THE REPUBLIC OF UGANDA

Ministry of Education and Sports

SECONDARY SCHOOL
ABRIDGED CURRICULUM
FOR UGANDA

MATHEMATICS
PHYSICS
BIOLOGY
CHEMISTRY
AGRICALITURE

SENIOR 2

NCDC

NATIONAL CURRICULUM DEVELOPMENT CENTRE

PRIMARY SCHOOL
ABRIDGED CURRICULUM
FOR UGANDA

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SENIOR 2

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NATIONAL CURRICULUM
DEVELOPMENT CENTRE

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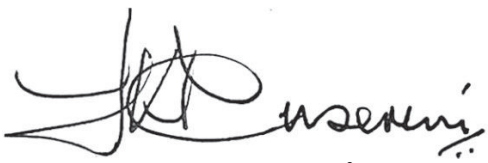
Foreword

The COVID-19 pandemic caused a disruption in our education system and made learners miss schooling for almost 18 months of the 2020-2021 schooling period. This has created a need to re-think what and how learners will learn when schools re-open.

The Ministry of Education and Sports through National Curriculum Development Centre (NCDC), has developed this abridged curriculum for Primary and Secondary schools in the country. This curriculum presents a selection of priority learning competences and concepts, along with psychosocial support, which should be the focus of instruction in the 2022 school year in order to achieve learning recovery.

This curriculum is not a departure from the existing curricula for the different classes but rather, a modification of the same with a purpose of recovering the lost learning time with minimum learning loss. It has been packaged for all Primary and Secondary classes with exception of Primary One, Senior One and Senior Five that will use the standard curriculum.

I therefore, recommend this abridged curriculum and ask all stakeholders to support its implementation as a strategic intervention towards the mitigation of the effects of COVID-19 pandemic on our education system. The effective implementation of this curriculum by the implementers will be a great milestone towards the recovery of lost learning time and giving hope and confidence to learners and teachers.



HON. Janet K. Museveni
First Lady and Minister for Education and Sports

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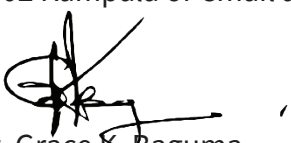
National Curriculum Development Centre (NCDC) would like to express its most sincere appreciation to all those who worked tirelessly towards the development of the abridged curriculum for Primary and Secondary levels of education.

The Centre is indebted to the NCDC Governing Council and the Academic Steering Board whose guidance and input helped to develop quality curriculum materials.

Great thanks go to the Specialists, panel members, the Quality Assurance and Editorial Committees that invested heavily in the conceptualisation, development and quality assurance processes that collectively delivered the materials that we have here. Their efforts, extra energy and professionalism has been unmatched.

This abridged curriculum was developed with support from The Government of the Republic of Uganda, Save the Children, UNESCO, Uganda National Examinations Board (UNEB), Directorate of Education Standards (DES), Universities, National Teachers Colleges (NTCs) and Primary Teachers Colleges (PTCs).

NCDC takes responsibility for any shortcomings that might be identified in this publication and welcomes suggestions for addressing the gaps. Such comments and suggestions may be communicated to NCDC through P.O. Box 7002 Kampala or email admin@ncdc.go.ug or www.ncdc.go.ug.



Dr. Grace K. Baguma
DIRECTOR,
NATIONAL CURRICULUM DEVELOPMENT CENTRE

MATHEMATICS

SENIOR TWO

TERM I

INTRODUCTION:

The following is a summary of what has been done on Senior One and Two syllabi to get the abridged curriculum senior two. The abridged content will be covered in one year.

SN	CRITICAL CHANGES	JUSTIFICATION
1.	**Number bases** has been omitted.	This topic is studied at primary level and the section in secondary level is mainly a recap.
2.	**Working with Integers** Some learning outcomes have been omitted like these below. • identify directed numbers • Work out and use divisibility tests of some numbers	It is implied in outcome; use directed numbers (limited to integers) in real life situations. This is implied in outcomes; Find the prime factorisation of any number and relate common factors with Highest Common Factor and multiples with Lowest Common Multiples.
3	Topic on Fractions, percentages and decimals has been removed.	This is already done at primary. The teacher needs to recap
4	Rectangular Cartesian coordinates in 2 dimensions has been deleted.	-This topic is studied at primary, and in secondary it is revision.
5	**Geometric construction skills** The following learning outcomes have been removed • Draw perpendicular and parallel lines • Construct perpendicular, angle	The concepts are learnt in primary. But in secondary school they are a recap.

	bisectors mediators and parallel lines. • Use a pair of compasses and ruler to construct special angles (60^0 and 450^0). • Draw polygons and Measure lengths and angles • Construct geometric figures such as triangles, square, rhombus, parallelogram	
6	**Bearings** The following learning outcomes have been removed • Know the compass points • Describe the direction of a place from a given point using compass points • Describe the bearing of a place from a given point. - • Apply bearings in real life situations. - • Differentiate between a sketch and a scale drawing	-Already studied at Primary level in Secondary it is revision. Already studied at Primary, in Secondary it is revision. Already studied at Primary level, in Secondary it is revision. Already studied at Primary level, in Secondary it is revision.
7	General and angle properties of geometric figures.	This topic is studied in primary. In secondary, it is taken as a revision.

8	**Algebra** **The following learning outcomes have been removed** • Write statements in algebraic form • Simplify algebraic expressions • Evaluate algebraic expressions by substituting numerical values • Manipulate simple algebraic equations in one variable and solve them	This content has been learnt in Primary. Teacher needs to recap in order to link with quadratic equations.
9	**Inequalities and Regions** The following learning outcome has been removed • Identify and use inequality symbols	This has been learnt in Primary level mathematics.
10	**Set Theory** **The following learning outcomes have been removed** • Describe a set • Identify elements of a set • Identify different types of sets and their symbols • Determine the number of elements in a set	This content has been done at Primary school level. The teacher needs to do some recap.

TOPIC 1: WORKING WITH INTEGERS

COMPETENCY: Learners should be able to carry out calculations with positive and negative integers.

Competencies ***Learners should be able to:***	**Key concepts**	**Teaching/learning activities**	**Assessment strategy**
i. Identify, read and write natural numbers as numerals and words in million, billion and trillion. ii. Differentiate between natural numbers and whole numbers/integers. iii. Use the hierarchy of operations to carry out the four mathematical operations in real life	Theoretical understanding of the four Mathematical Operations involving Integers: • Rational numbers as numbers of the form $\frac{a}{b}$ ($b \neq 0$). • Factors, Multiples, HCF & LCM Application of concepts on: • HCF & LCM by prime factorisation. Rational & irrational numbers-	Procedure: Collect 6 stones and pair them. Qn: How many pairs are there....3pairs and no remainder Increase to 8 stones…… 4 pairs and no remainder Qn: How many pairs would be formed with 16 stones? Qn: What have you noticed with the 6,8 and16 stones?	Observe learners as they discuss in groups how they can read and write natural numbers in words and differentiate between natural and whole numbers. Observe the interaction of learners within their groups Listen to the learners as they discuss in their respective groups. Give the Learners some exercise like the following: Nambi has these four number cards: She can rearrange the cards to form different numbers. For example, she can form the number 3407 ☐ ☐ ☐ ☐

situations iv. Identify even, odd, prime and composite numbers v. Find the prime factorisation of any number. vi. Relate common factors with HCF and multiples with LCM.	square	Reduce to 7 stones……..3 pairs and a remainder of 1 Increase to 11 stones…….5 pairs and a remainder of 1 Qn: How many pairs would be formed with 19 stones? Qn: What have you noticed with the 7 ,11 and 19 stones? Guide the in activities drown from real life situations as below : Constructing models for easy Addition, Subtraction,	a) What is the greatest even number Nambi can form using all four of her number cards? b) What is the smallest odd number she can form using all four of her number cards? c) How many hundreds are there in one million?

		Multiplication and Division involving Integers in practical situations Calibrating devices such as thermometers and measuring rule	

Topic 2: BEARINGS

COMPETENCEY: Learners should be able understand and use compass points, bearings and scale drawings.

Competencies ***Learners should be able to:***	**Key concepts**	**Teaching/learning activities**	**Assessment strategy**
Choose and use an appropriate scale to make an accurate drawing.	Bearings develop skills of determining the directions and accuracy.	Alex is facing North. He turns clockwise to face West. What angle has he turned through? Henry's school is 4km away from his home, on a bearing of 070°. The market is 1km away from the school on a bearing of 250°. The hospital is 6km away from the market, on a bearing of 310°. Make a scale drawing to find the distance and bearing of the hospital from Henry's home. Remember to state the scale you use on your drawing, and give your answer to a sensible degree of accuracy.	Let the learners in groups, discuss and explain how they will accomplish the following task; Two Ships leave Port bell port at the same time. One ship sails 80km on a bearing of 030^0 to position A. The other ship sails 160km on a bearing of 110^0 to position B Using a scale drawing find: a) the distance AB b) angle MAB, c) the bearing of B from A During the process of accomplishing the task, observe the communication skills of individual learners, creativity, respect for one another, sharing of information amongst themselves and other values and skills.

Topic 3: GEOMETRIC CONSTRUCTION SKILLS

COMPETENCEY: Learners should be able understand and use the angle properties of lines and shapes to solve problems.

Competencies ***Learners should be able to:***	**Key concepts**	**Teaching/learning activities**	**Assessment strategy**
i. Describe a locus. ii. Relate parallel lines, perpendicular bisector, angle bisector, straight line and a circle as loci	Application of theoretical understanding of lines and related angles through construction to develop the concept of locus.	a) Learners should identify perpendicular parallel items from the environment b) Let the learners identify situations in which perpendicular and parallel lines are used In groups, let a learner stretch his/her hand, touch a tree, and try to move around. Now the learners should describe the movement of their colleague	Observe learners as they select correct instruments to use. Observe their interaction, attitude towards what they are supposed to do. How the learner relates construction an loci. In your exercise book, construct the following angles by using a compass and pencil only.

TOPIC 4: SEQUENCE AND PATTERNS

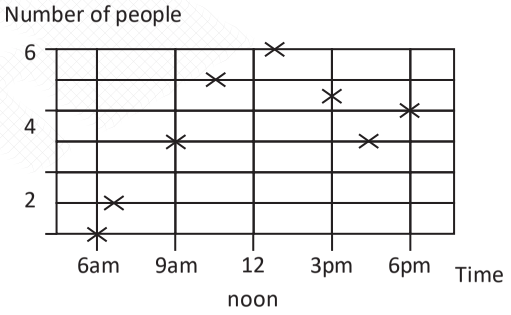
COMPETENCEY: Learners should be able to explore number patterns and sequences.

Competencies ***Learners should be able to:***	**Key concepts**	**Teaching/learning activities**	**Assessment strategy**
i. Explain how to generate number patterns and number sequence ii. Use number machines to generate a sequence iii. Describe a general rule when a pattern is given Determine terms in a sequence	Sequence and patterns develop skills of prediction of occurrence of phenomena Theoretical understanding of divisibility tests leads to sequence. Therefore, key concepts will include, the understanding of a sequence and how it leads to a pattern, then generalization of a rule.	Task learners to discuss instances where patterns occur in real life and how they can be used for financial purposes	Learners workout patterns and identify next terms for different sequences

TERM II

TOPIC 5: DATA COLLECTION AND PRESENTATION

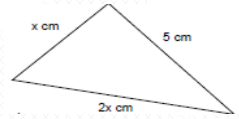
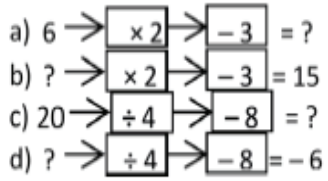
COMPETENCEY: Learners should be able to collect and present different sorts of data.

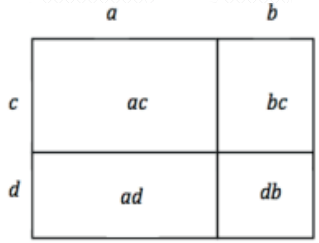
Competencies ***Learners should be able to:***	**Key concepts**	**Teaching/learning activities**	**Assessment strategy**
i. Understand the differences between types of data. Collects and represents simple data from the local environment using tally chart, bar chart (bars do not touch), pie chart and line graph	Develops skills of data presentation and analysis. Application of theoretical understanding of collection, presentation and analysis of data such as: • Collection (Interviews, questionnaires, surveys, observations, documents and	Students; Mukasa and Aminah disagreed about the size of their classmates' feet. Mukasa said: "Most learners in Senior 1 have feet which are 15 centimetres long." Aminah said: "No, most of them have feet that are shorter than that." Measure the lengths of learners' feet and record it. a) Make a tally chart to sort the data.	Let the learners study the graph below: The graph shows the number of people in a shop at different times one day. One of the points must be wrong.  a) Which point must be wrong? b) Explain why the point in part a) must be wrong, and why the other points may be correct.

	records, focus groups) • Presentation (Tabulation, Charts and diagrams, measures of dispersion, measures of central tendency) Analysis (Qualitative, quantitative)	b) Represent the data in a suitable way. c) Who was correct? Explain your answer. Measure the heights or weights of all the members of your class or year Group. (Data collection and presentation, that you could use). Group the results to give four or five classes. Display the results on a bar chart	During the process of doing the above task, observe the learners' creativity, presentations, collaboration, respect for another

TOPIC 6: ALGEBRA

COMPETENCEY: Learners should be able to recognize, expand, and solve quadratic equations and use them to solve real life problems.

	Competencies *Learners should be able to:*	**Key concepts**	**Teaching/learning activities**	**Assessment strategy**
ALGEBRA	i. Recognize equivalent quadratic ii. Expand algebraic expressions. iii. Identify perfect squares. iv. Factorise quadratic expressions. Solve quadratic equations where the quadratic expression can be factorised.	Theoretical understanding of algebraic expressions and equations including: • Variables and coefficients • Relating letters to numbers and/ or vice versa • Like and unlike terms Application of theoretical understanding of algebraic expressions and equations based	• In groups, draw a triangle and label as shown.  • The perimeter of the triangle is 26cm. Work out the value of x in the triangle • The sum of two numbers is 10 and their product is 21. What are the numbers? • What is the connection with	•As they discuss, observe participation in each group, presentations, methods used •Find the missing input and output numbers in these double number machines:  •Solve the following equations a) 3p – 2 = 8 b) 2x + 1 = 3x-2 Yusuf thinks of a number, b. He adds 6. He multiplies the

		on: • Commutative, Associative and Distributive properties. • Simplification, expansion, factorisation of algebraic expressions • Addition, subtraction, multiplication & division of algebraic expressions • Evaluating algebraic expressions by substituting variables with numbers.	x(10-x) =21 and x^2-10x+21=0 and (x-3) (x-7)=0? • Investigate the relationship between multiplication and finding the area of a rectangle, and generalize to algebra  $(a+b)(c+d) = ac + bc + ad + bd$ Multiply pairs of linear expressions (x+a) to generate quadratic expressions recognising the special cases of perfect squares $(x+a)^2$ and the	sum by 4. He subtracts twice the original number. His result is 32. a) Construct an equation to represent Yusuf's work b) Solve the equation to find Yusuf's original number. In pairs, let the learners discuss the following tasks. Observe them as they discuss the tasks. Assess the learners on the core values and generic skills. • Identify the perfect squares $x^2 + 2x + 1$ $x^2 + 2x + 2$ $x^2 - 6x + 8$ $4x^2 - 10x + 25$ • Use the difference of two squares to evaluate

			difference of two squares $x^2-a^2=(x+a)(x-a)$. Substitute values of x in quadratic expressions and note the values when the expression is zero – link with the solutions of the quadratic equation • Investigate when quadratic expressions can be factorised to establish $x^2+(p+q)x+pq=(x+p)(x+q)$	$101^2 - 99^2$ • Find the solutions of the following quadratic equations $x^2 - 5x + 6 = 0$ $x^2 + 3x - 10 = 0$ $x^2 - 6x + 8 = 0$ $x^2 - 10x + 24 = 0$

TOPIC 7: BUSINESS ARITHMETIC

Competency: Learners should be able to understand and apply Business arithmetic

Competencies *Learners should be able to:*	**Key concepts**	**Teaching/learning activities**	**Assessment strategy**
i. Describe and calculate profit (includes all expenses incurred), loss, ii. Commission, interest, insurance and discount. Express profit or loss as a percentage Solve simple interest problems	Understanding and application of theoretical Business Arithmetic such as: • Simple and Compound interest • Bank Charge • Insurance and assurance • Commission, discount • Profit • loss • Exchange rates • Bank Charges • Taxes • concept	In groups, let the learners set up imaginary shops in the classroom. Let the learners set the cost and selling prices of items. Learners should calculate the profit and losses for each item. Discuss causes of losses Teacher can develop activities using the following: • Mobile Money • Budgeting • VAT	After setting up imaginary shops as indicated in the Learning activity, let the learners Individually work out the following numbers in their exercise books. Observe learners whether they are doing the work as instructed (integrity), are they willing to do the work? (positive attitude towards work) How is their presentation of the work? Are they creative and innovative? 1. In a Day- Boarding School there are 100 boarders, each of whom is given 3 litres of milk per week. If a half-litre Tetra pack costs UGX.1500, find their monthly milk bill (1 month = 4 weeks) 2. A trader marked the prices of his goods 20% above the cost price and allowed a discount of 10% to the customers on the marked price. If Okot paid UGX..54,000 for a shirt,

	• Pensions and social schemes • Hire purchase • Wages, salaries and salary deductions • Overtime, commission, bonus • Depreciation and Appreciation	Utility Bills Village banking	what was the marked price of the shirt? What was its cost price? -

TOPIC 8: TIME AND TIME TABLES

Competency: Learners should be able to understand and use time.

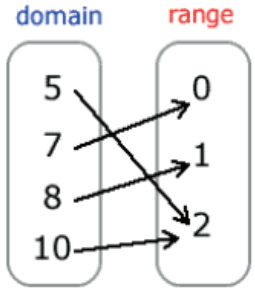
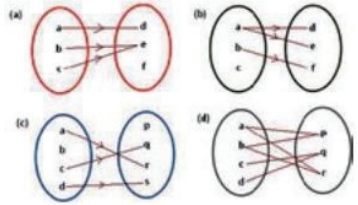
Competencies *Learners should be able to:*	Key concepts	Teaching/learning activities	Assessment strategy

<table>
<tr>
<td>i. identify and use units of time
ii. use and interpret different representations of time
apply the understanding of time in a range of relevant real-life contexts</td>
<td>Theoretical understanding of time in the
• 12 hour clock
• 24 hour clock
Application of time
• 12 hour clock
• 24 hour clock
• East African Time and GMT
Interpretation of bus travel time tables</td>
<td>The following subjects with their number periods per week are to S1 class.
Subject periods
1. English Language 6
2. Local Language 3
3. Kiswahili 3
4. Mathematics 6
5. General Science 5
6. Social Studies 5
7. Religious Studies 3
8. Physical Education 3
9. Agriculture 4
10. Foreign languages 3
In groups, develop a Time Table showing how the S1 Class subjects are distributed throughout the week (i.e. Monday to Friday)</td>
<td>After setting up a timetable for S1 as indicated in the Learning activity, let the learners Individually work out the following numbers in their exercise books.
Observe learners whether they are doing the work as instructed (integrity), are they willing to do the work? (Positive attitude towards work)
<table><tr><th>Bus Station</th><th>Arrive</th><th>Depart</th></tr><tr><td>Soroti</td><td></td><td>20:30</td></tr><tr><td>Kumi</td><td>22:00</td><td>22:15</td></tr><tr><td>Mbale</td><td>23:30</td><td>24:00</td></tr><tr><td>Iganga</td><td>01:30</td><td>01:45</td></tr><tr><td>Jinja</td><td>02:05</td><td>02:55</td></tr><tr><td>Kampala</td><td>04:00</td><td></td></tr></table>
How is their presentation of the work? Are they creative and innovative?
1. A Senior One mathematics lesson starts at two o’clock and lasts for 80 minutes. At what time does the lesson end? Give your</td>
</tr>
</table>

			answer in as many different forms as you can. Look at the bus timetable. a) Where does the bus start? b) Where does it travel to? c) How long does the whole journey take from start to finish? Give your answer in hours. d) The bus travels for half the total journey time. Which should be the nearest station? e) Rona lives in Kumi. She wants to travel to Mbale. It takes 40 minutes to walk from Rona's house to the Kumi bus station. What is the latest time that Rona should leave her house? f) Give the time on the 12-hour clock when the bus will arrive at Mbale. g) What is the total time the bus spends at the bus stations on its journey? Give your answer in hours and minutes. h) Musa wants to travel from Jinja to Kumi. Can he use this bus for his journey? Explain your answer.

TOPIC 9: MAPPINGS AND RELATIONS

Competency: Learners should be able to understand and use arrow diagrams/mappings to represent relations and functions.

Competencies *Learners should be able to:*	**Key concepts**	**Teaching/learning activities**	**Assessment strategy**
i. Use arrow diagrams/mappings to represent relations and functions. ii. identify domain and range of a mapping. iii. Describe and distinguish between function and non-function mapping.	Relating to the order of different objects: Understanding the difference between range and domain. Differentiating between a function and none function.	 Investigate situations where one set can be related to another and draw the mapping diagrams • Determine the features that make a mapping a function	Observe the learners in their groups as they complete the task below. Find out the learners' attitude towards the group work, are learners communicating effectively? Are they learning from one another? Are they creative and critical? • Do these mapping diagrams represent functions? – give reasons for your answers 

TOPIC 10: REFLECTION

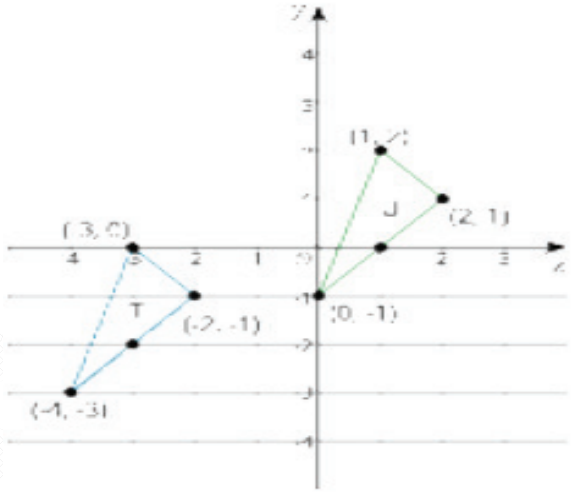
Competency: Learners should be able to reflect shapes in a range of contexts and identify lines of symmetry.

Competencies *Learners should be able to:*	**Key concepts**	**Teaching/learning activities**	**Assessment strategy**
i. Identify lines of symmetry for different figures. ii. Reflect shapes and objects. iv. Apply reflection in the Cartesian plane.	• Knowledge of symmetry, object, image, line of symmetry, mirror line, mediator/ perpendicular bisector and angle bisector.	•Identify all the lines of symmetry in the letters of the alphabet written as capital letters, repeat for numbers • Use a mirror to reflect objects in a given line of symmetry • Investigate what happens to the coordinates of the image when an object is drawn on a coordinate grid and reflected in each axis and the lines y=x and y=-x	In groups, learners should carry out the task below; Observe them as they do the task. Is there harmony in the groups? Is each learner's attitude towards the activity positive? How are they communicating to each other? Are they learning from each other? Look at their presentations. • Let each group explain to the other groups how they have carried out the task. **Task**: Plot the points A (1, 2), B (-1, 1) and C(-4, 3) on a Cartesian plane. Join up the points to create the object. After a reflection the image has points A' (2, 1), B' (1, -1) and C' (3, -4). Find the equation of the line of reflection.

TOPIC 11: VECTORS AND TRANSLATION

Competency: Learners should understand the nature of vector, manipulate and represent them in order to define translation.

Competencies *Learners should be able to:*	**Key concepts**	**Teaching/learning activities**	**Assessment strategy**
i. define translation with a vector. ii. identify scalars and vectors. use vector notation. iv. represent vectors both single and combined geometrically.	• translation vector in 2 dimensions and displacement. •Congruence of figures under translation • Symbols for Vectors • magnitude only, magnitude and direction. •Equivalent displacement vectors – single translations equivalent to two or more consecutive translations	Distinguish scalars (magnitude only) and vectors (magnitude and direction), Investigate moving objects plotted on a coordinate grid without changing their orientation. Use a vector (**a**) to define the translation where **a** represents movement parallel to the x-axis and **b** represents	In groups, let the learners discuss the following task. Observe them as they discuss the task. Assess the learners on the core values and generic skills. • What is the vector that translates T to J? • What is the vector that translates J to T?

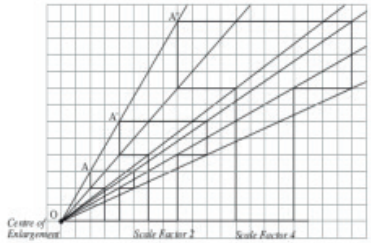
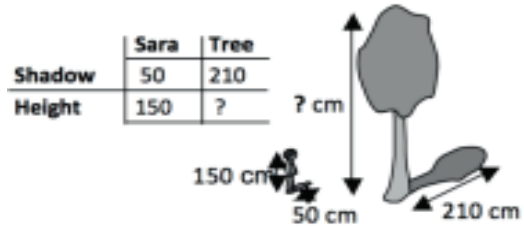
	•Equal but opposite Vectors e.g. **α**and -**α** Addition of vectors and related problems. •The zero vector •Multiples of vectors i.e. 3**α** (for example) as a scale factor of 3, applied to the vector (scalar) •Column vector notation. •Length of vectors	movement parallel to the y-axis. **b** • Investigate how to 'undo' a translation; the effect of performing more than one translation – draw diagrams to illustrate findings.	

TERM III

TOPIC 12: SIMILARITY AND ENLARGEMENT

Competency: Learners should be able to understand and apply relationship between lengths, areas and volumes of similar shapes and objects.

Competencies ***Learners should be able to:***	**Key concepts**	**Teaching/learning activities**	**Assessment strategy**
i) identify similar figures. ii) state and use the properties of similar figures. iii) define enlargement. iv) state the properties of enlargement to construct objects and images. v) understand and use the relationship between linear, area and volume scale factors.	•Properties of similar figures. •Enlargement in two dimensions •Linear Scale Factors:- $\geq +1, 0 \leq S.F \leq 1$, $-1 \leq S.F \leq 0, S.F \leq -1$ •Area and volume scale factors •Successive Enlargement.	Place an object in front of a lamp. What happens to the size of the shadow as the object moves closer to and further from the lamp? • Explore enlarging shapes through different centres of enlargement with different scale factors. What happens to the area of the shapes?	Observe the learners in their groups as they discuss the tasks below. During the process, are learners communicating effectively? Are they learning from one another? Are they creative and critical? • Bayo and Sara want to find the height of a tree. They cannot climb the tree. Instead, they measure Sara's own height, the length of Sara's shadow, and the length of the tree's shadow. The table shows their results.

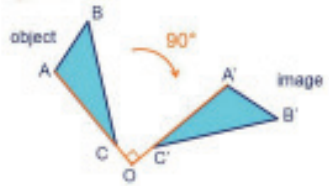
		 Extend to 3D starting with cubes and cuboids • Establish the relationship between the linear scale factor (k) and the area scale factor (k^2) and the volume scale factor (k^3)	 What is the height of the tree? Give your answer to a reasonable degree of accuracy. • Tom has a cylindrical saucepan with diameter 18 cm. The cook at his school has a similar saucepan with diameter 72 cm. Tom can make porridge for one person in his saucepan. For how many people can the cook make porridge for in the school?

TOPIC 13: ROTATION

Competency: Learners should be able to understand and apply rotation as a transformation.

Competencies *Learners should be able to:*	Key concepts	Teaching/learning activities	Assessment strategy

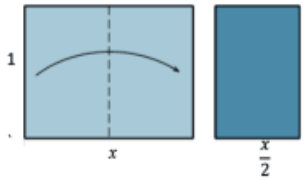
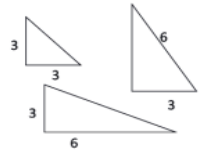
i)Identify the order of rotational symmetry of plane figures. ii)Distinguish between clockwise and anti-clock wise rotation. iii) State properties of rotation as a transformation including congruence. iv) Determine the centre and angle of rotation. v) Apply properties of rotation in the Cartesian plane.	•Orders of rotation rotational symmetry. •Centre of rotation. •Angle of rotation. •Determining the centre, image and object by drawing. •Direction of rotation	1.Cut out a regular polygon from a manila paper and mark one corner. Make an outline on paper. How many different ways will the cut polygon fit inside the outline of the polygon? e.g. An equilateral triangle has order of rotation 3  Repeat for other regular polygons. 2. Are there any capital letters of the alphabet that have rotational symmetry? 3. Cut shapes from scrap card, draw around the shape on a plain sheet of paper to create the object. Rotate the card shape about an identified centre of rotation (O) through an angle, and in a given direction (clockwise or anticlockwise). Draw around the card to create the image3. Cut shapes from scrap card, draw around the shape on a plain sheet of paper to create the object. Rotate the card shape about an identified centre	In pairs, let the learners discuss the following tasks. Observe them as they discuss. Assess the learners on the core values and generic skills. • Plot the points P (-2, 1), Q (0, 2) and R (1, 2) to form the triangle PQR on a square grid. Rotate PQR about the point (0, 0) through an angle of 90° clockwise. What are the coordinates of the image of triangle PQR after the rotation? • Determine the centre of rotation and the angle of rotation

		of rotation (O) through an angle, and in a given direction (clockwise or anticlockwise). Draw around the card to create the image  4. Investigate rotating different shapes on plain paper and a coordinate grid. 5. Given an object and image. construct the centre of rotation.	

TOPIC 14: NUMERICAL CONCEPTS

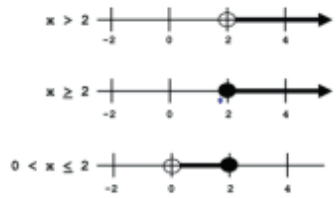
Competency: Learners should understand and use indices and standard form and be able to manipulate surds.

Competencies *Learners should be able to:*	**Key concepts**	**Teaching/learning activities**	**Assessment strategy**
i)give approximate answers to calculations. (u, s) ii) write numbers to a given number of significant figures. (u, s) iii) differentiate between significant figures and decimal places. (u, s) iv) express numbers in standard form. (u) v) Identify base number and index (k) vi) state and apply the laws of indices in calculations. (k, u, s)	•Rules for operations on integral indices •Standard form •Square and square roots from tables •Rules for operation of fractional indices •Standard form for numbers less than 1 e.g. A x 10^n Where $1 \leq A < 10$ and n is any integer. •Further	Take a long strip of paper and successively fold in half. Complete the table below. <table><tr><th>NUMBER OF FOLDS</th><th>NUMBER OF PARTS</th><th>IN INDEX FORM</th></tr><tr><td>0</td><td>1</td><td></td></tr><tr><td>1</td><td>2</td><td></td></tr><tr><td>2</td><td>4</td><td>2^2</td></tr><tr><td>3</td><td></td><td></td></tr></table>Use a calculator to explore how indices work, establishing general rules for multiplying and dividing numbers written in index form: na×nb and na÷nb Investigate how to 'undo' powers e.g. $4^2 = 16, \sqrt{16} = 16^{\frac{1}{2}} = 4$ $2^3 = 8, \sqrt[3]{8} = 8^{\frac{1}{3}} = 2$ • Investigate numbers that can't	In groups, let the learners discuss the following task and observe them as they discuss the activity. Assess the learners on the core values and generic skills. a. In 2013 the National Social Security Fund had assets of about UGX 3.4 trillion. a) How many millions are there in 3.4 trillion? b) How many ten thousand are there in 3.4 trillion? b. Akumu said, "$5^3 = 5 \times 3 = 15$." Burango said, "$5^3 = 5 \times 5 \times 5 = 225$." Who was correct? Justify your answer. c. The population census of 1969 found that the population of Uganda was 9,500,000. The population census of 2011 found that it was 32,900,000.

vii) use a calculator to find powers and roots. (k u s) viii) Use surds to represent roots that cannot be represented exactly as decimals. ix) manipulate and simplify expressions with surds.	computation without tables - with tables •Simple manipulation of surds •Simple identities involving square Roots. •Rationalization of surds.	be written exactly on a calculator e.g.thirds, sevenths, pi • Investigate the difference between significant figures, decimal places and rounding to a given level of accuracy e.g., to the nearest hundred. Investigate the lengths of diagonals in squares and rectangles e.g., square of side1; 2×1 rectangle; 3×4 rectangle using Pythagoras' theorem. • Investigate the ratio of the side lengths of a paper. When this rectangular paper is folded in half, the resultant rectangle is similar. 	Tushabesaid, "The population rose by 23,400,000." Mariam said,"The population rose by 2.34×10^{7}." Who was correct? Justify your answer. Observe the learners in their groups as they carry out the tasks below. During the process, are learners communicating effectively? Are they learning from one another? Are they creative and critical? • 1. Find the missing lengths in the right-angled triangles below  2. Simplify and order: $\frac{5\sqrt{3}}{10}$ $\sqrt{20}-\sqrt{8}$ $\frac{6-\sqrt{3}}{2-\sqrt{3}}$ $(\sqrt{3}-1)(4-2\sqrt{3})$ $(3+\sqrt{2})^{-1}$

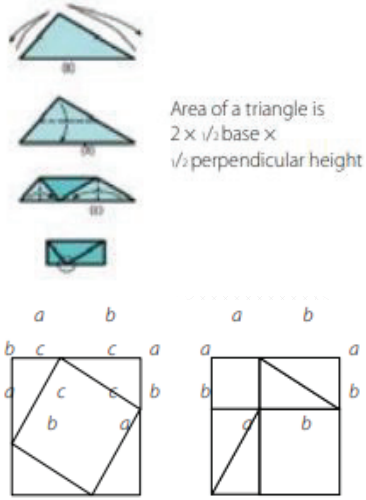
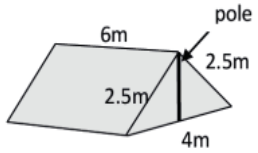
TOPIC 15: INEQUALITIES AND REGIONS

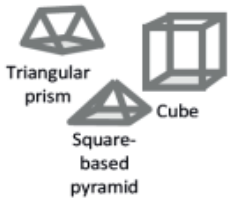
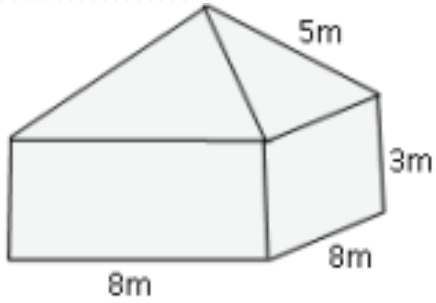
Competency: Learners should be able to represent and solve problems involving inequalities.

Competencies *Learners should be able to:*	**Key concepts**	**Teaching/learning activities**	**Assessment strategy**
ii)illustrate inequalities on the number lines. iii)solve linear inequalities in one unknown. iv)Represent linear inequalities graphically. v) Form simple linear inequalities for regions on a graph.	•Numerical solutions of simple inequalities. •Graphs of inequalities, regions bounded by straight Lines.	Match inequalities on a number line with their algebraic representation  Solve linear inequalities and represent the solution on a number line. • Define regions on a coordinate graph using linear inequalities	Observe the learners in their groups as they carry out the activity below. Find out the learners' attitude towards the group work, integrity, are they doing the work in harmony? • During the process of the description, are learners communicating effectively? are they learning from one another? are they creative? • Solve the linear inequalities and represent the solutions on a number line 2x+7<x+10 2x+7<x+10 • Use inequalities to define a square region that has (1, 1) at its centre.

TOPIC 16: TWO AND THREE DIMENSIONAL GEOMETRICAL FIGURES

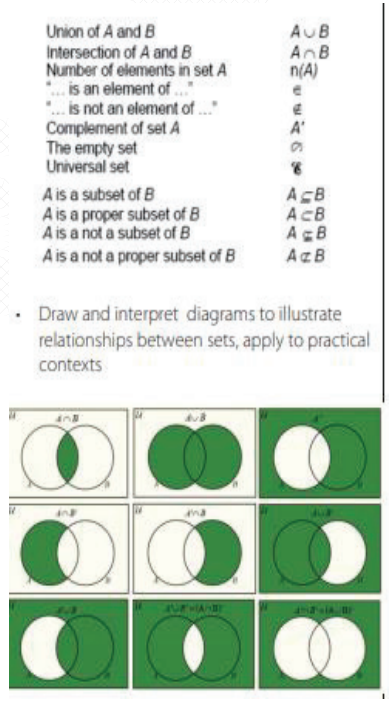
Competency: Learners should be able to understand, justify and apply area and perimeter formulae for different figures and be able to make and draw 2D and 3D shapes, and explore their properties.

Competencies *Learners should be able to:*	Key concepts	Teaching/learning activities	Assessment strategy
i)Describe the length of two-dimensional geometrical figures. ii)Develop, understand and state Pythagoras' theorem iii)Apply Pythagoras' theorem to right angled and isosceles triangles. iv)Understand the meaning of area in two dimensional geometrical figures (triangles, rectangles). v)Form nets of common solids.	•Linear properties of right angled triangles – Pythagoras theorem. •Areas of two and three dimensional figures and their volumes.	Cut a triangle from a piece of scrap paper –fold to show how the area of a triangle is related to the area of a rectangle  Provide learners with empty	Observe the learners in their groups as they carry the tasks below. During the process; - Are learners communicating effectively? - Are they learning from one another? - Are they creative and critical? • A square storeroom has sides of length 2 metres and a door near one corner. What is the length of the longest pole that can be stored safely, resting on the floor of the room? • The dimensions of a tent are shown in the pole used to support the tent? What is the surface area of the tent? 

vi) Identify common solids and their properties including faces, edges and vertices. ix) Calculate surface areas of three-dimensional figures. x) Calculate the volume of cubes and cuboids.		boxes and count the faces, edges and vertices. Dismantle to find the net. • How many different nets of the following solids can they create?  Cube • Cuboids • square based pyramid • Put learners in groups to make these three shapes out of strips of wood that are all the same length. How many strips are needed for each shape? • How many different cuboids can be made from 24-unit cubes?	Observe the learners in their groups as they carry out the task below. During the process, are learners communicating effectively? Are they learning from one another? are they creative and critical? **Task:** A tent has a cuboid base and a pyramidal roof. a) Sketch a net of the tent, and indicate the lengths of its edges. b) Calculate the surface area of the tent. c) Sketch as many different nets as you can for the tent  *Note: Learners may discuss whether the floor of the tent is covered. Such an observation would indicate that they are thinking mathematically*

TOPIC 17: SET THEORY

Competency: Learners should be able to use sets to solve problems.

Competencies *Learners should be able to:*	**Key concepts**	**Teaching/learning activities**	**Assessment strategy**
i) represent and show different operations on sets by shading the different regions in a Venn diagram. ii) apply sets in practical situations using two and three sets.	• Identification of all members belonging to a described set. •Use of symbols • Types of sets •Operations on sets. •Use and recognition of all the notation •Universal Sets. •Identification of complement sets. • Venn diagrams	Familiarise themselves with set notation  Union of A and B — $A \cup B$ Intersection of A and B — $A \cap B$ Number of elements in set A — $n(A)$ "... is an element of ..." — $\in$ "... is not an element of ..." — $\notin$ Complement of set A — A' The empty set — $\varnothing$ Universal set — $\mathscr{E}$ A is a subset of B — $A \subseteq B$ A is a proper subset of B — $A \subset B$ A is a not a subset of B — $A \not\subseteq B$ A is a not a proper subset of B — $A \not\subset B$ • Draw and interpret diagrams to illustrate relationships between sets, apply to practical contexts	Observe the learners in their groups as they carry out the tasks below. During the process, are learners communicating effectively? Are they learning from one another? Are they creative and critical? • Given U= {1,2,3,4,5.6,7,8,9,10}. set A and B aresubsets of U such that: A= {even numbers}, B= {square numbers} State n(A) and n(B). Draw a Venn diagram. List the members of AUB and (AUB)' • Ozo hosted a party with 300 guests. He served a meal with chicken (C) and meat (M). 200 guests had chicken. 130 guests had only chicken. 6 guests did not eat a meal. a) Represent this information in set notation

			b) Represent the information on a Venn diagram. c) How many guests ate both meat and chicken? d) How many guests had meat? • In a school there is an Arts Club, a Science Club, and a Mathematics Club. 30 learners in one class belong to at least one of the clubs. 15 belong to the Arts Club, 12 belong to the Science Club, and 13 belong to the Mathematics Club. What is the maximum number of learners that could belong to all three clubs?

PHYSICS

SENIOR TWO

Introduction

The abridged Physics Syllabus for Senior Two has been designed to address the learning gaps that were created as a result of the Covid 19 pandemic. It is hoped that you had covered the introduction to Physics and Measurements during the little time you were at school. Critical content has been sorted and put together to be taught in a period of one year. The syllabus combines work which was not taught in Senior One before the lock down and that for Senior Two. In order to avoid repetition of related concepts, learning has been structured around the major thematic areas i.e Mechanics and General Physics, Light, Heat, Waves and sound and finally Earth and Space Physics. It is hoped that the content areas included in this syllabus will enable the learner to acquire the target knowledge, understanding, skills and values for the progression in Physics.

The critical changes are highlighted in the matrix below.

SN	CRITICAL CHANGES	JUSTIFICATION
1	Effects of forces was left out	The effects of forces are a foundation in different topics such as work, energy and power, pressure and motion and will be treated under those topics
2	States of matter was left out	these concepts are taught in the primary school to almost the same depth
3	Temperature and heat were combined	These have related concepts
4	Energy, work and power was combined with turning effects of forces	The concepts taught are related

	and simple machines.	
5	Pressure in solids and fluids was combined with sinking and floatation.	These have common concepts of forces in fluids
6	Sun, moon and earth was combined with the solar system	The concepts taught are related.
7	Surface tension and capillarity was left out.	These were not carried forward from S1 because of time constraints and they would not affect the progress of the learners in the subsequent topics in Physics
8	Forms and sources of energy and measuring heat, and heat transfer.	These were carried from S1 and are to be taught under temperature and heat since the concepts form a basis for future progress of the learners in Physics.
9	Expansion of solids, liquids and gases.	This was left out since the concepts are similar to what the learner is expected to have met in primary school
10	Magnetic fields was left out	The learner is expected to meet these in S4 as an introduction to electromagnetism.
11	Electrostatics was left out	This was due to time constraints and the learner is expected to meet this in S3. This will be partly introduced before current electricity

PHYSICS: Term 1

DETAILED ABRIDGED PHYSICS SYLLABUS FOR SENIOR TWO

Topic 1: Nature of light; Reflection of light at plane surfaces

Topic/subtopic	Learning outcomes	Key Concepts	Teaching/Learning Activities	Assessment Strategy
1. Light sources in everyday life 2. How shadows are formed 3. Eclipses as natural forms of shadows 4. Reflection of light from plane surfaces and its applications	***Learners should be able to:*** a. Demonstrate that light travels in straight lines b. Explain how shadows and eclipse are formed c. Explain the terminologies related to reflection at plane surfaces d. Describe experiments to demonstrate the laws of reflection and use	• Light comes from different sources • Light behaves differently on different surfaces	i. Learners as individuals or in groups, make an artificial eclipse using items such as the globe, bulb, balls e.tc and make a report ii. In groups, learners carry out activities on measuring the angles of reflection for different angles of incidence and discuss the results iii. Individual, learners observe themselves	1. Task learners to draw a diagram of solar eclipse and label the umbra and penumbra. Then let the learners explain why it happens that way. 2. Assess learners on

	them in different situations e. Describe image formation in plane mirrors and its applications		through plane mirrors and discuss the nature of the images formed	numeri cal proble ms about plane mirrors.

TOPIC 2: Reflection of light at curved surfaces

Topic/ subtopic	Learning outcomes	Key Concepts	Teaching/ Learning Activities	Assessment Strategy
Images formed in curved mirrors	***The learner should be able to:*** a. explain the terminologies used in relation to curved mirrors b. describe how curved mirrors form images and their applications (scale drawings are required) c. determine the focal length of	Curved mirrors have a variety of applications. This is because they form different images depending on the position of the object	Learners observe themselves using curved mirrors and describe the nature of the image formed by the mirrors	Task learners to describe, using appropriate ray diagrams, the characteristics of the image formed by a concave mirror when the object is: (i) At a distance less than f (ii) At a distance greater than r

	concave mirrors using different methods			

TOPIC 3: Heat and Temperature

1. **Topic/ subtopic**	**Learning outcomes**	• **Key Concepts**	a. **Teaching/ Learning Activities**	.. **Assessment Strategy**
2. Establishment of temperature scales 3. Thermometric liquids 4. Causes and effects of the daily variations in atmospheric temperature 5. Heat energy transfer 6. Applications of modes of heat transfer 7. Greenhouse effect and global warming as aspects related to	***The learner should be able to:*** a. Explain the difference between temperature and heat. b. State and explain examples of thermometric properties. c. Compare mercury, alcohol and water as thermom	• Heat is a form of energy that causes a change temperature and a change of state in matter • Conduction, convection and radiation occur in different materials and have various applications	b. As groups, learners make an improvised thermometer c. As individuals or in groups, learners discuss the features of a clinical thermometer and the laboratory thermom	2. Task learners to describe the care of clinical thermometers. Consider how learners effectively communicate scientific knowledge 3. Teacher provides learners with corresponding values of Celsius and

heat transfer	etric liquids. d. Describe how the upper and lower fixed temperature points are determined. e. Solve numerical problems related to temperature scales including the Kelvin scale. f. Describe the construction and use of a clinical thermometer. g. Understand that thermal energy is transferred from a region of higher		eter d. In groups, learners measure their body temperature and compare it with the known value. e. Learners debate qualities of thermometric liquids. m. In groups, learners hold one end of a metallic material such as a knife and a piece of wood in a fire flame and discuss what happens and state where this behaviour	Kelvin temperatures and tasks the learners to develop a relationship between them 4. Task learners to explain the examples of the applications of heat energy transfer by conduction, convection and radiation and allow for peer assessment

	temperature to a region of lower temperature. h. Explain the causes in the variations of atmospheric temperature. i. Describe an experiment to compare the rates of conduction of different solids. j. Describe, in terms of density changes, convection in fluids. k. Investigate the factors that affect		is applied n. In groups, learners demonstrate convection in liquids and gases and discuss their applications. o. Learners use a thermos flask and discuss in groups how it keeps heat transfer to a minimum	

	the rate of heat transfer by radiation. l. Describe applications of heat transfer in everyday life.			

PHYSICS: Term 2

Topic 4: Work, Energy and Power; Machines

1. Topic/ subtopic	Learning outcomes	Key Concepts	Teaching/ Learning Activities	• Assessment Strategy
2. Work, energy and power 3. Energy resources 4. Moment of a force 5. The simple machines	***The learner should be able to:*** • Know and use the relationship between work done, force and distance moved, and time taken. • Understa	The operation of different devices involves work, power and energy. The turning effect of a force depends on the magnitude of the force and its perpendicul	• In pairs, learners research the terms work, energy and power and discuss how they are related. • In groups, learners discuss about transformation of mechanical energy.	• Listen/observe group discussions, ask probing questions to promote critical thinking and understanding about work, power and energy • Observe pairs and groups engaged in

	nd that an object may have energy due to its motion or its position and change between kinetic and positional potential energy. • Know the mathematical relationship between positional potential energy and kinetic energy and use it in calculations. • Understand and apply the principle of moments in	ar distance from the turning point.	• In pairs, learners solve numerical problems involving work, energy and power. • Learners investigate moment of a force and how machines make it possible to perform tasks using smaller forces than would otherwise be the case. • Learners investigate the centre of gravity of different objects and how it affects stability. • Investigate and research on the	activities and intervene to ensure calculations are well understood and conducted • Evaluate quality of learning through assessment of products: diagrams; reports; posters; calculations.

	different instances. • Understand the principles behind the operation of simple machines.		principles of operation of different simple machines. • Solve simple numerical problems on the M.A., V.R. and efficiency of simple machines.	

TOPIC 5: Pressure in solids and fluids; sinking and floating

1. **Topic/ subtopic**	**Learning outcomes**	• **Key Concepts**	i. **Teaching/ Learning Activities**	.. **Assessment Strategy**
2. Pressure exerted by solids 3. Pressure exerted by fluids 4. The expression P = ρhg 5. Measuring gas pressure 6. Using a	***The learner should be able to:*** a. Explain the term pressure and derive its units. b. Apply the relationship	• Pressure is exerted in solids, liquids and gases due to their masses • Atmospheric pressure	ii. In groups or as individuals, learners place different faces of the same rectangular brick/block onto a flat heap of sand or clay and	2. Task learners to explain the following phenomena using knowledge of pressure: (a) farm tractors have large wheels

manometer 7. Transmission of pressure in fluids 8. Atmospheric pressure 9. Measuring atmospheric pressure 10. Archimedes principle and the law of flotation 11. Applications of sinking and floatation	$pressure = \frac{force}{area}$ to explain situations and to solve numerical problems related to minimum and maximum pressure. c. Demonstrate the factors that affect liquid pressure. *d.* Explain the transmission of liquid pressure and its applications. *e.* Apply the relationship P = ρhg to solve related	has various consequences to life on earth • Objects weigh less in different liquids than in air	compare how much the sand or clay is depressed by the different faces iii. In groups, learners measure the length, width and thickness of a rectangular block/ brick. Then they measure its mass and use these readings to calculate the least and greatest pressure it exerts on a smooth table iv. Learners in groups or as individuals make holes on a used water bottle at different/ same depth	with wide tyres (b)a hippo can easily walk in mud than a goat 3. Learners calculate the minimum and maximum pressure exerted by solids in different situations. 4. Provide learners with numerical problems related to floating and assess how they use these laws to solve the problems

	numerical problems (**derivation of the equation not required**). *f.* Describe cause, effects and applications of atmospheric pressure. *g.* Describe construction and use of a simple mercury barometer. *h.* Describe the use of a manometer in the measurement of gas pressure. *i.* state and verify		and pour water into the bottle. Then they discuss what they observe v. In groups or as individuals; learners plan and carry out an activity to demonstrate the existence of atmospheric pressure using (a) crushing can (b) Siphoning (c) Partial vacuum vi. Learners use a balance and solids to verify the law of floatation and Archimedes principle vii. In groups, learners construct	

	Archimedes principle. *j.* State and verify the law of floatation. *k.* Work out calculations related to floating. *l.* Explain the applications of the law of flotation in real life situations.		devices that operate on the principle of floating	

PHYSICS: Term 3

TOPIC 6: Mechanical properties of matter

1. Topic/ subtopic	Learning outcomes	Key Concepts	1. Teaching/ Learning Activities	• Assessment Strategy
2. Common structures in use 3. Elastic and plastic materials 4. Hooke's law 5. Effect of heat on properties of materials	***The learner should be able to:*** a. Understand how the mechanical properties of common materials can be utilised in physical structures. b. Understand that the tensile strength of materials is determined by the properties of the substances they are composed of. c. Understand that heating changes the	The applications of different materials depend on their mechanical properties	2. In groups learners research and explain the meaning of the following characteristics, and name common materials that exhibit these properties: - • brittle - • ductile - • strong - • hard - • malleable - • flexible - • elastic 3. In pairs, learners	• Listen to pairs and groups of learners as they research, plan and investigate and support, where appropriate, to ensure all are making progress towards achievement of learning outcomes. • Evaluate quality of learning through assessment of products: outcomes of research, posters/presentations and investigation reports.

	structure and properties of some materials.		construct and test to destructio n model bridges made out of different materials and produce a report in which they: - • relate physical properties to their characteri stics - • identify material used in everyday life and research and relate their use to their properties - • explain, in terms of particle theory, why heating materials	

			changes their structure and properties 4. In groups, learners investigate and report on the strength of concrete strips made with different proportions of sand and cement. 5. In pairs, learners research the stress lines of beams under tension and compressive stress, and then explain how reinforcing concrete	

			changes its properties. 6. In groups, learners investigate the relationship between the diameter of a tube and its tensile strength. They should relate the findings to the structure of bones and to the use of materials in construction.	

Topic 7: The Solar System

1. Topic/ subtopic	Learning outcomes	• Key Concepts	1. Teaching/ Learning Activities	Assessment Strategy

2. Relative sizes and positions of the earth, sun and moon 3. Earth and moon movements 4. The solar system 5. The origin of the universe	***The learner should be able to:*** a. Know the relative sizes, positions and motions of the Earth, sun and moon. b. Understand how day and night occur and demonstrate the phases of the moon. c. Understand the roles of the sun, Earth and moon in explaining time, seasons, eclipses and ocean tides. d. Know the components of the solar system and	• The earth is part of the solar system • Diurnal and seasonal variations depend on the movement of the earth and the moon in the solar system.	2. In pairs, learner research and explain; • how the Earth orbits around the sun and the moon orbits the Earth, and the time taken for these orbits • the cause of day and night • why the shape of the moon appears to change over a period of time when viewed from the Earth • How the tilt of the Earth gives rise to seasons in some parts of the world, and the implications of these for the activities on Earth. 3. In pairs, learners use a	• Listen to group and pair discussions, asking probing questions to promote thinking, and ensure that learners acquire the expected knowledge, understanding and skills. • Observe learners working together, providing guidance to ensure all grasp concepts. • Evaluate quality of learning through assessment of products: planet models and research reports.

	their positions. e. Know the main characteristics of the inner and outer planets. f. Know that there are many solar systems in the universe and understand that some may contain planets with similar characteristics to Earth which may support life. g. Know outline details of the origin and structure of the universe.		model to explain how the Earth and moon move relative to sun and use it to explain eclipses. 4. In groups, learners research, discuss and report on the connection between the moon and ocean tides. 5. In pairs, learners research and report on: • the components of the solar system, • and make a scale model of the planets • and place them in order showing their relative distance	

			from the Sun • the main character istics of the inner • four and outer four planets • Why the Earth is the only planet which supports life. 6. In groups, learners research, discuss and explain, using an appropriate medium the origin and structure of the universe.	

BIOLOGY

SENIOR TWO

SENIOR TWO BIOLOGY - ABRIDGED CURRICULUM

Introduction

The Senior Two abridged syllabus has been designed to address the learning gaps that were created as a result of the covid-19 pandemic. The syllabus is a combination of content from the new lower secondary biology curriculum for Senior One and Senior Two. The critical content has been sorted and put together to be taught in a period of one year. The abridged syllabus contains key concepts in all topics from both classes. In order to compensate for the lost time, concepts that were taught at primary level (for example parts of a flowering plant, drawing of teeth etc.) are left out. Learning outcomes with similar content are merged or transferred to another class. Content that was not relevant to the abridged curriculum is also left out (for example systems and processes other than those in mammals). It is assumed that "Introduction to Biology" was covered during the time before the lockdown. It is hoped that the content areas included in this syllabus will enable the learner to acquire the target knowledge, understanding, skills and values for their progression. The teacher's and learners are encouraged to make reference to the Biology home study materials that can be accessed on the center's website www.ncdc.go.ug.

The matrix below shows the key changes that were made in abridging the Senior Two syllabus and their justification.

KEY CHANGES	JUSTIFICATION
All S.1 topics moved to S.2 except introduction to biology and all S.2 topics are maintained	These topics had not been covered before students went for lock down except Introduction to biology.
Classification: Learning outcomes on concepts of classification and naming of organisms are left out.	Concepts are not key in the abridged Curriculum.

Learning outcomes on characteristics and examples of some organisms are left out. Learning outcomes on Viruses are left out.	Learners are familiar with concepts on viruses from primary school and awareness campaigns on media.
Insects Learning outcomes on the dichotomous key are left out.	Concepts will be picked through various practical activities in classes ahead.
Flowering plants Learning outcomes on external parts of a flowering plant are left out.	Concepts dealt with at primary school level.
Soil Learning outcomes on types of soil and experiments on components of soil are left out.	Concepts are not key in the abridged Curriculum.

Detailed Syllabus

Topic 1 : Cells (10 periods)

Learning outcomes	Suggested learning activities	Sample assessment strategy

The learner should be able to: a. life processes are common to all living things, but they are manifested differently in different organisms b. know and understand the structure and functions of a typical animal cell and plant cell c. understand the structure of specialized cells in terms of their functions in an organism **d.** understand levels of organization in organisms (cell, tissue, organ, system, organism)	• In pairs, learners observe plants and animals, and identify characteristics that show that organisms are living. Identify, research on and record the seven characteristics of living things. • Observe prepared slides of plant and animal cells, draw cells and identify similarities and differences. • Draw and label the animal and plant cell as seen under a light microscope. • Research on the functions of the parts in a plant and animal cell, and annotate labels on cell diagrams accordingly. • Draw examples of specialised cells in animals and plants. Identify	• Listen and observe as learners demonstrate orally or by completing a comparison table that they understand how animals and plants carry out nutrition, respiration, movement, excretion, growth and reproduction, and how they show sensitivity. • Listen to learners explaining why a machine such as a moving vehicle is a not a living organism. • Listen and observe as learners explain orally or in writing: • similarities and differences between plant and animal cells • structure and functions of cells, parts of cells and some specialised cells • different levels of organisation and their importance in large organisms • Observe group simulations showing the organ systems that need to work together when a person is: • dancing • eating • writing a story • Teacher involves class members in peer assessment and discussion of how groups could improve the quality of

	and explain the similarities and differences between the cells. In groups, learners brainstorm, research on and list the different types of cells, tissues, organs and systems in the human body. Devise creative ways of explaining the five levels of organization (from simple to complex) to the class.	simulations. • Evaluate quality of learners' illustrations relating to each activity mentioned above.

Topic 2: Five Kingdom System of Living Organisms (15 periods)

- Learning outcomes	uggested learning activities	Sample assessment strategy
a) know examples of organisms belonging to Kingdom Monera, Kingdom Protoctista and Kingdom Fungi b) understand the value of micro organisms in food-making	• Learners use pictures (and possibly microscope slides) as well as lists of group characteristics to identify organisms as belonging to the following groups: Monera/bacteria, Protoctista, Fungi,	• Observe learners in groups as they develop and use identification keys. • Listen to learners' conversations and ask probing questions to check their

processes c) identify three characteristics (cell structure, mode of feeding, and photosynthetic pigment) of organisms in Kingdom Plantae d) know examples of organisms from each of the following categories: vascular & non-vascular, angiosperms & gymnosperms, monocots & dicots in Kingdom Plantae (No drawings required) e) identify and describe the common observable characteristics and give examples of organisms from phylum Arthropoda including its classes (No drawings required) f) Identify and describe the common observable characteristics (types of teeth, temperature regulation, habitat, reproduction, and gas exchange) and give examples of	Plantae, and Animalia. • In groups, learners construct simple identification keys for grouping the organisms in the pictures, share their keys with other groups, and then use them to identify other examples of organisms belonging to the same groups. • In groups, learners research on and make summary write- ups on the use of bacteria and fungi in the production of yoghurt, cheese, bread and alcohol. • In groups, learners research on the common characteristics and differences between examples of members of the kingdom Plantae belonging to the following categories: vascular/non-vascular, angiosperms/gymnosperms, monocots/ dicots. Groups choose the format to use to present their findings (tables, drawings or more creative methods) • Groups construct simple keys to place plants in the correct category.	understanding. • Observe and listen to group presentations. Evaluate quality of products such as keys, tables, experiment reports, diagrams, and drawings.

organisms from the phylum Chordata and its classes. No details of the reproduction process should be given -	• In groups, learners research the common characteristics of arthropods and differences between members of the classes of arthropods. Groups choose the format to use to present their findings (tables, drawings or more creative methods) • Groups construct simple keys to place animals in the correct category. • In groups, learners research the common characteristics (see list in learning outcomes) and differences between examples of members of the five main classes of the phylum Chordata: fish, amphibians, reptiles, birds, and mammals. Groups choose the format to use to present their findings (tables, drawings or more creative methods)	

Topic 3 : Insects (08 periods)

- Learning outcomes	Suggested learning activities	Sample assessment strategy
a. Identify the observable external features of a housefly, cockroach, bee, and butterfly (No details of mouth parts required) b. Appreciate the useful and harmful effects of a housefly, cockroach, bee, and butterfly c. Know the different methods of controlling the harmful stages of a housefly, cockroach, and butterfly	• In pairs, use a hand lens to observe a housefly, cockroach, bee, and butterfly; paying specific attention to the following structures: • head (mouth parts, antennae, eyes, hair) • thorax (wings, halters, hairs, strips, legs and the different segments) • abdomen • Pairs create a suitable table and record observations; comparing each of the insects. • Draw the insects provided, label the structures listed above and annotate drawings to explain the	• Observe pairs carrying out activities and check that they identify the parts listed; create an appropriate comparison table; draw and label correctly; construct keys that work. • Listen to pairs' conversations and monitor understanding and progress towards learning outcomes. Evaluate quality of products of each activity.

	functions of the structures. • Pairs construct a dichotomous key for any four of the insects listed above. • Pairs research on the different methods of controlling the harmful stages of a housefly, cockroach, mosquito, and butterfly. They produce a presentation advising the class on how to control these populations.	
a. Know the external parts of a typical flowering plant. b. understand how the structures of monocotyledonous and dicotyledonous roots, stems, leaves, flowers, and fruits suit their functions c. Classify leaves	• In pairs, learners draw and label the parts of a whole mature dicotyledonous and monocotyledonous plant. • In groups, learners compare the structural features (root system, leaf venation, leaf	• Observe pairs carrying out activities, and check that they interpret specimens and identify functions correctly. • Listen to pairs' conversations and monitor understanding and progress towards learning outcomes. • Monitor individuals' and groups' contributions to whole class discussion. Evaluate quality of products from activities.

	shape, leaf attachment to stem, and flower colour) of a whole herbaceous dicotyledonous plant and whole monocotyledonous plant. Learners record their observations and present them to the class • In groups or as a whole class, learners discuss how the structures observed in the two plants carry out their functions. Annotate the drawings made above to explain how each structure is suited to its function. • In pairs, learners draw and label the parts of the flower. • In groups or as a whole class, learners discuss how each part of	

	the flower is suited to its function, and annotate the drawing made above to explain how. • In groups learners classify leaves using observable characteristics and construct a dichotomous key for not more than four leaves. Pairs observe a bean seed and a tomato or other fruit, and write down the similarities and differences. Learners present their findings.	

Topic 4: PHYSICAL AND CHEMICAL PROPERTIES OF SOIL (12 periods)

Learning outcomes	uggested learning activities	ample assessment strategy

a) determine soil constituents and identify their properties (u, s) b) understand that different soil samples have different properties: water retention, drainage, capillarity and pH; learners conduct experiments to investigate these properties (u, s) c) understand the importance of air and water in soil to other living organisms (u)	• In pairs or groups, learners observe three different soil samples – clay, sand and loam, and: - examine the dry soil samples - shake the samples in water and allow them to settle to show different layers/ particle sizes. Pairs/groups record their observations relating to the following characteristics: - the colour of each soil sample - the texture of each soil sample - the size of particles in each soil sample • Task groups of learners to design, perform and report on investigations to show: retention, drainage and	• Observe pairs/groups as they examine soil samples. • Listen to conversations and ask questions to gauge and deepen learning. • Evaluate products: records of characteristics of each soil type. • Observe groups and pairs carrying out activities. Check that they plan investigations that will give meaningful results. • Listen to pairs' discussions and monitor understanding and their progress towards learning outcomes. Ask probing questions to promote critical thinking and deepen learning. • Evaluate quality of products from activities: reports of investigations; conclusions relating to impact of different properties on quality of soil; explanations of the impact of soil types on crop yield and reasons for it.

	capillarity in loam, clay, and sandy soils. The report for each experiment should follow scientific methods. • In pairs, learners determine the pH of a soil sample and discuss the significance of their findings. Group Project Aim: To investigate whether crop growth is different in different soil types. Design and carry out an experiment using 20 annual plants (fast growing legumes) in soils with different percentages of contents; e.g. high clay content or high sand content. Remember to make sure to design a fair test, controlling variables; e.g. the amount of water and light the plants receive. Observe the plants and record	

	their appearance and the yield of the crop. From your observations deduce which type of soil is best for the chosen plants, and suggest why. Record conclusions.	

Topic 5: SOIL EROSION AND CONSERVATION: CAUSES, EFFECTS, AND PREVENTION (10 periods)

earning outcomes	uggested learning activities	ample assessment strategy
a) know the features of fertile soil (k) b) understand the process of and factors leading to soil erosion (u) c) understand the causes of reduced soil fertility and describe methods of soil conservation (u, v) d) outline the processes involved in the nitrogen cycle (u)	• In groups, learners discuss conclusions from Topic 2 and agree on a list of the features of fertile soil. Present their conclusions to the class. • In groups, learner's research on the causes of soil erosion and the impact erosion has on communities. Produce a short presentation to show the types and the possible	• Through listening to group discussions, or through whole class discussion, gauge whether all learners understand the features of fertile soils, the causes and impact of soil erosion, and the steps taken to increase fertility and reduce erosion • Observe groups carrying out activities and check that they communicate effectively and work as teams so that everyone is learning and developing skills • Listen to pairs' conversations and monitor their progress towards learning outcomes. Intervene as appropriate to deepen learning

	impact. • In groups, learners discuss what steps farmers and gardeners in their locality take to maintain the fertility of their soils. Then research and write a report on the different methods used to maintain soil fertility and conserve soil in the following regions of Uganda: - Lake Victoria basin - Kigezi highlands - Karamoja region • In groups, learners carry out research into soil organisms that are called decomposers. Produce a short presentation/dra ma to explain why	• Observe groups interacting and intervene as appropriate to steer research and project planning so that learning outcomes are achieved Evaluate quality of products: presentations and reports

	they are so important. • In groups, learners use labelled cards to role play and explain the nitrogen cycle. • In groups, learners design and carry out an investigation to show the presence of microorganisms in root nodules, soils and compost. Present their findings to the whole class and compare with other groups Group Project: Design, perform and write a report on an investigation into the formation of compost in a compost bin. Report on the process of composting, how fast different materials decompose, any	

	organisms (decomposers) that seem to be involved in the process, and anything else significant or interesting.	

Topic 6: NUTRITION TYPES AND NUTRIENT COMPOUNDS (06 periods)

earning outcomes	Suggested learning activities	ample assessment strategy
a) identify the food nutrients, their sources, and importance to humans (u) b) perform food tests for various nutrients (only quality testing required) (s) c) appreciate the concept of balanced diet in relation to age, sex, and an individual's activity (u, v) d) appreciate the causes and effects of nutrient deficiency in humans including diseases related to	• In groups or pairs, learners carry out tests on foods such as potato, egg yolk, milk, groundnuts, and pineapple to determine what main food nutrients they contain. • In groups or as a whole class, learners discuss, research and report on: - the meaning of the term 'balanced diet' and what this might mean for a baby, a child, an adult woman	• Observe groups and pairs carrying out activities. Check they carry out tests and research effectively, and plan experiments that will give valid results. • Listen to pairs' discussions and monitor understanding and progress towards learning outcomes. Ask probing questions to deepen learning • Evaluate quality of products from activities: reports and conclusions from tests and investigations; presentations, and explanations.

malnutrition (u, s) e) identify the major plant mineral nutrients (N, P, K, Mg, Ca, S, Mg), their role, and the symptoms of deficiencies (u)	and adult, an athlete, and an inactive person. They record their conclusions. - the likely effects of an imbalanced diet • In groups, learners design and perform an experiment to compare the growth of a plant in distilled water and pond water and/or other water rich in nutrients. Learners use scientific method to write a report. In groups, learners research on the uses of N, P, K, Mg, Ca, S and Mg to plants and the effects of deficiencies. Groups present their findings to the class (illustrated, if possible), with examples of	

	leaves in good health, and showing deficiencies found in the locality.	

Topic 7: NUTRITION IN GREEN PLANTS (08 periods)

earning outcomes	Suggested learning activities	Sample assessment strategy
a) understand the meaning of autotrophic and heterotrophic nutrition (k) b) derive the meaning of the term photosynthesis and understand the process (u, s) c) perform experiments to investigate the factors that affect the rate of photosynthesis (s, gs) d) appreciate the structures and adaptations that enable a leaf to carry out the process of photosynthesis	• In pairs or groups, learners discuss, research on and document: - the meaning of autotrophic and heterotrophic nutrition - why autotrophs are the providers of all food - the origin and meaning of the term photosynthesis - the equation for photosynthesis and its implications regarding what plants	• Listen to discussion and ask probing questions to promote critical thinking and guide learners towards learning outcomes. • Observe pair and group activities to monitor development of practical skills, effectiveness of experiment designs, and accuracy of models. • Evaluate products: conclusions from discussion and research; reports on experiments, findings about leaf structure, and 3D leaf models.

(k, u)	need for photosynthesis • In groups, learners design and carry out experiments to show the need for carbon dioxide, light and chlorophyll, during photosynthesis. Learners produce a formal report at the end of the experiments that includes the following: title, question, prediction, materials, procedure, record/analysis of results, and conclusion. Groups present their report to the rest of the class • In groups learners examine diagrams, photographs or microscope slides of sections through a leaf and discuss how the	

	structure is adapted so that cells can obtain the water, carbon dioxide, light, and energy they need. • Groups share findings and through whole class discussion agree on conclusions Group Project: Develop a simple 3D model of the internal structure of a leaf using locally available materials	

Topic 8: NUTRITION IN MAMMALS (11 periods)

earning outcomes	Suggested learning activities	Sample assessment strategy
a) understand the role of enzymes in influencing life processes; and appreciate that the working of enzymes may be affected by	• In groups, learners research on and discuss the effects of enzymes on chemical reactions, list the properties of	• Observe groups carrying out research and experiments to check that engagement in skills development and experiment designs is appropriate for achieving learning outcomes. Steer learners towards learning

different factors (no details of lock and key mechanism required) (u, s)

b) conduct experiments on and explain the effects of pH and temperature on enzyme activity (s, gs)

c) know and identify different types of mammalian teeth, and relate their structure and position in the jaw to diet (k, u, s)

d) understand the importance of oral hygiene, and describe good practice in caring for teeth and gums in humans (u, v)

e) appreciate the structure of the different parts of the mammalian alimentary canal, and its role in the digestion of food (k, u)

f) understand how the end products of digestion are absorbed and enzymes, and the names and functions of some enzymes, that work in the human digestive system.

Produce a presentation to explain findings.

- In groups, learners design and carry out an experiment to determine the effect of one factor (pH or temperature) on enzyme activity. Share findings with other groups and develop understanding of the effect of pH and temperature on enzyme activity. Check findings against established science theory.
- In pairs, learners observe a molar, canine, pre-molar and incisor tooth and identify:
- the common structural features

outcomes if necessary

- Listen to, and engage in group conversations and ask probing questions to check and guide progress towards learning outcomes.
- Evaluate quality of products: findings on role of enzymes; explanation of effect of pH and temperature on the rate of reaction; clarity of drawings; accuracy and creativity of presentations; drawings; guide and dental formulae; experiment reports, simulations, mind maps/spider diagrams, descriptive reports

assimilated (u)	of each of the teeth in a mammal • the adaptations of each type of tooth to its function • Learners make an accurate labelled drawing of each tooth and state the magnification. • In pairs, learners share experience and research on reasons for, and methods of ensuring dental hygiene as well as consequences of poor hygiene. Produce a short good practice guide. • In pairs, learners research on and write the dental formula for a herbivore, a carnivore and an omnivore. • In pairs, learners observe an unlabelled chart and, through discussion and research, identify	

	and name the parts of the alimentary canal and associated organs, labelling the parts and adding their functions • Guide groups of learners to design a controlled experiment to determine what substances are digested in the mouth: • include the hypothesis • describe the experimental design • indicate the control group(s) • describe the results of the test • In groups, learners simulate the process of digestion, its products and their absorption using either: • labelled cards with names of parts of the alimentary canal	

	and different food types • strings of beads that can be linked and unlinked • role play (holding hands to form long chain molecules,)	

Topic 9: TRANSPORT IN PLANTS (13 periods)

earning outcomes	uggested learning activities	Sample assessment strategy
a) investigate the different ways in which materials move into, though, and out of cells (s) b) know how the root hair is adopted for absorption of water and mineral salts (u) c) understand the processes of transpiration and translocation (u) d) conduct experiments on and understand the factors that affect transpiration (s, u)	• In pairs, learners observe a tea bag in a clear glass container of still warm water for a period of five minutes, then discuss and explain their observations. Whole class discussion leads to understanding of the process of diffusion. • In groups, learners use scientific process skills to design and carry out an experiment to show the effect of solutions of	• Observe pairs and groups carrying out activities. Check that they understand how to use resources effectively, take due account of prior learning, use research skills well, and plan valid experiments. • Listen to pair and group discussions, monitor progress towards learning outcomes and ask questions to help learners develop skills and deepen understanding. • Evaluate quality of products from activities: report on root hairs; transpiration diagram; Translocation, and investigations of conditions affecting transpiration rates

	different concentrations on raw unshelled eggs and raw potatoes. Groups discuss and draw conclusions to explain their results. Individuals write reports at the end of the experiment that include the following: title, question, prediction, materials, procedure, record/analysis of results and conclusion. Groups present their work to the rest of the class. • In groups, learners discuss and research the meanings of diffusion, osmosis and active transport, as well as the circumstances in which each is involved in the entry and exit of substances to and from cells. Groups present conclusions	

	in a comparison table • In pairs, learners use a drawing and look at germinated seedlings to explain how the root hair is adopted for absorption of water and mineral salts. Pairs prepare a report to share with the class. Through whole class discussion, learners agree on the correct explanation, and record it in notes and or diagrams. • In pairs, learners consider what they know about leaf structure, transport vessels in stems, roots and root hairs, and connect their learning to explain how the process of transpiration takes place. Individuals produce an annotated diagram	

	to explain the process. • In pairs or groups, learners research on the need for, and the meaning of, translocation in plants. Share findings with the class before learners go on to explain in notes and diagrams. In groups, learners use scientific process skills to design and carry out experiments to investigate how wind, temperature, and light intensity affect the rate of transpiration. Groups consider the significance of their findings for farmers and growers, and report their findings and conclusions to the class.	

Topic 10: TRANSPORT IN ANIMALS (14 periods)

Learning outcomes	Suggested learning activities	Sample assessment strategy
a) understand the principle of the surface area to volume ratio (s) b) know the need for a transport system, and identify the components involved in the transport system in mammals (k) c) describe the structure of the heart and how it functions (u, s) d) understand how structure of blood vessels are related to their function by comparing arteries, veins and capillaries (u, s) e) identify the major functions of blood, and relate the functions to the components of blood (u, s) f) understand the	• In pairs, learners use cubes of different dimensions to calculate the surface area to volume ratios of the cubes, then discuss and explain the biological significance of calculated ratios. • In pairs, learners discuss what they already know about the components of their circulatory systems. • In pairs, learners discuss the structure and function of the heart, referring to diagrams and a model. Pairs share their thoughts in groups or whole class discussion.	

causes and prevention of diseases associated with the heart (high blood pressure, coronary heart disease and stroke) (u, v) g) understand the importance of knowledge of blood groups for blood transfusion (k, u) h) appreciate the role of blood in the defence of the human body (u) k) appreciate the function of the lymphatic system in maintaining a healthy body (u)	Learners draw and label the parts of a mammalian heart adding clear notes relating to function. • In groups, learners design a model, visual aid, animation or drama to illustrate blood flow/circulation in the human body and present to the class. • In pairs, learners research on structures of arteries, capillaries and veins, and produce tables, models or diagrams to show how structure is related to function in each case. • In pairs, learners research on components of blood and their functions and produce a table summarising their findings to share	

	with the class. • Organise learners to visit a health facility to find out about the causes and prevention of high blood pressure, coronary heart disease, and stroke. Learners write a report on the causes and their prevention. • Learners watch a video clip or listen to a talk from blood bank personnel to find out the importance of blood transfusion and the possible risks involved. In pairs, learners complete a short report on the benefits and risks of transfusions, including compatible blood groups.	

CHEMISTRY

SENIOR TWO

SENIOR 2 CHEMISTRY ABRIDGED CURRICULUM

Introduction

This Abridged S2 Chemistry Curriculum involves critical reduction of the concepts to be learned by transferring some concepts to related topics in higher classes, reducing time spent on tasks by reducing the activities to be done and or putting related concepts together such that they are handled concurrently. All this is intended to ensure that the learner learns the critical concepts that can enable them progress to the next classes where much more detail will be done.

Based on this premise, for the S3 Abridged curriculum, a number of topics have been merged because of their relatedness, others have been removed since they are redundant, while some have been transferred to Physics.

Some of the critical changes include the following:

S/N	Change	Justification
01	Topic 1: Chemistry and Society – removed,	Since learners had already attended for some time
02	Topic 3: States of matter merged with Topic 5 permanent and temporary changes in matter	The concepts are related
03	Topic 4: Using materials deleted	The concept is redundant
04	Topic 1 in S2: Acids bases and salts were merged	Because the concepts are related
05	Book 2Topuic 4: Structure of Allotropes of carbon - removed	Since the concepts will also be covered in S3 under structures of substances and bonds

The detailed syllabus is shown below.

TERM 1

TOPIC 1: EXPERIMENTAL CHEMISTRY (12 PERIODS)

Competency: Understand that chemistry is a process of evidence-based enquiry involving the collection of evidence about the natural world, the identification of trends and patterns in the evidence and the development of theories that help us explain the evidence.

LEARNING OUTCOMES	SUGGESTED LEARNING ACTIVITIES	SAMPLE ASSESSMENT STRATEGY
The learner should be able to: a. know laboratory rules and regulations and understand the importance of risk assessment in order to work safely, and action required in the event of an accident (k) b. know and use laboratory equipment (such as burettes, pipettes,	• In groups, learners a) examine a list of laboratory rules and produce a table or diagram showing the reasons for each rule; b) observe a demonstration of how to deal with a fire and how a fire extinguisher is used, and produce a set of guidelines • In groups, learners plan and carry out an investigation using measuring cylinders, separating funnel, a thermometer, Bunsen burner and balance to	• Observe the learners in the laboratory when taking part in practical experiments and offer guidance to ensure safe practice and effective use of techniques so that learning outcomes are achieved • Listen to group discussions and: • guide learners as

measuring cylinders, thermometers, the Bunsen burner, and balance) appropriately for measuring time, temperature, mass and volume (s, k) c. understand the scientific method to carry out investigations and the importance of risk assessment to keep self and others safe (u) e. know how to purify a mixture, given information about the substances involved (s, k) f. know how to identify substances and their purity by using their melting and	mix 5g of sand and 200 cm3 water, separating them and recording detailed observations and measurements. Learners should: • plan by selecting techniques, apparatus and materials • make predictions based on prior knowledge and propose a hypothesis • record observations and measurements in a table • interpret observations and report results • compare observations and results with other groups • discuss and develop explanations • In groups, learners plan and carry out investigations, using the scientific method to purify	necessary on the use of different apparatus and correct techniques for using them safely • intervene to ensure knowledge, understandin g and skills are developing appropriately • Gauge learners' developing knowledge, understanding and skills through assessment of products: reasons for lab rules and fire guidelines; observations and results re boiling water; experiment

boiling points (k, s)	named impure substances and formally write up investigations individually. Techniques: • physical separation e.g. sulphur and iron filings • dissolving, filtration and crystallization, e.g. salt and sand • distillation of a solution and fractional distillation, with particular references to the fractional distillation of crude oil, liquid air and fermented liquor • In groups, learners carry out chromatography using some common dyes/inks and then: • interpret chromatograms • develop and	reports on separating mixtures, including chromatography; purity of substances.

	apply knowledge of paper chromatography in explaining results • research and use locating agents in chromatography of colourless compounds Groups discuss, research and agree explanations of their observations. Individuals record results and conclusions. • In groups, learners investigate the melting and boiling points of substances, comparing their results with those of pure substances and drawing conclusions about the purity of their samples. Groups produce tables comparing their actual results with theoretical results and show conclusions and possible experimental	

	errors.	

TOPIC 2: STATES AND CHANGES OF STATES OF MATTER (16 PERIODS)

Competency: The learner uses knowledge of the arrangement and motion of particles to explain the properties of solids, liquids and gases.

LEARNING OUTCOMES	SUGGESTED LEARNING ACTIVITIES	SAMPLE ASSESSMENT STRATEGY
The learner should be able to: a. understand that matter is anything which occupies space and has mass and can exist in a solid, liquid, gas and plasma form (u) b. understand that solids, liquids and gases have different properties including shape, pouring and compressing (u, s) c. know the kinetic theory of matter	• Individually, learners research what is known about states of matter and kinetic theory, and in groups, they discuss where they are observed in everyday life. • In groups, learners use the results from Topic 1.2 and explain them in terms of how matter exists and kinetic theory. • In groups, learners plan and use the scientific method to investigate changes of state of matter	• Observe how individuals use texts or the Internet and use it to contribute to group discussion about the kinetic theory, and then use the information to explain states of matter. Intervene to pose questions to clarify and deepen understanding. • Listen to gauge progress towards achieving an understanding of kinetic theory and

and use it to explain particle arrangement, inter-particle forces, movement of particles and the properties of solids, liquids and gases (k, u) d. understand that a change from one state to another involves either heat gain or heat loss (u, s) e. appreciate the cooling effect of evaporation and how this contributes to maintaining constant body temperature (k,u, s) f. understand that many substances undergo permanent changes when they are heated or burnt, forming new materials	and record observations in a table, e. g melting a candle wax, or ice, boiling water (observe the change of state with temperature), heating iodine or naphthalene. • In groups, learners investigate diffusion in a gas, liquid and solid using the scientific method • Ammonia, from concentrated ammonia solution and, concentrated hydrochloric acid to form ammonium chloride. • Potassium manganate (VII) in water and in a hot gel solution. • In groups, learners	states of matter as solid, liquid, gas and plasma, and intervene to ensure knowledge and understanding are developing appropriately. • Evaluate learners' knowledge of the kinetic theory through their explanations of diffusion and pressure illustrated by common phenomena. • Listen to group discussion and the explanation of changes of state to: • check understanding of kinetic theory

while other substances change temporarily (u, s) g. understand that heating changes the structure and properties of some materials (u, s) h. recognise temporary (reversible) and permanent (irreversible) changes to matter under different conditions (u)	observe Brownian motion and use the particle theory to explain • the properties of solids, liquids and gases and phenomena such as gas pressure, clothes drying, rain formation and making a cup of tea, and • how diffusion takes place faster in a gas than in a liquid or a solid, and then explain why this is the case. • In groups, learners draw on prior learning from Topic 2 and identify which materials underwent permanent change when	• Evaluate understanding of changes in states of matter and heating and cooling. • intervene where misconceptio ns are identified • Observe group interaction and engagement in the practical investigation and gauge skill in making and recording observations; intervene to help them understand temporary (reversible) and permanent (irreversible) changes to matter. • Listen to discussions and ask questions to deepen learning.

	heated.
	• In groups, learners plan and carry out a practical investigation to find out which are temporary, and which are permanent changes and record the results in a table:
	  • boiling and condensing water
	  • heating and cooling candle wax
	  • sublimation of iodine
	  • melting of ice
	  • dissolving salt in water
	  • rusting an iron nail
	  • In groups, learners use the scientific method to investigate the heat changes as ice melts and water is heated and cooled, and
		• Evaluate how well learners apply their learning to explain which are permanent and which are temporary changes.

	then produce diagrams to explain why heat is taken in during melting and boiling but given out during condensing and freezing. • In groups, learners use their knowledge of kinetic theory to discuss and explain the importance of evaporation in preventing the body from overheating on a hot day.	

- ICT Support
- The learner can:
- use Internet to download or view an appropriate simulation about particle nature of matter.
- use data collection tools such as a temperature sensor to capture temperature-time data.

TOPIC 3: MIXTURES, ELEMENTS AND COMPOUNDS (20 PERIODS)

Competency: The learner should be able to recognize the characteristics of mixtures and compounds.

LEARNING OUTCOMES	SUGGESTED LEARNING ACTIVITIES	SAMPLE ASSESSMENT STRATEGY
The learner should be able to: a. know the criteria for determining whether a substance is pure or not (k, s) b. understand that substances are either elements, mixtures or compounds (u) c. identify different mixtures and	• In groups, learners plan and carry out a practical investigation to find out whether 100g of crushed ice made from distilled water melts faster or slower than crushed ice made from tap water which contains salts; they should record their results in a table and discuss. • Individually, learners research and then discuss in groups examples of	• Observe learners investigating, note their understanding of a fair test, and intervene to check their understanding that pure (distilled) water melts at a different rate from tap (impure) water which is a mixture. • Listen to group discussion and intervene where appropriate to assist understanding. Encourage learners to add to their list of characteristics and share them and check the correct

devise ways of separating pure substances from them (u, s) d. know that, when added together, some liquids mix while others form two layers (k) e. understand that air is a mixture of different gases that can be separated and used (k, u) f. understand how air pollution can affect the atmosphere (u) g. Understand and appreciate that processes such as burning and	elements, compounds and mixtures and list the characteristics. These might include: • Elements: made from one type of atom • Compounds: a mixture of elements that can only be separated by chemical means • Mixtures: made up of two or more substances that can be separated by physical means • In groups, learners research and then classify substances into compounds, mixtures or elements: e.g. carbon dioxide,	use of definitions. • Gauge learners' progress towards achieving learning outcomes • Listen to learners and encourage use of the terms: solvent, solute and solution and link their thinking to prior learning about mixtures. • Listen to learners in the process of planning the separation of salt and encourage learners to use and record the process using the correct terms. • Intervene where necessary to avoid misunderstandings and gauge learners' progress towards achieving learning outcomes through the products of activities.

rusting/corrosion use oxygen from the air to form oxides (k, u)	hydrochloric acid, sugar, air, chlorine, gold, chlorophyll, oxygen, salt plus other examples • In groups, learners use a spatula to slowly add 10gms sugar to 150cm3 distilled water and record their observations. Learners should discuss whether dissolving and disappearing are the same and explain their thinking. They should be introduced to the terms: solvent, solute and solution, and if necessary revise their observations using these terms. • Individually, learners research the terms soluble and insoluble. Having been informed that rock salt is a mixture	• Listen to discussions and gauge learners' understanding of why air is considered a mixture of gases rather than a compound, how the gases can be separated, how air pollution occurs, and its consequences. Intervene appropriately to clarify understanding about the composition of air and fractional distillation. •

	of rock which is insoluble in water and salt which is soluble in water, in groups, learners plan and implement a procedure to separate the rock from the salt. • Learners use the following terms to explain their method: filtration, dissolve, soluble, solute and solution. • Learners use their experience of evaporation to plan a procedure to separate the solute from the solvent (water) and so recover the salt by crystallisation. •	

TERM 2
TOPIC 4: AIR AND WATER (16 PERIODS)

Competency: the learner appreciates that air and water are important resources which must be well protected and harnessed to ensure they are of good quality and sustainable.

Learning outcomes The learner will be able to:	Suggested learning activities	Sample assessment strategy
a. understand that air is a mixture of different gases that can be separated and used (k, u) b. understand how air pollution can affect the atmosphere (u) c. Understand and appreciate that processes such as burning and rusting/corrosion use oxygen from the air to form oxides (k, u)	• In pairs or individually, learners research: • the composition of air, • the percentage of each chemical from a pie chart of the composition of air; • consider what else might be in the air • In groups, learners examine a fractionating column and draw on research to discuss how different liquids have different boiling points, and how this is used to separate them into fractions. • In groups, learners research and discuss how air pollution occurs when excessive quantities of	• Listen to discussions and gauge learners' understanding of why air is considered a mixture of gases rather than a compound, how the gases can be separated, how air pollution occurs, and its consequences. Intervene appropriately to clarify understanding about the composition of air and fractional distillation. • Evaluate how learners draw on prior knowledge of burning and rusting (and

	gases and particles change the composition of air, and report on the causes and consequences • Individuals or pairs research and explain how oxygen and nitrogen can be separated from liquid air using a fractionating column, and then discuss in groups • In groups, learners discuss what is necessary for wood to burn and understand that oxygen is the active ingredient in air that allows burning to take place and causes iron to rust.	breathing) to develop the idea that there is an active ingredient (oxygen) in air. • Observe and listen to discussions about group planning and guide learners on the equipment required and the importance of controlling variables. Note the accuracy of their observations and whether their conclusions reflect their observations and predictions. • Listen to discussion about word equations and guide learners to understand that oxygen from the air combines with other element to form oxides. • Evaluate quality of learning through assessment of products: outcomes of investigation reports and correct use of scientific notation.

a. understand the occurrence of water as a natural resource, its physical and chemical properties and importance in everyday life (u, s) b. appreciate how water is recycled by natural processes (u, v) c. understand the process of water and sewage treatment	• In groups, learners draw on prior learning to brainstorm ideas about evaporation and condensation of water, ice and steam as changes of state, and produce a chart of the water cycle to explain its physical and chemical properties and the role of the sun in providing energy to drive the cycle. • In groups, learners use their water cycle charts, and prior learning about the characteristics of water, to identify and report upon where pollution might occur, its causes, impact and possible ways to prevent it.	•Listen to group discussion and encourage learners to draw on and consolidate prior learning about changes of state, solvents and solutions, and then apply it to their understanding of the water cycle, the causes and prevention of water pollution, and the treatment of sewage. • Gauge learners' progress towards achieving the learning outcomes by assessing their understanding of the characteristics of water and the chemistry of water through their products of the activities.

TOPIC 5: ROCKS AND MINERALS (12 PERIODS)

Competency: The learner appreciates that rocks are composed of different minerals and these determine the properties of the rocks.

LEARNING OUTCOMES	SUGGESTED LEARNING ACTIVITIES	SAMPLE ASSESSMENT STRATEGY
The learner should be able to: a. understand how igneous, sedimentary and metamorphic rocks are formed, that they are made up of minerals, and that some minerals are useful (k, u, s) b. identify the physical properties of rocks and distinguish between the different types (s)	• In groups, learners examine and discuss the general appearance of igneous, sedimentary and metamorphic rocks and record characteristics such as colour, patterns, texture, and particle size in a chart. Individually, learners create a dichotomous key using the information from their observations. • Individuals or pairs research and report on the minerals found in granite, sandstone and slate, and identify any patterns. Learners share their research	• Observe group interaction and assess the accuracy of observations and words used to record the results, and gauge learner's ability to transfer this information to use it to create a dichotomous key; observe their progress towards the learning outcomes. • Gauge learners' ability to access and summarise information from complex text and understand where minerals (chemicals) originate.

c. understand the process of weathering and how weathered rock particles form the basis of soil (u, s)	with the class and discuss the use made of the minerals. • Groups discuss the role that water (rain, ice, rivers) might play in extracting the minerals from the rocks, and how these minerals are deposited in the soil. Individually, learners write a report about their understanding of weathering. • Learners discuss what will happen when palm oil is mixed with tap water, using the terms miscible and immiscible liquids, and how they might separate them.	• Listen to learners' discussions and presentations on weathering and where appropriate, make suggestions to improve clarity and understanding • Evaluate quality of learning through assessment of products: keys; tables; reports.

ICT Support

The learner can:

- use Internet to research on useful minerals and present to the class.
- use any word processor to write the research report.

TOPIC 6: Acids bases and salts (16 periods)

Competency: The learner appreciates the importance of and properties of acids bases and salts in everyday life

LEARNING OUTCOMES	SUGGESTED LEARNING ACTIVITIES	SAMPLE ASSESSMENT STRATEGY
The learner should be able to: a. recognise that locally available materials' substances are either acidic or alkaline (k) b. understand the concept of pH as a measure of the strength of acids and alkalis (u) c. understand the reaction between acids and alkalis (u, s) d. be familiar with, and be able to carry out, neutralisation reactions to prepare salts (k, u, s) e. Know and	• In groups, learners brainstorm what they know about acids and alkalis and, from personal experience, identify the characteristics of some familiar substances (e.g. the sharp taste of acids such as lemon juice and vinegar, the bitter taste of alkalis such as ash filtrate from banana peel, and the soapy feel of alkalis) and record information in a chart. • In groups, learners drop lemon juice into a solution made from red fruit (grapes, red cabbage) and universal indicator solution, discuss and report on the colour change and how this	• Observe learners engaged in activities, offering guidance to ensure all participate and make good progress in terms of their learning. • Listen to group discussions and if appropriate, warn about the dangers of tasting unknown chemicals and therefore the need to find a chemical test (or indicator) of acidity in the form of litmus paper. Ask probing questions to promote thinking. • Discuss with individuals and groups to check their

appreciate the uses of common salts in everyday life (k, s)	provides an indicator of acidity. • In groups, learners use litmus paper to decide whether a range of solutions (e.g. lemon juice, vinegar, diluted bleach, diluted liquid soap, tea, cola, tap water, carbonated water) are acid or alkali, and record their results in a chart, making note of the final colour. • Individually, learners record the group results and write an explanation about the level of acidity in each solution. • In groups, learners review litmus colour charts and note that different shades have a numerical value of acidity, the pH, and use this information to add a numerical value to their personal report and compare it with others. Learners to agree consistency or discuss where there is	progress towards the learning outcomes and if appropriate, offer guidance to understand the pH scale and the notion of the balance between an acid and alkali solution (a base) or neutral. • Evaluate learning through products: charts, reports. • Listen to group discussions and where appropriate, intervene to ensure complete understanding of the reaction between an acid and a base to form a salt and water and how this can be represented using symbols. • Observe groups preparing magnesium sulphate and listen to the discussion to check: there is understanding about the process; a risk assessment has taken

	inconsistency. • In groups, learners discuss and record their thinking about the following: • Where there is no change in colour this is the balance between acid and alkali (or a base) solution or neutral point. • In groups, learners half-fill a plastic water bottle with vinegar and place a spatula of baking soda (sodium bicarbonate) into a balloon and fix it over the mouth of the bottle so that the baking soda mixes with the vinegar and they observe and report on the reaction they observe. • Individuals research the reaction between an acid and a base and explain what happens when hydrochloric acid and sodium hydroxide react. Then they produce a word equation. • In groups, learners discuss the word equation	place; flow charts show that the sequence of action and chemical terms are used correctly; word equation shows an understanding about neutralisation and forming a salt. If appropriate, guide learners to use correct terms such as filtrate, residue, evaporation, crystallisation, solubility, soluble, insoluble and precipitation. • Listen to the discussion about the use of common salts and how they draw on prior learning and research to suggest chemical formulae. Where appropriate, guide learners toward using the correct symbols. • Evaluate quality of learning through assessment of investigations and

	and use symbolic representation to predict the outcome from the chemical reaction. • In groups, learners make magnesium sulphate by gently heating 50cm3 of diluted sulphuric acid in a beaker to 60C and adding magnesium oxide powder, stirring until a milky solution is formed. This is filtered, and the clear liquid or filtrate is magnesium sulphate solution. The water can be removed by gentle heating and evaporation. • Individually, learners make a record of the process based on careful observation in the form of a flow chart and create a word equation to explain the chemical reaction. Individually, learners research the use of common salts and record their results in a table and discuss in a group. e.g. sodium chloride, sodium hydrogen carbonate	where appropriate, help learners to understand the importance of establishing a consistent approach, or fair tests, which may involve observation or timing of changes so results can be compared.

	(sodium bicarbonate), calcium carbonate, potassium nitrate, lead chloride, barium sulphate, potassium carbonate, sodium phosphate, ammonium chloride. • Groups use prior learning to suggest the chemical formulae of these salts: sodium chloride, calcium carbonate, potassium nitrate, potassium carbonate and discuss how to write a simple equation to explain how they might have been made. • Groups plan an investigation to find out	

TERM 3

TOPIC 7: THE PERIODIC TABLE :12 Periods

Competency: The learner investigates the diversity of the elements in the Periodic Table.

LEARNING OUTCOMES	SUGGESTED LEARNING ACTIVITIES	SAMPLE ASSESSMENT STRATEGY
a. understand that elements can be grouped into metals and non-metals and relate the physical properties of metals and non-metals to their uses (k, u, s) b. know that the Periodic Table is a classification of elements according to their atomic or proton number (k) c. relate the arrangement of electrons in the first 20 elements to their positions in the Periodic	• In groups, learners use prior learning and research to discuss how: • they might identify a metal and a non-metal and present to other groups. • to arrange elements into a table according to whether they are metals or non-metals: e.g. iron, sulphur, copper, hydrogen, silver, aluminium, oxygen, chlorine, argon, sodium, magnesium, calcium, iodine, nitrogen, zinc Learners present conclusions to other groups • Individuals carry	• Observe group interaction and assess the accuracy of observations and words used to record the results, and gauge learner's ability to transfer this information to use it to create a dichotomous key; observe their progress towards the learning outcomes. • Gauge learners' ability to access and summarise information from complex text and understand where minerals (chemicals) originate. • Listen to learners' discussions and presentations on weathering and where appropriate, make

Table (u, s) d. understand the relationship between the position of elements in groups and the charge on the ions that they form (u)	out research to find the chemical symbol and physical properties of each element and record their results in a chart. • In pairs, learners study the Periodic Table and carry out research and complete reports explaining: • the work of Mendeleev and others in classifying the elements • the meanings of the terms: proton/atomic number and mass number • the relationship between the proton (atomic) number of an element and the number of electrons. • In groups, learners discuss their findings and use a card activity and research to give each of the 13 most abundant elements in Earth's crust, listed	suggestions to improve clarity and understanding • Evaluate quality of learning through assessment of products: keys; tables; reports.

	from most to least abundant, its symbol, proton number, atomic mass, electron configuration, and element classification • oxygen • silicon • aluminum • iron • calcium • sodium • magnesium	

TOPIC 8: CARBON IN THE ENVIRONMENT (30 PERIODS)

Competency: The learner investigates the diversity of carbon compounds in the environment

LEARNING OUTCOMES	SUGGESTED LEARNING ACTIVITIES	ASSESSMENT STRATEGY
a. understand how and why carbon compounds are used as fuels (k, u) b. know and appreciate the difference between renewable and non-renewable fuels and understand that non-	• In groups, learners draw on their experience and research to discuss the main uses of common carbon-based fuels in Uganda: charcoal, paraffin, petrol, firewood and diesel. • Individually, learners use prior learning to write a word equation to show the	• Listen to learners' conversations and ask probing questions to help them draw on prior learning and use it to build on new learning. • Observe learners carrying out

renewable fuels are not sustainable (k, u) c. know and appreciate the impact on the environment of burning carbon-based fuels (k, u) d. appreciate the impact on the environment of burning carbon-based fuels (u) e. understand the processes of making charcoal but recognise that the use of charcoal as a fuel is cheap, efficient and sustainable only if it is made from wood that can be regrown easily (u, s) f. know and appreciate the physical properties and uses of carbon dioxide (k, u) g. understand how the increase in carbon dioxide in the	reaction when carbon-based fuels burn in oxygen. • In groups, learners discuss and report on the meaning of the terms 'renewable' and 'non- renewable' as applied to fuels, and then use data to estimate how long the world's coal, oil and natural gas reserves are likely to last at the current rates of usage. • Individually, learners research the idea of 'sustainability' and write a report on how the use of fuel in their locality can be made more sustainable. • In groups, learners discuss and produce posters to explain why air pollution is a global problem and why it can only be properly controlled if all the countries of the world agree to collaborate. • Individuals research the making of charcoal from waste organic material and energy- saving charcoal stoves, and then explain the chemistry of what happens when organic material burns	activities and intervene to ensure all participate and develop knowledge, skills and understanding. • Evaluate quality of learning through assessment of products: how learners present their ideas to the wider group and their progress towards the learning outcomes • Listen to group discussions and intervene appropriately, especially where learners misunderstand. Encourage discussion about the outcomes from personal and group research such as posters and models

air can cause the atmosphere and the oceans to get warmer (u) h. understand what greenhouse gases are, where they come from and how they are affecting climate (u) j. understand how the properties and uses of the allotropes of carbon relate to their structures (u)	in a limited supply of oxygen. • Groups draw on prior learning to make carbon dioxide by reacting limestone • In pairs, learners research and report how an increase in carbon dioxide in the air can cause the atmosphere and the oceans to get warmer, what this tells us about the nature of carbon dioxide, and then they compare their findings with other learners to explain the effect on climate. • In pairs, learners research how rainwater becomes hard as it soaks through limestone and how it affects soap. • In groups, learners discuss, research and explain in a poster how adding washing soda (sodium carbonate) results in reducing 'hardness'.	

TOPIC 9: REACTIVITY SERIES (12 Periods)

COMPETENCY: The learner evaluates data on reactivity in order to arrange metallic elements according to their reactivity.

LEARNING OUTCOMES	SUGGESTED LEARNING ACTIVITIES	SAMPLE ASSESSMENT STRATEGY
a. appreciate that metals vary in their chemical reactivity and can be arranged in a reactivity series (k, u, s) b. understand that alloys are mixtures of a metal with other metals and/ or non-metals and compare the properties of common metals with their alloys	• Groups design and carry out an investigation, using the scientific method, to compare the reactivity of calcium, copper, iron, magnesium and zinc placed in cold water and dilute hydrochloric acid. Learners should discuss how they will measure and record the level of 'reactivity' and evaluate the limitations of the investigation. • Individually, learners research how the reactivity of an element depends on its electronic structure, and they draw structure diagrams of calcium, copper, iron, magnesium and zinc to explain their level of reactivity and how this determines their uses. • In small groups, learners use a charcoal block and blowpipe to extract copper from copper oxide, explaining their observations and writing a word equation for the process. They should research and discuss with the wider group why the more reactive metals (e.g. groups I and II metals and aluminium) cannot be extracted on a charcoal block, and how gold is an uncombined metal at the bottom of the	• Observe and listen to group discussions to check: • whether their investigation is valid and reflects the scientific method and • the recording of results is accurate and informs their learning about the reactivity series • understanding of how reactivity is related to the electronic structure of the element • Listen to

(u, s)	reactivity series that can be recovered in pure form from alluvial deposits. • Groups examine a collection of objects made from or containing alloys. They should research and report on the difference in chemical composition and properties, and then explain on a poster how this determines their use. • Observe and listen to group discussions to check: • whether their investigation is valid and reflects the scientific method and • the recording of results is accurate and informs their learning about the reactivity series • understanding of how reactivity is related to the electronic structure of the element • Listen to learners' conversations about the extraction of copper from copper oxide, and how the level of reactivity of alloys and unreactive elements are related to their use. • Evaluate quality of learning through assessment of products to determine the progress of learners towards achieving the learning outcomes.	learners' conversations about the extraction of copper from copper oxide, and how the level of reactivity of alloys and unreactive elements are related to their use. • Evaluate quality of learning through assessment of products to determine the progress of learners towards achieving the learning outcomes.

AGRICULTURE

SENIOR TWO

ABRIDGED SYLLABUS FOR AGRICULTURE

SENIOR TWO

RATIONALE OF THE AGRICULTURE SELECTED CONTENT FOR TEACHING

Agriculture teaching and learning at secondary school builds on the foundation made in primary school integrated science. Teaching agriculture in primary school introduces young people to basic scientific procedures of growing crops and rearing animals. It shows them how to apply these integrated science lessons into daily life. For example, a great primary school science teacher can teach pupils about the art and science of growing crops, rearing animals and processing both crop and animal products. This means that it is not only teaching learners how to be farmers, but also train tomorrow's scientists, nutritionists, processors, teachers and so much more.

, The selection of the topics is therefore consciously done to ensure that those who participate in secondary school agricultural training graduate with the skills necessary to become productive citizens as practitioners of crop and animal production. This is done by learning about tools, equipment, land tenure, farm building, farm structures and basic science. This is to say that agriculture puts machines, engineering, building technology, food processing, marketing, chemistry, biology and physics into everyday-life application.

The topics below emphasize a mix and a combination of classroom instruction and application of agriculture experiences outside the classroom. At the same time, these learners with this experience should be able to succeed in post-secondary education or the workforce for the labour market. The selection allows you to build the foundation for educated consumers and agriculturists.

SN	CRITICAL CHANGES	JUSTIFICATION
1	Dropped topic 1 Introduction to agriculture	Emphasis is on growing crops, rearing animals and using the current knowledge of production. The content about the historical background of agriculture was dropped. You are advised to teach about soil, in this, they are expected to focus on where crops and pastures for animals are grown. You will go ahead and choose one topic on crop production out of seven (7) and another one topic on animal production out of four (4) as shown in red colour; from a range given in the syllabus. You should also introduce the available careers in agriculture, generating of records plus basic occupational health, safety and environmental protection practices as you deem fit in each topic they handle.

TERM ONE

TOPIC 1: SOILSCIENCE

Competency:
The learner understands how soil is formed from rocks through the process of weathering.

LEARNING	SUGGESTED LEARNING	SAMPLE ASSESSMENT

OUTCOMES	ACTIVITIES	STRATEGY
The learner should be able to a. show skills in analysing soil and identifying its different components. (s,v) b. understand various types of weathering processes and factors influencing soil formation. (u, k, s,v) c. identify tools used on the farm including garden tools, woodworking tools, metal tools, and the basic tools used for fencing, mechanics and other farming	n groups or pairs, learners' analyses soil composition by means of experiments to determine the presence of organic matter, air, water, mineral salts, and living organisms. roups report conclusions to the class, relating to the components of soil and techniques used to identify the components. n groups, learners research and use the different methods of carrying out soil sampling; highlight the main steps and reasons why in a report. n pairs or groups, learners carry out mechanical analysis of soil, analysis by sedimentation, investigations of water holding capacity, drainage and produce reports on the techniques and their findings.	)bserve how learners carry out scientific experiments of soil composition, mechanical analysis or sedimentation, soil PH, soil sampling, water holding capacity and drainage to find out if they are making progress towards learning outcomes and intervene to deepen learning. isten to pair/ group discussions and offer guidance to ensure that all individuals engage and develop skills and an understanding. • Evaluate learning through quality of products: reports on soil components and analysis techniques. • Analyse reports on soil sampling and soil

activities. (k,u) d. show skills in distinguishing between the different soil particles, soil textures, and soil structures, as well as soil profile horizons and types of soils as used for agricultural purposes. (u, s,v) e. show skills in soil sampling. (u,s) f. understand the importance of plant nutrients and soil pH. (u, s,v) g. demonstrate soil improvement practices and	n groups, learners employ a running dictation to discuss and share information about types of weathering that lead to soil formation. roups produce diagrams to explain how soil is formed. n groups, learners determine pH of soil samples using a soil testing kit (containing materials like test tubes, indicators, soil samples, droppers, barium sulphate, Munsell chart) and recommend appropriate action to improve soils. n groups, learners research soil fertility, then dig a soil profile and prepare compost manure for use in a farmer's garden including how to earn from the activities. As a class, collaboratively, establish an experimental garden to demonstrate the functions of the plant nutrients: nitrogen,	formation diagrams, • Have recommendations on improving soil pH, soil profiles and compost prepared, and reports on effects of NPK on plants. • The learners should be assessed by carrying out the actual soil sampling in the available school gardens and then carrying out soil sampling at their home gardens and bring to school for analysis. Observe learners perform a test on availability of plant nutrients within a soil sample with a focus on nitrogen, phosphorus, and potassium.

understand their effects on plant growth. (u, s, a,v)	phosphorus, and potassium.	

TERM TWO

SELECT ONE TOPIC IN CROP PRODUCTION

TOPIC 2.1A VEGETABLE GROWING

COMPETENCY:
The learner selects a suitable vegetable for a locality and carries out all the processes required in order to grow and market the vegetable

LEARNING OUTCOME:	SUGGESTED LEARNING ACTIVITIES	SAMPLE ASSESSMENT STRATEGIES
The learners should be able to a. Know a range of vegetables grown locally and understand their value in both nutritional and financial terms (k, u)	Using think-pair-share, learners identify the common vegetables in their locality and discuss the value of vegetables in the diet and as a commodity. They should present conclusions in drawings	Observe learners as they plan and carry out the survey on vegetable growing focusing on planning activities, how they gather and record information, how they build

b. Understand how to select an appropriate vegetable for growing locally (k, u) c. Demonstrate skills of using farm tools and implements correctly for better production (s) d. Be able to establish a nursery, apply good practice for vegetable growing (k, u, s) e. show skills in preparing bio pesticides and plant derivatives. (k, u, s) f. handle vegetables during and after harvest in order to maintain quality. (s) g. market vegetables effectively. (s) h. follow food safety guidelines for	and/or a written report. s a class, select and use a method of gathering information and design a survey tool to use in collecting data on vegetable growing in the locality. Collect findings in a whole class report. n groups, develop and conduct a survey, including interviews with appropriate groups of people, to collect data on vegetables so as to select one for growing. s a class, develop and document a budget using spread sheets or hand drawn tables for constructing a nursery bed, procuring materials, establishing a nursery bed and raising vegetable seedlings.	rapport with respondents and their debrief of each group. Observe learners establishing a nursery bed, transplanting seedlings, caring for developing plants, harvesting and marketing of vegetables to check on skills development, understanding of procedures, safe practice and food safety guidelines. Listen to learners' conversations and offer prompts or ask questions to deepen learning and guide learners towards achievement of learning outcomes. Observe learners establishing a vegetable garden,

harvested fresh vegetables. (u, s) i. demonstrate basic occupational safety and health standards in agriculture. (u, s) j. show skills in applying the steps in giving first aid on the farm and during agricultural activities. (k, u, s)	In groups, research on first aid and the basic occupational safety and health standards in agriculture by listening to an invited speaker or using the internet or other resources. Present the group's conclusions about what all agriculture workers should know and be able to do with respect to paying attention to health and safety and carrying out First Aid.	caring for developing plants, harvesting and storing the seeds. Check on vegetable growing skills and procedures, follow the safe practice and food safety guidelines.

TOPIC 2.1B GROWING CEREAL DURATION: 12 PERIODS

COMPETENCY:
The learner understands the basic parts of a plant and their functions, appreciate the growth requirements of crop plants and grow cereals successfully.

LEARNING OUTCOME	SUGGESTED LEARNING ACTIVITIES	SAMPLE ASSESSMENT STRATEGIES

The learners should be able to a. Explain the ways in which crops are important to humans. (k, u) b. Understand the structures and functions of the basic parts of a plant (u) c. Understand the structures and functions of the parts of the reproductive system of a plant. (k, u) d. Understand the factors that influence plant growth and crop production. (k, u, s) e. Show skills in classifying crops as annual, biennial and perennial. (u, s)	In groups or as a class, brainstorm and record the ways in which crops are important to humans and the value of cereals both in terms of nutrition and as a commodity. In groups, examine and draw the different basic parts of plants, including the reproductive system. Research in the library or through internet and annotate diagrams to explain the functions of each part. In groups, learners research, discuss and prepare a presentation on: I. The meaning of annual, biennial and perennial plants. II. Examples of crop plants that are annuals, biennials and perennials. III. The propagation methods that are used for each.	Observe learners carrying out activities and intervene as necessary to ensure learning is taking place by, offering group guidance with research strategies; supporting groups to ensure use of scientific techniques in investigations; checking that all individuals understand key points from presentations; highlighting and demonstrating good practice in terms of use of tools and care for crops. Listen to pair and group discussions, asking probing questions and

f. Understand the value of cereals both in nutritional terms and as a commodity. (k, u)	In groups, learners plan, carry out and record the outcome of an investigation into the effect of wind / temperature on plants by conducting a simple experiment: using two identical well-watered pot plants, a fan / a heater or cooler, a thermometer and weighing scales.	offering guidance to ensure all individuals think critically and develop skills and understanding.
g. Understand how to select appropriate planting material for the cereal chosen for growing. (k, u)		Observe learners establishing a cereal garden, caring for developing plants, harvesting and storing the seeds. Check on cereals growing skills and procedures; follow the safe practice and food safety guidelines.
h. Demonstrate skills of using farm tools and implement correctly for better production. (s)	Learners conduct an investigation individually or in pairs to compare the growth of plants in different conditions in an outdoor environment, considering factors such as rainfall, light, temperature and humidity.	
i. Show skills in the following: • Growing cereals. (s) • Maintaining soil fertility in cereals. (k, u, s) Handling cereals during and after harvest. (s)	In groups or as a class practical, learners select which cereal to grow, select and sow seeds or other planting material, care for and manage the growing crop, maintain soil fertility, harvest the crop, select and use appropriate	Evaluate learning through quality of Products that is to say, reports on importance of: • Crops and value of cereals; • Annotated diagrams of plant parts and their functions
j. Understand the various methods for storing cereals. (k, u)		

k. Demonstrate basic occupational safety and health standards in agriculture. (u, s)
l. Show skills in applying the steps in giving first aid on the farm and during agricultural activities. (k, u, s)

techniques for storing the seeds.

Individuals keep records at each stage in the process and produce a report.

In groups, they research on first aid and the basic occupational safety and health standards in agriculture by listening to an invited speaker or using the internet or other resources.

Present the group's conclusions about what all agriculture workers should know and be able to do with respect to paying attention to health and safety and carrying out first aid

- Presentations on plant life cycles and propagation of examples.
- Investigation reports; crop yield

(Quality and quantity) and reports on process.

TOPIC 2. 1C GROWING ROOT AND STEM TUBERS

COMPETENCY:
The learner grows and process root and stem tubers for the market.

LEARNING OUTCOME	SUGGESTED LEARNING ACTIVITIES	SAMPLE ASSESSMENT STRATEGIES
The learners should: a. Understand the meanings and the value of roots and stem tubers, both in terms of nutrition and as a commodity. (u) b. Understand how to select appropriate planting material for the crop chosen for growing. (k, u) c. Demonstrate skills of using farm tools and implements correctly for better production (s) d. Show skills in Growing roots & stem tubers (s)	As a class or in groups, learners brainstorm, research and report on the meaning of tubers, root and stem, giving examples of each and their value in the diet and as marketable commodities. Groups use their findings to select a root or stem tuber to grow and harvest, reporting the reasons for their choice verbally or in writing. In groups or as a whole class practical, learners select appropriate planting material for their chosen crop; plant the crop, care for and manage the crop as it grows, maintain soil fertility, harvest the crop, select and use appropriate methods	Observe learners as they carry out the activities, intervening where necessary, to ensure they are on track with research and that they understand how to use tools and equipment effectively and safely. Observe as they select, design, construct and operate a solar dryer focusing on: participation, collaboration, time management, creativity, adhering to standard measurements and justification for actions. Listen to learners' conversations, guide them and ensure that they all make progress towards achievement of learning outcomes. Evaluate products

e. Show skills in handling roots/ stem tubers during and after harvest. (s) f. Show skills in processing and solar drying of roots/ stem tuber.s (k, s) g. Demonstrate basic occupational safety and health standards in agriculture. (u, s) h. Show skills in applying the steps in giving first aid on the farm and during agricultural activities. (k, u, s)	for processing the crop, using solar drying accordingly. Individuals keep records at each stage in the process and produce a report. As a group, learners select, design and construct a solar dryer for proper processing (sorting, cleaning and washing) of root and stem tubers, presenting their product to the class.	through: reports on root and stem tubers, examples and their value; explanations of choice of tuber to grow and reasons for crop yield (quality and quantity); effectiveness of processing after harvest and of solar dryers. Observe learners establishing a root and stem tubers garden, caring for developing plants, harvesting and storing the seed.. Check on a root and stem tuber growing skills and procedures, follow the safe practice and food safety guidelines.

TOPIC 2.1 D GROWING LEGUMES AND OIL SEEDS
DURATION: 24 PERIODS

COMPETENCY:
The learner grows and stores legumes and oil seeds for the market

LEARNING OUTCOME	SUGGESTED LEARNING ACTIVITIES	SAMPLE ASSESSMENT STRATEGIES
The learners should: a. Know the structure of a seed and understand the functions of each part. (k, u) b. Show skills in breaking seed dormancy in crops and optimising germination. (s, u) c. Understand the value of legumes and oil seeds in	In pairs, learners should: I. Examine, discover and draw the internal structure of a seed. II. Research the functions of each part of the seed and the types of seed dormancy. III. Complete a report on seed structure, functions and dormancy. In groups, learners should: I. Brainstorm the meanings and think of examples of legumes and oil seeds. II. Research the nutritional and financial. III. value of legumes and oil seeds complete a chart on legumes and oil seeds,	Observe pairs and groups, monitoring learning and intervening as appropriate to ensure all learners are fully engaged and making progress towards success in terms of learning outcomes. Listen carefully to learners' discussions, asking questions to prompt critical thinking and creative solutions to challenges. Guide learners to help

both nutritional and financial terms. (k, u)	giving important examples and explaining their value.	them overcome barriers to learning.
d. Understand how to select appropriate seeds for growing a chosen crop. (u, k, s)	In groups, learners select appropriate seeds for growing a chosen crop through an experiment using, e.g., a seed viability test (Tetrazolium salt and potassium permanganate), and calculate the germination percentage and report on their findings verbally and/or in writing using word document or flip chart.	Evaluate quality of learning through the quality of the products like: drawings and reports on seeds, legume / oil seed charts, seed viability reports, crop yield (quality and quantity), seed drying and storage reports.
e. Show skills in growing legumes and oil seeds. (s)		
f. Show skill in handling legumes and oil seeds during and after harvest. (s)	In groups, research on first aid and the basic occupational safety and health standards in agriculture by listening to an invited speaker or using the internet or other resources. Present the group's conclusions about what all agriculture workers should know and be able to do with respect to paying attention to health and safety and carrying out First aid	Observe learners establishing a legume and oil seeds garden, caring for developing plants, harvesting and storing the seeds.
g. Know, understand and apply the skills involved in the various methods of		Check on a legume and oil seeds growing skills and procedures, follow the safe practice and food safety guidelines.

storing		

NB: Due to the timescales required for growing trees to maturation and the scale of planting required for effective watershed and permaculture systems, the learning activities involved in this unit should focus on aspects of practice rather than the whole cycle from planting to harvest (agroforestry), or significant levels of environment-friendly planting (watershed and permaculture).

TOPIC 2.1E BEVERAGE PRODUCTION (You choose one topic of either coffee, tea or cocoa)

COMPETENCY: The learner produces and markets perennial crops profitably.

LEARNING OUTCOME	SUGGESTED LEARNING ACTIVITIES	SAMPLE ASSESSMENT STRATEGIES
The learners should: a. Know the value of coffee / tea /cocoa to the Ugandan	As a class, learners brainstorm and research the uses	Observe learners' developing practical skills in relation to planting and growing coffee / tea / cocoa

economy, and the key markets for these products. (k) b. Understand the general geographical areas in which coffee / tea / cocoa is grown in Uganda, and the soil and climatic requirements for propagating and growing. (k, u) c. Understand how to establish and manage a coffee / tea / cocoa nursery and coffee garden. (u,s) d. Show skills in applying financial management principles to coffee / tea / cocoa production (k, s). e. Demonstrate skills of using farm tools and implements	and importance of coffee / tea / cocoa to the Ugandan economy, and the balance between export destinations and home consumption, recording class conclusions in notes. In pairs, learners research using the library, internet or other resources, and draw maps showing the geographical locations of where coffee / tea / cocoa is grown in Uganda and the world. In pairs, learners	commercially; intervene and provide support to ensure they make good progress and achieve learning outcomes. Listen to learners' conversations and contributions in pair, group and class discussion, asking probing questions and leading them to further develop both their thinking and deepen understanding. Evaluate the quality of learning through products: Make conclusions regarding uses and importance of coffee / tea / cocoa crops; come up with maps of growing areas and annotation about climate and soil. Conclusions should be made regarding establishment and management of nurseries /gardens; quality of crops harvested; quality of crops after roasting / curing, grinding and quality of drinks served; lists and self-assessments of

correctly for better production. (s) f. Show skills in the preparation of the soil for growing coffee / tea /cocoa seedlings. (s) g. Show skills in transplanting coffee / tea / cocoa seedlings into the garden. h. Show skills in managing coffee /tea / cocoa plants until harvesting. (k, u, s, a, v) i. Be able to harvest and process coffee / tea / cocoa for the market. (k, u, s ,a,v)	explore and make notes on the soil and climatic requirement for propagating and growing coffee / tea / cocoa, and then annotate their maps to explain why the crops are grown in the areas shown.	entrepreneurial skills should equally be made. Observe learners establishing a beverage garden, caring for developing plants, harvesting and storing the seeds. Check on beverage growing skills and procedures, follow the safe practice and food safety guidelines.

TOPIC 2. 1 F FRUIT CROP PRODUCTION

COMPETENCY:
The learner produces and markets perennial crops profitably.

LEARNING OUTCOME	SUGGESTED LEARNING ACTIVITIES	SAMPLE ASSESSMENT STRATEGIES
The learners should: a. Know the varieties and value of fruit crops grown in Uganda. (k) b. Understand how to select an appropriate fruit crop for growing. (u) c. Show skills in the methods of planting fruit trees. (u, s) d. Understand the soil and climatic requirements for propagating a selected fruit tree. (k, u) e. Demonstrate skills of using farm tools and implements correctly for better production. (s) f. Be able to propagate fruit tree crops. (s)	In groups, learners brainstorm, research and report on the types of fruit grown, their uses and importance to the Ugandan economy and diet. In pairs, learners carry out research through the library, internet, local observation / Interviews, to select the most appropriate fruit to grow in the locality. They should report their conclusions to the class. In groups, learners explore and make notes on the soil and climatic requirement for propagating and growing the fruit selected. In groups, learners carry out research	Observe learners' developing practical skills in relation to planting and growing fruits commercially, intervene and provide support to ensure they make good progress and achieve learning outcomes. Listen to learners' conversations and contributions in pair, group and class discussion. Asking probing questions that leads them to further develop both their thinking and deepen understanding. Evaluate the quality of learning through

g. Show skills in the preparation of the soil for growing selected fruit trees. (s) h. Show skills needed in the planting of seeds and seedlings / cuttings. (s) i. Understand and apply the principles of good management of fruit trees. (u,s) j. Be able to carry out basic fruit tree nursery tending operations. (s) k. Show skills in applying financial management principles to fruit production. (k, s) l. l. Be able to establish and harvest fruit tree crops in the field. (s) m. Demonstrate basic occupational safety and health standards	and visit farmers or processing units to find out about the conditions required to ensure a good quality harvest while recording their conclusions. As a class, learners establish and manage a fruit nursery, growing and caring for the fruit and following appropriate procedures. Individuals keep learning logs of the process. In groups, they research on first aid and the basic occupational safety and health standards in agriculture by listening to an invited speaker or using the internet or other resources. They present the group's conclusions about their findings. agriculture workers	products. Make conclusions regarding types, uses and importance of fruit crops; conclusions regarding appropriate fruit for the locality and suitable climate and soil; conclusions regarding establishment and management of fruit nurseries; learning logs; outcomes of learners' application of skills in grafting, budding, pollarding and pruning Make reports on harvesting, marketing; lists and self-assessments of entrepreneurial skills should equally be made Observe learners establishing a fruit garden, caring for developing plants, harvesting and storing the seeds.

in agriculture. (u, s) n. Show skills in applying the steps. Giving first aid on the farm and during agricultural activities (k, u, s)	should know and be able to do with respect to paying attention to health and safety and carrying out first aid	Check on fruit growing skills. procedures; follow the safe practice and food safety guidelines.

TOPIC 2.1G AGRO FORESTRY / WATERSHED / PERMACULTURE PRODUCTION

COMPETENCY:
The learner produces and markets perennial crops profitably.

LEARNING OUTCOME	SUGGESTED LEARNING ACTIVITIES	SAMPLE ASSESSMENT STRATEGIES
The learners should: a. Know the meaning of the terms agroforestry,	n groups, learners brainstorm and research on the meaning, uses and	Observe learners' developing practical skills in

watershed, and permaculture. Understand their importance to the environment and value to the Ugandan economy. (k,u, a,v) b. Understand the rationale for eco-friendly farming techniques in managing and caring for the environment and natural resources. Show appropriate skills in agroforestry, watershed, and permaculture development. (u,s, a,v) c. Design an agroforestry, a watershed and a permaculture model plan for the area. (s, a,v). d. Understand how to select appropriate tree species and crops for an agroforestry garden,	importance of agroforestry, watershed, and permaculture to the Ugandan economy and environment. Share their thoughts with the class. The whole class discusses appropriate areas in the locality for agroforestry, watershed, and permaculture projects in the area. Individuals record conclusions n pairs, learners: i. Carry out research from the library, Internet and other sources. and select the most appropriate trees and crops for agroforestry, watershed or permaculture projects in the area. ii. Design a model plan, explaining the reasons for the decisions about what and where to plant. iii. Develop a management plan	relation to planting and growing trees and crops suitable for agroforestry / watershed / permaculture. Intervene, ask questions and provide support to ensure that they make good progress and achieve learning outcomes. Listen to learners' conversations and contributions in pair, group and class discussion. Asking probing questions and leading them to further develop both their thinking and

a watershed development area, and a permaculture garden. (u,s, a,v). e. Understand how to establish and manage an agroforestry garden, a watershed development area, and a permaculture garden. (u,s, a,v). f. Show skills in applying financial management principles to planning an agroforestry garden, a watershed development area, and a permaculture garden. (k, s, a,v) g. Know how to harvest and process the products of agroforestry, watershed, and permaculture (k, a,v) h. know how to market	detailing how to care for both the crops and the environment. s a class, learners grow and care for some selected trees and crops included in the model plan, following appropriate procedures. ndividuals keep a learning log. n groups, learners visit agroforestry farms and/or farms using eco-friendly watershed/permaculture approaches. and interview them about management required to ensure a good quality harvest and conservation of the natural environment (If no local examples, theoretical research will be required) ndividuals add to learning logs. n pairs, learners research, read a case study, discuss and report on how to harvest and market products of agroforestry, watershed	deepen understanding. Evaluate the quality of learning through products. Make conclusions regarding the meaning and uses of agroforestry / watershed / permaculture and suitable locations for projects; model plans and management plans; learning logs; reports on harvesting and marketing of products. Make lists and do a self-assessments of entrepreneurship characteristics

agroforestry, watershed, and permaculture (k, a, v) i. show entrepreneurial skills required to make a success of agroforestry, watershed, and permaculture(s,a)	areas, and permaculture gardens. As a class, learners discuss the different entrepreneurial and other skills needed in agroforestry, watershed, and permaculture. Learners then write a list of the characteristics of an ideal farmer. Individuals self-assess against the list.	and other skills.

TERM THREE

SELECT ONE TOPIC IN ANIMAL PRODUCTION

TOPIC 3. 1a POULTRY REARING

LEARNING OUTCOME	SUGGESTED LEARNING ACTIVITIES	SAMPLE ASSESSMENT STRATEGIES
The learners should: a. Understand and identify the important breeds of poultry reared in Uganda and their place in supplying the market. (u, s) b. Understand how eggs are hatched and ways of raising chickens. (u, s) c. Know how to care for the health of poultry and understand the role of veterinary services. (k, u)	In groups or as a class, learners brainstorm and research on: i. The different breeds and their commercial importance. ii. Supply and the demand for eggs and poultry meat in Uganda. iii. Individuals record conclusions. In groups, learners watch a video clip, visit a poultry farm or use other resources to research on how eggs are hatched and chickens are reared	Observe learners' developing practical skills in relation to rearing poultry for the meat market and for egg production. Provide support to ensure they make good progress and achieve learning outcomes. Observe learners establish a poultry unit, rear poultry, perform husbandry practices and market products following the safe practice and food safety guidelines.

d. Demonstrate knowledge of diseases and pests affecting poultry. (k, s) e. Demonstrate the use of tools and equipment for controlling diseases and pests in poultry. f. Show skill in handling poultry and their products. (s) g. Understand how to market animal products. (u, s) h. Understand the importance of entrepreneurial skills in marketing poultry. (u, s) i. Apply knowledge and skills related to the marketing of animals and	commercially for meat and for egg, reporting their findings to the class. As a class or in groups, learners research common pests and diseases, their causes, symptoms and treatment (Newcastle disease, fowl pox, fowl typhoid, salmonela, Marek's disease, coccidiosis, mites, lice, fleas, worms) and present findings in a table. In groups, learners collect, research, identify and draw the different kinds of endo-parasites and ecto-parasites that affect poultry. In group learners find opportunities in the community to participate in poultry rearing and poultry product marketing.	Listen to learners' conversations and contributions to class discussion, leading them to further develop both their thinking and deepen understanding. Evaluate the quality of learning through products. Make conclusions regarding breeds and their importance in the market Evaluate the findings in relation to the processes of commercial egg and poultry meat production; learning logs; pest and disease tables. Conclusions should be made on treatment of pests and diseases; drawings of parasites; summaries of the slaughtering and dressing process; marketing plans; farmer/entrepreneur

products. (k, s)		characteristics.

TOPIC 3.1b. FISH AND AQUAPONICS FARMING

LEARNING OUTCOME	SUGGESTED LEARNING ACTIVITIES	SAMPLE ASSESSMENT STRATEGIES
The learners should: a. Know and understand the terminologies relating to fish farming and aquaponics. (k, u) b. Understand why fish farming is important in Uganda and the value of fish, both in nutritional terms and as a commercial product. (u, k) c. Know how to select appropriate fish for rearing. (k, s) d. Understand how a fish pond is	In groups, learners research and discuss fish farming and aquaponics, the terminology and the importance of farmed fish to the national diet and to the economy of Uganda. Groups share findings with the class and individuals record conclusions. In groups, learners research the characteristics of fresh water fish such as tilapia, carp, trout and other species and record the advantages and disadvantages of each as a commercial species, suggesting which they would choose and why. In pairs, learners	Observe learners' developing practical skills in relation to rearing fish for the market and provide support to ensure they make good progress and achieve Observe learners establishing a fish farming unit, rear fish, perform husbandry practices and market products following the safe practice and food safety guidelines. Listen to learners' conversations and contributions to class discussion, leading them to further develop both their thinking and deepen understanding.

constructed and how to determine whether the soil in a given area is suitable for a pond. (u,s,v) e. Be able to construct a fixed pond or a mobile pond / aquaponic system or an aquarium. (u, s) f. Understand how to, and show skills in, stocking and managing a fish pond and/ or an aquaponic system. (u, s) g. Recognize and understand how to deal with different diseases, parasites and predators. (k, u)	investigate local soil and report, giving reasons, verbally or in writing, whether it is suitable for pond construction. In groups, learners construct a a portable fish pond / aquaponics system, or an aquarium at school, and research the principles for rearing fish in them. Individuals produce a brief guide to successful commercial fish rearing. In groups, learners investigate through interviews or other resources: Ssources of fish stock and water for aquaculture. Find opportunities in the community to participate in fish rearing and fish marketing.	Evaluate the quality of learning through products, reports on terminology and the importance of farmed fish to the diet and the economy. Compare the different fish species and reasons for choosing one; Have reports on suitability of soil for pond construction; guides to commercial fish rearing; conclusions on - re stocking; Have characteristics of a good pond; disease, parasites and predators; learning logs about the rearing process; harvesting and preservation.

TOPIC 3.1c. RABBIT REARING

LEARNING OUTCOME	SUGGESTED LEARNING ACTIVITIES	SAMPLE ASSESSMENT STRATEGIES
The learners should: a. Know the most important breeds of rabbits, their characteristic s, their importance in commercial farming and their value in nutritional and financial terms. (k, u) b. Show skills in constructing a rabbit house. (u, s) c. Understand the safety	In groups, learners brainstorm and research on: i. The important breeds of rabbit and their three commercial uses (meat: Californian, New Zealand, Satin; wool: Jersey, Angora, American; pets: Netherland dwarf, Dutch, Lop) ii. ii. Their value in nutritional and financial terms. Groups share findings with the class and individual's record. In groups, learners plan, budget, procure materials and construct a rabbit house	Observe learners' developing practical skills in relation to rearing rabbits commercially, and provide support to ensure they make good progress and achieve learning outcomes. Observe learners establishing a rabbit rearing unit, rear the rabbit, perform the husbandry practices and market products following the safe practice and food safety guidelines. Listen to learners' conversations and contributions to class, group and pair discussions, leading them

'Do's and Don'ts' of rabbit keeping. (u, a, v) d. Show skills in feeding, managing and rearing of rabbits. (k, u, s, a, v)	In groups, explore, brainstorm, research and record a list of safety 'Do's and Don'ts' for rabbits In pairs, learners manage and rear rabbits ensuring healthy practice in relation to feeding, watering, housing, grooming and all aspects of care, keeping individual learning logs of the processIn groups or individually, learners find opportunities in the community to participate in rabbit rearing and rabbit products marketing.	to further develop their skills, their thinking and deepen their understanding. Evaluate the quality of learning through products: Make conclusions regarding breeds, their importance in the market and their commercial and nutritional value; rabbit houses; "Do and don't lists" ; learning logs; health checklists; presentations about treatment of pests and diseases; marketing campaigns

TOPIC 3. 1d. GOAT REARING

LEARNING OUTCOME	SUGGESTED LEARNING ACTIVITIES	SAMPLE ASSESSMENT STRATEGIES

The learners should: a. Identify the breeds of goats reared in Uganda and understand their qualities and the value of goat products in financial and nutritional terms. (k, u) b. Understand how to choose a goat breed for rearing. (u) c. Understand the different systems for mating and breeding goats. (u)	In groups, learners brainstorm and research the different breeds of goats, their characteristics, their suitability for different products (meat, milk, cheese, skins) and the value of these products in financial and nutritional terms. Groups share findings with the class and individuals record the conclusions. The groups use the information to decide an appropriate breed for rearing in the locality, and record the reasons for the agreed choice. In groups, learners manage and rear goats ensuring healthy practice in relation to all aspects of care, and in management of pasture, keeping individual learning logs of the process. In groups, discuss and report	Observe learners' developing practical skills in relation to rearing goats commercially, and provide support to ensure they make good progress and achieve learning outcomes. Observe learners establishing a goat rearing unit, rear the goat, perform the husbandry practices and market products following the safe practice and food safety guidelines Listen to learners' conversations and contributions to class, group and pair discussions, They should ask questions as appropriate to further develop their thinking and deepen their understanding. Evaluate the quality of learning through products. Make conclusions

	on the advantages and disadvantages of different mating and breeding systems for goats, focusing particularly on cross breeding and pure breeding; assertive mating and random mating. In groups or individually learners find opportunities in the community to participate in goat rearing and goat products marketing	regarding breeds, their importance in the market and their commercial and nutritional value; breed selections; learning logs; breeding calendars; kid rearing programmes; hay and silage strategies and quality of products; marketing campaigns; lists and self-assessments of entrepreneurial skills

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