ability to create patterns involving addition, subtraction and multiplication	Creates patterns involving addition, subtraction and multiplication accurately and creatively.	Creates patterns involving addition, subtraction and multiplication accurately.	Creates patterns involving any two of; addition, subtraction or multiplication accurately	Creates patterns involving any one of; addition, subtraction or multiplication accurately
Ability to divide up to a 4-digit number by up to a 3-digit number	Divides up to a 4-digit number by up to a 3 digit number correctly and consistently	Divides up to a 4-digit number by up to a 3 digit number correctly	Divides up to a 4-digit number by up to a 2-digit number correctly	Divides up to a 4-digit number by a 1-digit number correctly
Ability to add and subtract fractions using LCM	Adds and subtracts fractions using LCM correctly and proficiently	Adds and subtracts fractions using LCM correctly	Adds or subtracts fractions using LCM correctly	Adds fractions using LCM correctly
Ability to convert fractions to percentages and	Converts fractions to percentages and percentages to fractions	Converts fractions to percentages and percentages to	Converts fractions to percentages or percentages to fractions correctly	Converts fractions to percentages correctly

percentages to fractions	correctly and systematically	fractions correctly		
Ability to Identify decimals up to ten thousandths	Identifies decimals up to ten thousandths correctly and systematically	Identifies decimals up to ten thousandths correctly	Identifies decimals upto thousandths correctly	Identifies decimals up to hundredths correctly
Ability to convert decimals to fractions and fractions to decimals	Converts decimals to fractions and fractions to decimals correctly and logically	Converts decimals to fractions and fractions to decimals correctly	Converts decimals to fractions or fractions to decimals correctly	Converts decimals to fractions correctly
Ability to convert decimals to percentages and percentages to decimals	Converts decimals to percentages and percentages to decimals correctly and logically	Converts decimals to percentages and percentages to decimals correctly	Converts decimals to percentages or percentages to decimals correctly	Converts decimals to percentages correctly
Ability to add and subtract decimals up to 4-decimal places	Adds and subtracts decimals up to 4-decimal places correctly and logically	Adds and subtracts decimals upto 4-decimal places correctly	Adds or subtracts decimals up to 4-decimal places correctly	Adds decimals upto 4-decimal places correctly
Ability to form, simplify and solve inequalities in one unknown	Forms, simplifies and solves inequalities in one unknown accurately and logically	Forms, simplifies and solves inequalities in one unknown accurately	Forms, simplifies or solves inequalities in one unknown accurately	Forms inequalities in one unknown accurately

STRAND 2.0: MEASUREMENT

Strand	Sub Strand	Specific Learning Outcomes	Suggested Learning Experiences	Suggested Key Inquiry Questions
2.0 Measurement	2.1 Length (14 Lessons)	By the end of the Sub Strand, the learner should be able to; <ol style="list-style-type: none"> a) use the millimetre (mm) as a unit of measuring length in different situations, b) establish the relationship between the millimetre and centimetre in different situations, c) convert centimetres and millimetres to millimetres in different situations, d) add centimetres and millimetres in different situations, e) subtract centimetres and millimetres in different situations, f) multiply centimetres and millimetres by whole numbers in real life situations, g) divide centimetres and 	The learner is guided to: <ul style="list-style-type: none"> • Discuss and identify the millimetre as a unit of measuring length using a ruler. • measure length of objects in millimetres using a ruler. • measure a given length in cm and mm to establish the relationship between mm and cm. • Convert mm to cm and cm to mm when measuring lengths of different objects and comparing results. • measure lengths of different objects in the environment. • determine lengths in mm and cm in addition, subtraction, multiplication and division and discuss the answers. 	<ol style="list-style-type: none"> 1. Why do we measure distances in day to day life? 2. What do we use to measure length in real life?

		<p>millimetres by whole numbers in real life situations,</p> <p>h) determine the circumference of a circle practically,</p> <p>i) identify the relationship between circumference and diameter in different situations,</p> <p>j) appreciate use of length in real life situations.</p>	<ul style="list-style-type: none"> • sketch the circumference, diameter and radius of a circle practically. • measure the circumference of a circle practically. • divide circumference by diameter to get pi (π). • Play games involving length in centimetres and millimetres using digital devices or other resources. 	
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Core Competences to be developed:

Creativity and imagination; learners sketch the circumference, diameter and radius of a circle practically.

Values:

Unity; learners in pairs/groups work amicably to determine lengths in centimetres and millimetres in addition, subtraction, multiplication and division and discuss the answers.

PCIs:

Learners choose appropriate units to measure lengths of different objects in the environment to enhance Environmental education.

Link to other subjects:

Learners handle objects with care when measuring lengths of different objects in the school compound for play activities in Creative Arts.

Strand	Sub Strand	Specific Learning Outcomes	Suggested Learning Experiences	Suggested Key Inquiry Questions
2.0 Measurement	2.2 Area (6 Lessons)	<p>By the end of the Sub Strand, the learner should be able to;</p> <ul style="list-style-type: none"> a) work out area of triangles in square centimetres (cm²), b) work out area of combined shapes involving squares, rectangles and triangles in cm², c) estimate the area of circles by counting squares, d) appreciate the use of cm² in working out area in real life. 	<p>The learner is guided to:</p> <ul style="list-style-type: none"> • establish that the area of a triangle is equal to a half of the area of a rectangle or a square when the rectangle or the square is divided by a diagonal. • work out the area of triangles in cm² using the relationship between a rectangle and a triangle (Area of a triangle is equal to ½ area of a rectangle or square. $A = \frac{1}{2} (L \times W)$). • sketch a circle on a unit square grid and count the full squares to estimate the area of circles and compare answers. • prepare own combined shapes involving rectangles, squares, triangles and ask other groups/pairs to determine the area. • play games involving area using digital tools or other resources. 	<p>Where is area used in real life?</p>

Core Competencies to be developed:

Creativity and imagination; learners in groups or pairs work out the area of triangles in cm^2 using the relationship between a rectangle and a triangle.

Values:

Love; learners sketch a circle on a unit square grid and count the full squares to estimate the area of circles and compare answers with one another.

PCIs:

Learners confidently establish that the area of a triangle is equal to a half of the area of a rectangle or a square when the rectangle or the square is divided by a diagonal to enhance self-esteem.

Link to other subjects:

Learners explore their environment to calculate area of different places such as play fields within the community as part of Social Studies.

Strand	Sub Strand	Specific Learning Outcomes	Suggested Learning Experiences	Suggested Key Inquiry Questions
2.0 Measurement	2.3 Capacity (6 Lessons)	<p>By the end of the Sub Strand, the learner should be able to;</p> <p>a) identify the relationship among cubic centimetres (cm^3), millilitres and litres in real life,</p> <p>b) convert litres to millilitres in different situations,</p> <p>c) convert capacity in millilitres to litres in different situations,</p> <p>d) appreciate use of cm^3 and litres in measuring capacity in real life.</p>	<p>The learner is guided to:</p> <ul style="list-style-type: none"> • work out the relationship between cm^3, millilitres and litres through measuring practically. • measure capacity in millilitres and litres, discuss answers and share with others. • change capacity in litres to millilitres using containers from the environment by comparing sizes of different containers. • work out conversions of capacity of millilitres to litres. • play games involving capacity using containers of different capacities. 	<ol style="list-style-type: none"> 1. How can we measure capacity? 2. Where is capacity applicable in real life?

Core Competencies to be developed:

Critical thinking and problem solving; learners work out the relationship between cm^3 , millilitres and litres through measuring practically.

Values:

Peace; learners in groups or pairs work together harmoniously to measure capacity in millilitres and litres and agree on answers.

PCIs:

Learners change capacity in litres to millilitres using containers from the environment as part of Environmental education.

Links to other subjects:

Learner take accurate measurements of liquids using different containers from the immediate environment as part of Science and Technology.

Strand	Sub Strand	Specific Learning Outcomes	Suggested Learning Experiences	Suggested Key Inquiry Questions
2.0 Measurement	2.4 Mass (14 Lessons)	By the end of the Sub Strand, the learner should be able to; <ol style="list-style-type: none"> a) identify the tonne as a unit for measuring mass in real life, b) identify items measured in tonnes in real life, c) identify the relationship between the kilogram and the tonne, d) estimate mass in tonnes in different situations, e) convert kilograms to tonnes and tonnes to kilograms in real life situations, f) add tonnes and kilograms in real life situations, g) subtract tonnes and kilograms in real life situations, h) multiply tonnes and kilograms by whole 	The learner is guided to: <ul style="list-style-type: none"> • discuss tonne as a unit of measuring mass • discuss items in the environment such as loaded lorries, whose mass may be measured in tonnes • establish the relationship between the kilogram and the tonne (1000kg =1 tonne). • Estimate masses in tonnes of various objects found in the environment. • change kilograms to tonnes and tonnes to kilograms. • determine mass of items in tonnes and kilograms using different operations 	<ol style="list-style-type: none"> 1. How can we measure large amounts of mass? 2. In what situations would the tonnes be more applicable to use when measuring mass?

		<p>numbers in real life situations,</p> <p>i) divide tonnes and kilograms by wholenumbers in real life situations,</p> <p>j) appreciate use of the kilogram and tonne in measuring mass.</p>	<p>involving addition, subtraction, multiplication and division.</p> <ul style="list-style-type: none"> • Use digital weighing machines to measure masses of different items. 	
<p>Core Competencies to be developed:</p> <p>Digital literacy; learners use digital weighing machines to measure masses of different items.</p>				
<p>Values:</p> <p>Integrity; learners honestly determine mass of items in tonnes and kilograms using different operations involving addition, subtraction, multiplication and division.</p>				
<p>PCIs:</p> <p>Learners discuss items in the environment such as loaded lorries, whose mass may be measured in tonnes to enhance Environmental education;.</p>				
<p>Link to other subjects:</p> <p>Learners discuss the transit trucks that carry grains in tonnes to different places as part of Agriculture and nutrition.</p>				

Strand	Sub Strand	Specific Learning Outcomes	Suggested Learning Experiences	Suggested Key Inquiry Question
2.0 Measurements	2.5 Time (10 Lessons)	By the end of the sub- strand, the learner should be able to; a) identify time in a.m. and p.m. in day to day life experiences, b) write time in a.m. and p.m. in day to day life, c) relate time in a.m. and p.m. to the 24h clock system, d) convert time from 12h to 24h and 24h to 12h system, e) interpret travel timetable in different situations, f) appreciate use of time in both 12h and 24h systems.	The learner is guided to: <ul style="list-style-type: none"> • discuss time in a.m. and p.m. from digital and analogue clocks. • determine time in a.m. and p.m. from digital and analogue clocks. • equate time in a.m. and p.m. to the 24h clock system using a chart. • change time from the 12h to 24h system and 24h to 12h using a chart. • interpret travel timetables to create travel schedules for different events. • determine time durations of traveling using travel timetables within the country. • check local time using digital clock or analogue in 12h and 24 h systems. 	How do we read and tell time?
Core Competencies to be developed: Learning to learn; learners determine time in a.m. and p.m. from digital and analogue clocks.				
Values:				

Integrity; Learners observe time in various activities and be punctual.

PCIs:

Learners determine time durations of travelling using travel timetables within the country to enhance Citizenship.

Link to other subjects:

Learns record time taken to perform in different games such as athletics as part of Creative Arts.

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Strand	Sub Strand	Specific Learning Outcomes	Suggested Learning Experiences	Suggested Key Inquiry Question
2.0 Measurements	2.6 Money (8 lessons)	<p>By the end of the Sub Strand, the learner should be able to;</p> <ul style="list-style-type: none"> a) prepare simple budget in different situations, b) determine buying and selling prices of different items in the community, c) work out profit from sales of different items in the community, d) calculate loss realized from sales of different items in the community, e) identify types of taxes in different situations, f) appreciate use of money in real life situations. 	<p>The learner is guided to:</p> <ul style="list-style-type: none"> • identify different shopping items in the community or at home especially food items and draw a simple budget. • discuss the meaning of buying and selling price. • determine buying and selling prices of different items in the community. • discuss the meaning of profit and loss in real lifesituations and share with other groups. • discuss and determine profit and loss by practicing buying and selling in the classroom model shop. • discuss income and value added tax (VAT) from receipts issued by shops and retailers as a form of tax. 	<p>How can you make profit in a business?</p>

			<ul style="list-style-type: none"> • use IT devices or other resources to explore more on money. 	
<p>Core Competencies to be developed: Communication and collaboration; Learners discuss the meaning of profit and loss in real life situations and share with other groups.</p>				
<p>Values: Integrity; Learners honestly determine buying and selling prices of different items in their classroom model shop.</p>				
<p>PCIs: Learners discuss income and value added tax (VAT) as a form of tax as part of Financial literacy.</p>				
<p>Links to other subjects: Learners participate in making budgets for buying food at home as part of Agriculture and nutrition.</p>				

ASSESSMENT RUBRIC

Level Indicator	Exceeds Expectations	Meets Expectations	Approaches Expectations	Below Expectations
Ability to prepare a simple budget	Prepares a simple budget accurately and consistently	Prepares a simple budget accurately	Prepares a simple budget Partially accurately	Prepares a simple budget with continuous assistance
Ability to convert centimetres to millimetres and millimetres to centimetres	Converts centimetres to millimetres and millimetres to centimetres correctly and proficiently	Converts centimetres to millimetres and millimetres to centimetres correctly	Converts centimetres to millimetres or millimetres to centimetres correctly	Converts centimetres to millimetres correctly
Ability to add, subtract, multiply and divide centimetres and	Adds, subtracts, multiplies and divides centimetres and millimetres correctly	Adds, subtracts, multiplies and divides centimetres and	Adds, subtracts, multiplies or divides centimetres or	Adds or subtracts centimetres or millimetres correctly

millimetres	and proficiently	millimetres correctly	millimetres correctly	
Ability to measure the circumference of a circle	Measures the circumference of a circle correctly and efficiently	Measures the circumference of a circle correctly	Measures the circumference of a circle less efficiently	Measures the circumference of a circle with continuous assistance
Ability to work out area of triangle and combined shapes	Works out area of triangle and combined shapes correctly and procedurally	Works out area of triangle and combined shapes correctly	Works out area of triangle or combined shapes correctly	Works out area of triangle correctly
Ability to identify the relationship among cm^3 , millilitres and litres	Identifies the relationship among cm^3 , millilitres and litres correctly and logically	Identifies the relationship among cm^3 , millilitres and litres correctly	identifies the relationship between millilitres and litres correctly	Identifies the relationship between millilitres and litres with continuous support
Ability to convert litres to millilitres and millilitres to litres	Converts litres to millilitres and millilitres to litres correctly and logically	Converts litres to millilitres and millilitres to litres correctly	Converts litres to millilitres or millilitres to litres correctly	Converts litres to millilitres correctly
Ability to identify the relationship between the kilogram and the tonne	Identifies the relationship between the kilogram and the tonne correctly and logically	Identifies the relationship between the kilogram and the tonne correctly	Identifies the relationship between the kilogram and the tonne inconsistently	Identifies the relationship between the kilogram and the tonne with continuous assistance
Ability to convert tonnes to kilograms and kilograms to tonnes	Converts tonnes to kilograms and kilograms to tonnes correctly and proficiently	Converts tonnes to kilograms and kilograms to tonnes correctly	Converts tonnes to kilograms or kilograms to tonnes correctly	Converts tonnes to kilograms correctly

Ability to add, subtract, multiply and divide tonnes and kilograms	Adds subtracts, multiplies and divides tonnes and kilograms accurately and proficiently	Adds subtracts, multiplies and divides tonnes and kilograms accurately	Adds subtracts, multiplies or divides tonnes or kilograms accurately	Adds or subtracts, tonnes or kilograms accurately
Ability to identify and write time in a.m. and p.m.	Identifies and writes time in a.m. and p.m. accurately and consistently	Identifies and writes time in a.m. and p.m. accurately	Identifies or writes time in a.m. or p.m. accurately	Identifies time in a.m. or p.m. accurately
Ability to convert time from 12h to 24h and 24h to 12h system	Converts time from 12h to 24h and 24h to 12h system accurately and logically	Converts time from 12h to 24h and 24h to 12h system accurately	Converts time from 12h to 24h or 24h to 12h system accurately	Converts time from 12h to 24h accurately
Ability to interpret travel timetables	Interprets travel timetables accurately and comprehensively	Interprets travel timetables accurately	interprets travel timetables inconsistently	interprets travel timetables with continuous support
Ability to prepare a simple budget	Prepares a simple budget appropriately and comprehensively	Prepares a simple budget appropriately	prepares a simple budget with limited items	prepares a simple budget with continuous support
Ability to determine buying and selling prices	determines buying and selling price accurately and consistently	determines buying and selling price accurately	determines buying or selling price accurately	Determines buying or selling price with continuous support
Ability to work out profit and loss from sales	Works out profit and loss from sales accurately and consistently	Works out profit and loss from sales accurately	works out profit or loss from sales accurately	works out profit or loss from sales with continuous support
Ability to identify types of taxes	Identifies types of taxes accurately and consistently	Identifies types of taxes accurately	Identifies types of taxes inconsistently	Identifies types of taxes with continuous support

STRAND 3.0: GEOMETRY

Strand	Sub Strand	Specific Learning Outcomes	Suggested Learning Experiences	Suggested Key Inquiry Questions
3.0 Geometry	3.1 Lines (6 Lessons)	By the end of the sub- strand, the learner should be able to; a) draw parallel lines in different situations, b) bisect lines by construction, c) construct perpendicular lines indifferent situations, d) appreciate use of linesin daily life.	The learner is guided to: <ul style="list-style-type: none"> • construct parallel lines using geometrical instruments and other writing materials. • bisect lines using geometrical instruments. • draw perpendicular lines using geometricalinstruments. • share digital devices and other resources to draw parallel lines. 	Why do we need to draw lines?

Core Competencies to be developed:

Creativity and imagination; Learners in groups or pairs bisect lines by construction.

Values:

Responsibility; Learners in pairs/groups or as individuals carefully share digital devices and other resources to draw parallel lines.

PCIs:

Learners exercise caution as they use geometrical instruments in construction of parallel lines as they observe safety measures.

Link to other subjects:

Learners construct lines that can be used in creative drawing as part of Creative Arts.

Strand	Sub Strand	Specific Learning outcomes	Suggested Learning Experiences	Suggested Key Inquiry Questions
3.0 Geometry	3.2 Angles (6 Lessons)	<p>By the end of the Sub Strand, the learner should be able to;</p> <p>a) identify angles on a straight line at a point in different situations,</p> <p>b) measure angles on a straight line at a point in different situations,</p> <p>c) work out sum of angles on a straight line in different situations,</p> <p>d) determine the sum of angles in rectangles and triangles</p> <p>e) construct equilateral, right angled and isosceles triangles,</p> <p>f) measure the interior angles of equilateral, right angled and isosceles triangles,</p> <p>g) appreciate use of angles in real life.</p>	<p>The learner is guided to:</p> <ul style="list-style-type: none"> • discuss angles on a straight line using concrete objects that have straight edges. • draw a line that cuts the straight line to form an angle. Measure and write the size(s) of angles formed. Compare the sizes of angles with your classmates. • work out the sizes of various angles on a straight line. • practically establish the sum of angles in a triangle and rectangles using different objects in the environment. • identify and draw equilateral, right angled and isosceles triangles using geometrical instruments. • practically establish the sum of the interior angles in a rectangle and triangle. • use geometrical instruments or digital resources to practice drawing 	<p>Where can you use angles in real life?</p>

			different lines and angles.	
Core Competencies to be developed:				
Self-efficacy; Learners confidently and practically establish sum of the interior angles in a rectangle and triangle.				
Values:				
Unity; Learners in groups or pairs harmoniously compare the sizes of angles with their classmates.				
PCIs:				
Learners in groups or pairs practically establish the sum of angles in a triangle and rectangles from different objects in the environment to enhance Environmental education.				
Link to other subjects:				
Learners draw lines and angles that can be used in drawing and painting in Creative Art.				

Strand	Sub Strand	Specific Learning Outcome	Suggested Learning Experiences	Suggested Key Inquiry Question
3.0 Geometry	3.3 3-D Objects (6 Lessons)	By the end of the Sub Strand, the learner should be able to; a) identify vertices, faces and edges in cuboids and cubes in different situations, b) identify faces and edges of cylinders in different situations, c) describe plane figures in 3- d objects in the environment, d) appreciate use of 3-D objects in real life.	The learner is guided to: <ul style="list-style-type: none"> • discuss and collect 3-D objects and safely keep them as part of their role in environmental conservation. • identify and relate cuboids and cylinders in the environment. • open up nets of cuboids, cubes and cylinders and sketch the layout. • discuss the rectangular, square and circular shapes on the nets. • manipulate 3- D objects using containers or digitally using IT devices 	How do we use containers in daily life?
<p>Core Competencies to be developed: Creativity and imagination; Learners open up nets of cuboids, cubes and cylinders.</p>				
<p>Values: Learners discuss and collect 3-D objects and safely keep them as part of their role in environmental conservation to enhance Patriotism.</p>				
<p>PCIs: Learners in groups discuss rectangular, square and circular shapes on the nets and respect each other's views as part of social cohesion.</p>				

Link to other subjects:

Learners establish and discuss the differences between 3-D objects in terms of faces, edges and vertices in drawing to improve language skills.

ASSESSMENT RUBRIC

Level Indicator	Exceeds Expectations	Meets Expectations	Approaches Expectations	Below Expectations
Ability to construct parallel and perpendicular lines	Constructs parallel and perpendicular lines accurately and systematically	Constructs parallel and perpendicular lines accurately	Constructs parallel or perpendicular lines correctly	Constructs parallel lines correctly
Ability to bisect lines through construction	Bisects lines through construction accurately and logically	Bisects lines through construction accurately	Bisects lines through construction partially accurately	Bisects lines through construction with continuous assistance
Ability to identify and measure angles on a straight line at a point	Identifies and measures angles on a straight line at a point correctly and consistently	Identifies and measures angles on a straight line at a point correctly	Identifies or measures angles on a straight line at a point correctly.	Identifies angles on a straight line at a point correctly
Ability to work out sum of angles on a straight line, rectangles and triangles	Works out sum of angles on a straight line, rectangles and triangles accurately and correctly	Works out sum of angles on a straight line, rectangles and triangles accurately	Works out sum of angles on a straight line, rectangles or triangles accurately	Works out sum of angles on a straight line accurately

Ability to construct equilateral, right angled and isosceles triangles and measure their interior angles	Constructs equilateral, right angled and isosceles triangles and measure their interior angles accurately and systematically	Constructs equilateral, right angled and isosceles triangles and measure their interior angles accurately	Constructs equilateral, right angled or isosceles triangles or measure their interior angles accurately	Constructs equilateral, right angled or isosceles triangles accurately.
Ability to identify vertices, faces and edges in cuboids and cubes	Identifies vertices, faces and edges in cuboids and cubes correctly and systematically	Identifies vertices, faces and edges in cuboids and cubes correctly	Identifies vertices, faces or edges in cuboids or cubes correctly	Identifies any one of vertices or faces or edges in cuboids or cubes correctly
Ability to identify faces and edges of cylinders	Identifies faces and edges of cylinders correctly and systematically	Identifies faces and edges of cylinders correctly	Identifies faces or edges of cylinders correctly	Identifies faces or edges of cylinders with continuous assistance.

STRAND 4.0: DATA HANDLING

Strand	Sub Strand	Specific Learning Outcomes	Suggested Learning Experiences	Suggested Key Inquiry Questions
4.0 Data Handling	4.1 Bar Graphs (10 Lessons)	By the end of the Sub Strand, the learner should be able to; <ol style="list-style-type: none"> a) draw a frequency table of real-life situation data, b) represent data from real life situations using pictographs c) represent data from real life situation through piling, d) represent data from real life situations using bar graphs, e) interpret information from bar graphs, f) appreciate use of bar graphs in real life. 	The learner is guided to: <ul style="list-style-type: none"> • collect data on identified area from immediate environment and organize it in a frequency table. • collect data, discuss and organize it in pictographs. • pile similar objects such as match boxes vertically to represent data. • discuss and organize data in form of bar graphs. • discuss information represented on bar graphs and explain what it represents. • use digital devices or other resources to draw bar graphs and other charts to present data. 	How can bar graphs be used in real life situations?

Core Competencies to be developed:

Creativity and imagination; Learners collect data and organize it using pictographs.

Values:

Integrity; Learners pile similar objects such as match boxes vertically to honestly represent data.

PCIs:

Learners collect data on identified area from immediate environment and observe safety measures.

Link to other subjects:

Learners gather information on any items in the environment that will enhance learning in Science and technology.

ASSESSMENT RUBRIC

Level Indicator	Exceeds Expectations	Meets Expectations	Approaches Expectations	Below Expectations
Ability to draw a frequency table	Draws a frequency table accurately and comprehensively	Draws a frequency table accurately	Draws a frequency table partially	Draws a frequency table with continuous support
Ability to represent data using pictographs, piling and bar graphs	Represents data using pictographs piling and bar graphs correctly and accurately	Represents data using pictographs piling and bar graphs correctly	Represents data using pictographs piling or bar graphs correctly	Represent data using pictographs piling or bar graphs continuous support
Ability to interpret information from bar graphs	Interprets information from bar graphs correctly and comprehensively	Interprets information from bar graphs correctly	Interprets information from bar graphs partially	Interprets information from bar graphs continuous support

APPENDICES

APPENDIX I: SUGGESTED RESOURCES

Strand	Sub Strand	Resources
NUMBERS	Whole numbers	Place value apparatus, number charts, number cards, multiplication table
	Multiplication	Multiplication tables
	Division	Multiplication tables
	Fractions	Equivalent fraction board, circular and rectangular cut outs, counters
	Decimals	Place value charts, number cards
MEASUREMENT	Length	Metre rule, 1 metre ticks, tape measure
	Area	Square cut outs, 1cm squares, 1m squares
	Capacity	Tea spoons, containers of different sizes, water, sand, soil,
	Mass	Tea spoons, soil or sand, manual/electronic weighing machine, beam balance,
	Time	Analogue and digital clocks, digital watches, stop watches
	Money	Price list, classroom shop, electronic money tariff charts
GEOMETRY	Lines	Chalk board ruler, 30cm ruler, straight edges
	Angles	Unit angles, protractors, rulers

	3-D objects	Cubes, cuboids, cylinders, pyramids, spheres, cut outs of rectangles, circles, and triangles of different sizes
DATA HANDLING	Bar graphs	Bar graph worksheets, data graph worksheets, data samples from different sources
ALGEBRA	Inequalities	Digital inequality worksheets; greater than, less than or equal to, sorting cards.

NOTE

The following ICT devices may be used in the teaching/learning of mathematics at this level;

Learner digital devices (LDD), teacher digital devices (TDD), mobile phones, digital clocks, television sets, videos, cameras, projectors, radios, DVD players, CD's, scanners, internet among others.

APPENDIX II: SUGGESTED ASSESSMENT METHODS AND TOOLS

- a) Written tests and quizzes
- b) Rating scales
- c) Projects
- d) Observation Schedules
- e) Portfolios
- f) Assessment Rubric
- g) Questionnaires

APPENDIX III: CSL GUIDELINES FOR UPPER PRIMARY (GRADE 4-6)

At this level, the goal of the CSL activity is to provide linkages between concepts learnt in the various Learning Activities and the real life experiences. Learners begin to make connections between what they learn and the relevance to their daily life. CSL is hosted in the Social studies learning area. The implementation of the CSL activity is a collaborative effort where the class

teacher coordinates and works with other subject teachers to design and implement the integrated CSL activity. Though they are teacher-guided, the learners should progressively be given more autonomy to identify problems and come up with solutions. The safety of the learners should also be taken into account when selecting the CSL activity. The following steps for the integrated CSL activity should be staggered across the school terms:

Steps in carrying out the integrated CSL activity
<p>1) Preparation</p> <ul style="list-style-type: none"> ● Map out the targeted core competencies, values and specific learning areas skills for the CSL activity ● Identify resources required for the activity (locally available materials) ● Stagger the activities across the term (Set dates and time for the activities) ● Communicate to learners, parents/caregivers/guardians, school administration, teachers and other relevant stakeholders in the school community ● Identify and develop assessment tools
<p>2) Implementation CSL Activity</p> <ul style="list-style-type: none"> ● Assigning roles to learners. ● Ensure every learner actively participates in the activity ● Observe learners as they carry out the CSL activity and record feedback. ● Use an appropriate assessment tool to assess both the process and the product (Assess learner’s work from the beginning to the end product) ● Assess the targeted core competencies, values and subject skills.
<p>3) Reflection on the CSL Activity</p> <p>Conduct a self-evaluation session with learners on the integrated CSL activity undertaken by discussing the following:</p> <ul style="list-style-type: none"> ● what went well and why ● what did not go well and why,

- what can be done differently next time
- what they have learnt.

There will be **one** integrated CSL activity that will be conducted **annually**. The thematic areas for the integrated CSL activity will be derived from the broader categories of the PCIs and concepts from the various Learning Areas. Teachers are expected to vary the themes yearly to allow learners to address different PCIs within their contexts. There should be a linkage between the skills from the learning areas and the themes.

The integrated CSL activity will take a Whole School Approach (WSA) where the entire school community is involved (learners, parents/caregivers/guardians, school administration, teachers). Parents/caregivers/guardians are key stakeholders in the planning and execution of the CSL activity. Although the teacher takes the lead role in the planning and integration of the CSL activity, learners will be expected to participate actively in the whole process.

The CSL activity provides an opportunity for the development of core competencies and the nurturing of various values. The teacher is expected to vary the core competencies and values emphasised in the activity yearly.

ASSESSMENT OF THE CSL ACTIVITY

Assessment of the integrated CSL activity will focus on 3 components namely: skills from various learning areas applied in carrying out the activity, and core competencies and values demonstrated. Assessment should focus on both the process and end product of the CSL activity. The teacher will assess learners in groups using various tools such as an observation schedule, checklist or rating scale or any other appropriate tool.