SCIENCE AND ELEMENTARY TECHNOLOGY (SET) SYLLABUS FOR LOWER PRIMARY (P1-P3)

FOREWORD

The Rwanda Basic Education Board is honored to present to you this SET syllabus which serves as both official document and as a guide to competence-based teaching and learning. This syllabus ensures consistency and coherence in the delivery of quality education in Rwandan schools.

The Rwandan education philosophy aims to ensure that young people at every level of education achieve their full potential in terms of relevant knowledge, skills and appropriate attitudes in order to prepare them to be well integrated into society and access employment opportunities.

In line with efforts to improve the quality of education, the government of Rwanda emphasises the importance of aligning the syllabus with teaching and learning materials and assessment approaches in order to ensure that the system is producing the kind of citizens the country needs. Many factors influence what children are taught, how well they learn and the competences they acquire, particularly the relevance of the syllabus, the quality of teachers' pedagogical approaches, the assessment strategies and the instructional materials available. The ambition to develop a knowledge-based society and the growth of regional and global competition in the job markets has necessitated the shift to a competence-based curriculum. With the help of the teachers, whose role is central to the success of the syllabus, learners gaining appropriate skills and being able to apply what they have learnt in real life situations and thus making a difference not only to their lives but also to the nation.

I wish to sincerely extend my appreciation to all educational experts who contributed to the development and translation of this syllabus, particularly REB/ CTLR Department staff who organized the whole process from its inception. Any comment of contribution would be welcome for the improvement of this syllabus.

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1. INTRODUCTION

1.1. Background to the Curriculum Review

The goal to develop a competence-based society, the globalization process and particularly the growth of the world market and competition at the global level, as well as a shift from knowledge-based to competence-based curriculum necessitated a comprehensive review of the national curriculum to address the required skills in the Rwandan education system.

It is against this background that the SET syllabus at primary level was reviewed to ensure that the syllabus is responsive to the needs of the learner with a shift from knowledge-based learning to competence-based learning. Another innovation in the review is the inclusion of the ICT component.

Competence-based learning refers to systems of instruction, assessment, grading, and academic reporting that are based on pupils demonstrating that they have acquired and learnt the prerequisite knowledge, skills and attitudes as they progress through their education. Apart from being integrative, the newly revised syllabus guides the interaction between the teacher and the learner in the learning process. It further puts greater emphasis on skills a learner should acquire during each unit of learning. As a Competence-based syllabus, it elaborates on the three aspects of knowledge, skills and attitudes in science.

Apart from the introductory section that includes a brief background to the curriculum review, the rationale of teaching and learning SET, the objectives of learning SET, the pedagogical approach as well as the assessment approach, this newly revised curriculum is structured in such a way that each topic area for each year of study is divided into a number of learning units for which the following elements are clearly described:

- A key unit competence which is the expected outcome after the completion of the unit,
- The learning objectives expressed in terms of knowledge, skills and attitudes,
- The content to be covered and
- The specific learning activities the learner will be involved in during learning process

At the end of the syllabus, there is a list of references and appendices including the weekly time allocation of a primary school leaver.

1.2. The Rationale of Teaching and Learning SET

1.2.1. Science and Elementary Technology and Society

Teaching elementary science to young children is critical for establishing a foundation for further success in science and for coping with the demands of the 21st century. Furthermore, technology education constitutes an unequalled important added value. Not only in developed countries but also in developing countries such as Rwanda, the love and interest in science and technology begins in primary school where young children tend to be more curious and motivated to learn. Again, the inclusion of Science and Elementary Technology in the Primary School reflects the importance of science and technology in many aspects of our daily lives, at work, at school and at home. As integrated science, it provides a very good foundation for the study of science subjects in the post-primary setting. Most importantly, it cultivates a positive attitude towards science and provides pupils with opportunities to experience the excitement of working as a scientist.

Above all, the rationale of teaching and learning of SET is embedded in the need for learners to have a greater awareness of the role of science and technology in everyday life. The SET subject at primary school will enable the learner to develop competences which have great impact on the society in general. Teaching SET at primary school is further justified in that it helps to develop basic scientific and technological literacy by introducing and exciting young Rwandans to learning science and ICT .

1.2.2. Science and Elementary Technology and learners

Learners have to be prepared from an early age for active and responsible citizenship. With this regard, SET strives to equip learners to understand and situate scientific and technological developments in their cultural, environmental, economic, political and social contexts. At the center of teaching and learning of SET, hands on activities will play a key role, which in turn, should contribute significantly towards improving learners' achievement, motivation, technological literacy and test scores.

1.2.3. Competences

Competence is defined as the ability to use an appropriate combination of knowledge, skills attitudes, values and behaviour to accomplish a particular task successfully.

Basic competences are addressed in the stated broad subject competences and in objectives highlighted year on year basis and in each of units of learning. The generic competences and basic competences that must be emphasized and reflected in the learning process are briefly described below and teachers will ensure that learners are exposed to tasks that help them to acquire the skills.

Generic competences

Critical and problem solving skills: The acquisition of such skills will help learners to think imaginatively, innovatively and broadly to evaluate and find solutions to problems encountered in our surrounding.

Creativity and innovation: The acquisition of such skills will help learners to take initiatives and use imagination beyond knowledge provided in classroom to generate new ideas and construct new concepts.

Research: This will help learners to find answers to questions based on existing information and concepts and use it to explain phenomena from gathered information.

Communication in official languages: Teachers, irrespective of being language teachers will ensure the proper use of the language of instruction by learners. Teachers should communicate clearly and confidently and convey ideas effectively through spoken and written by applying appropriate language and relevant vocabulary. The teacher will support learners to gain new vocabularies and their meanings.

Cooperation, inter personal management and life skills: This will help the learner to cooperate as a team in whatever task assigned and to practice positive ethical moral values and while respecting rights, feelings and views of others. Perform practical activities related to environmental conservation and protection. Advocate for personal, family and community health, hygiene and nutrition and responding creatively to a variety of challenges encountered in life.

Lifelong learning: The acquisition of such skills will help learners to update knowledge and skills with minimum external support. The learners will be able to cope with evolution of knowledge advances for personal fulfillment in areas that are relevant to their improvement and development.

Broad SET competences

The teaching of science and elementary technology at primary level should aim at:

- Developing an interest in science as a body of knowledge and methods of thinking, inquiring and working,
- Developing a concern for the world around us,
- Making children aware of themselves within the world we live and the importance of science in relation to this,
- Helping children to realize the importance of technology for society and the need for scientific knowledge to understand the present technological age,
- Developing positive attitudes, practical skills and basic scientific concepts.

The overall objective of learning SET at primary level is to promote basic scientific literacy. Upon completion of primary education, learners will have acquired competences (knowledge, skills and attitudes) which will enable them to:

- Demonstrate an understanding of the nature of science (NOS),
- Apply inquiry-based science learning strategies,
- Solve problems in their daily life,
- Reflect good habits of personal hygiene and their surroundings,
- Practice good habits to protect their own health and that of others,
- Reflect a positive attitude towards environmental protection and conservation,
- Improve crop and animal husbandry,
- demonstrate an understanding of the interrelationship between science, society and technology,
- Perform SET learning through ICT and make based enquiry projects in the daily life.

Science and Elementary Technology and developing competences

The national policy documents based on national aspirations identify some 'basic Competences' alongside the 'Generic Competences" that will develop higher order critical thinking skills and help pupils to learn Science, elementary technology and information communication technology for application in real life. The nature of learning activities which are mainly

inquiry oriented contribute to the achievement of those competences.

Through observations, experimentation, and presentation of information during the learning process, the learner will not only develop deductive and inductive skills but also acquire cooperation and communication, critical thinking and problem solving skills. This will be achieved through learners' group work and cooperative learning of Science, elementary technology and information communication technology which in turn will promote interpersonal relations and teamwork.

The manipulation of apparatus and data during class experiments and undertaking of project work by learners will involve analytical and problem solving skills directed towards innovation, creativity and research activities by learners.

The acquired knowledge in learning science, elementary technology and information communication technology should develop a responsible citizen who adapts to scientific reasoning, attitudes and develops confidence in reasoning independently. The learner should show concern of individual attitudes, environmental protection and comply with the scientific method of reasoning. The scientific method should be applied with the necessary rigor, intellectual honesty to promote critical thinking while systematically pursuing the line of thought.

2. PEDAGOGICAL APPROACH

Contrary to the old SET syllabus which was designed for only upper primary school, this subject has been expanded to cover the whole primary school from P1 to P6. In the lower primary school (P1 to P3) the syllabus is now designed in English, which is the medium of instruction, like the upper primary school (P4-P6). At both levels, the constructivist approach of teaching science which reinforces the inquiry-based instruction will be at the heart of the implementation of the new revised syllabus.

2.1. Role of the learner

The approach considers the learning process to involve the construction of meaning by learners. Simply it emphasises the need for children to think about scientific activities in order to have a deep understanding of the scientific concepts being introduced. Traditionally, science instruction has relied heavily on teacher-lead, direct instructional strategies with learners being the recipients of knowledge. In the syllabus, learners are in the driver's seat which implies they will construct their knowledge by posing question, planning investigation, conducting their own experiments, analysing and communicating results. More

specifically, when engaging in inquiry, learners will describe objects and events, ask questions, construct explanations, test those explanations against current scientific knowledge and communicate their ideas to others. By so doing, the learners will take ownership of the learning process.

As for learners, their activities are indicated against each learning unit reflecting their appropriate engagement in the learning process. Even though they do not necessarily take place simultaneously in each and every SET lesson and for all levels, over time learners get involved in the following activities (IAP, 2010, p. 9):

- Observing and where possible, handling and manipulating real objects;
- Pursuing questions which they have identified as their own even if introduced by the teacher;
- Taking part in planning investigations with appropriate controls to answer specific questions;
- Using and developing skills of gathering data directly by observation or measurement and by using secondary sources;
- Using and developing skills of organizing and interpreting data, reasoning, proposing explanations, making predictions based on what they think or find out;
- Working collaboratively with others, communicating their own ideas and considering others' ideas;
- Expressing themselves using appropriate scientific terms and representations in writing and talking;
- Engaging in lively public discussions in defense of their work and explanations;
- Applying their learning in real-life contexts;
- Reflecting self-critically about the processes and outcomes of their inquiries.

During this reciprocal interaction, what learners will acquire is not only content knowledge, but a number of skills including how to approach a problem, identify important resources, design and carry out hands-on investigations, analyze and interpret data, and most importantly, recognize whether they have answered the question or solved the problem (Marsha, 2000).

2.2. Role of the teacher

The role of the teacher will remain critical however. Instead of being the "sage on the stage", the teacher will rather be "the guide on the side" who acts as a facilitator in a variety of ways which include:

- Encouraging and accepting pupil's autonomy and initiative;

- Using raw data and primary sources, along with manipulative, interactive and physical materials;
- Using a cognitive terminology such as classify, analyse, predict, and create when framing tasks.
- Allowing pupil's responses to drive lessons, shift instructional strategies and alter content;
- Familiarizing themselves with pupils' understandings of concepts before sharing their own understandings of those concepts;
- Encouraging pupils to engage in dialogue, both with the teacher and one another;
- Encouraging pupil's inquiry by posing thoughtful, open-ended questions and asking pupils to question each other;
- Eeeking elaboration of pupils' initial responses;
- Engaging pupils in experiences that pose contradictions to their initial hypotheses and then encouraging discussion;
- Providing time for pupils to construct relationships and create metaphors; and
- Nurturing pupils' natural curiosity.

2.3. Special needs education and inclusive approach

All Rwandans have the right to access education regardless of their different needs. The underpinnings of this provision would naturally hold that all citizens benefit from the same menu of educational programs. The possibility of this assumption is the focus of special needs education. The critical issue is that we have persons/ learners who are totally different in their ways of living and learning as opposed to the majority. The difference can either be emotional, physical, sensory and intellectual learning challenged traditionally known as mental retardation.

These learners equally have the right to benefit from the free and compulsory basic education in the nearby ordinary/ mainstream schools. Therefore, the schools' role is to enroll them and also set strategies to provide relevant education to them. The teacher therefore is requested to consider each learner's needs during teaching and learning process. Assessment strategies and conditions should also be standardized to the needs of these learners. Detailed guidance for each category of learners with special education needs is provided for in the guidance for teachers.

3. ASSESSMENT APPROACHES

Assessment is the process of evaluating the teaching and learning processes through collecting and interpreting evidence of individual learner's progress in learning and to make a judgment about a learner's achievements measured against defined standards. Assessment is an integral part of the teaching learning processes. In the new competence-based curriculum assessment must also be competence-based; whereby a learner is given a complex situation related to his/her everyday life and asked to try to overcome the situation by applying what he/she learnt.

Assessment will be organized at the following levels: School-based assessment, District examinations, National assessment (LARS) and National examinations.

3.1. Types of assessment

3.1.1. Formative and continuous assessment (assessment for learning)

Continuous assessment involves formal and informal methods used by schools to check whether learning is taking place. When a teacher is planning his/her lesson, he/she should establish criteria for performance and behaviour changes at the beginning of a unit. Then at the of end of every unit, the teacher should ensure that all the learners have mastered the stated key unit competences basing on the criteria stated, before going to the next unit. The teacher will assess how well each learner masters both the subject and the generic competences described in the syllabus and from this, the teacher will gain a picture of the all-round progress of the learner. The teacher will use one or a combination of the following: (a) observation (b) pen and paper (c) oral questioning.

3.1.2 Summative assessment (assessment of learning)

When assessment is used to record a judgment of a competence or performance of the learner, it serves a summative purpose. Summative assessment gives a picture of a learner's competence or progress at any specific moment. The main purpose of summative assessment is to evaluate whether learning objectives have been achieved and to use the results for the ranking or grading of learners, for deciding on progression, for selection into the next level of education and for certification. This assessment should have an integrative aspect whereby a pupil must be able to show mastery of all competences.

It can be internal school based assessment or external assessment in the form of national examinations. School based summative assessment should take place once at the end of each term and once at the end of the year. School summative assessment average scores for each subject will be weighted and included in the final national examinations grade. School based assessment average grade will contribute a certain percentage as teachers gain more experience and confidence in assessment techniques and in the third year of the implementation of the new curriculum it will contribute 10% of the final grade, but will be progressively increased. Districts will be supported to continue their initiative to organize a common test per class for all the schools to evaluate the performance and the achievement level of learners in individual schools. External summative assessment will be done at the end of P6.

3.2. Record Keeping

This is gathering facts and evidence from assessment instruments and using them to judge the pupil's performance by assigning an indicator against the set criteria or standard. Whatever assessment procedures used shall generate data in the form of scores which will be carefully be recorded and stored in a portfolio because they will contribute for remedial actions, for alternative instructional strategy and feed back to the learner and to the parents to check the learning progress and to advice accordingly or to the final assessment of the pupils.

This portfolio is a folder (or binder or even a digital collection) containing the pupil's work as well as the pupil's evaluation of the strengths and weaknesses of the work. Portfolios reflect not only work produced (such as papers and assignments), but also it is a record of the activities undertaken over time as part of pupil's learning. Besides, it will serve as a verification tool for each learner that he/she attended the whole learning before he/she undergoes the summative assessment for the subject.

3.3. Item writing in summative assessment

Before developing a question paper, a plan or specification of what is to be tested or examined must be elaborated to show the units or topics to be tested on, the number of questions in each level of Bloom's taxonomy and the marks allocation for each question. In a Competence based curriculum, questions from higher levels of Bloom's taxonomy should be given more weight than those from knowledge and comprehension level.

Before developing a question paper, the item writer must ensure that the test or examination questions are tailored towards Competence based assessment by doing the following:

- Identify topic areas to be tested on from the subject syllabus.
- Outline subject-matter content to be considered as the basis for the test.
- Identify learning outcomes to be measured by the test.
- Prepare a table of specifications.
- Ensure that the verbs used in the formulation of questions do not require memorization or recall answers only but testing broad competences as stated in the syllabus.

Structure and format of the examination:

There will be 2 papers in Science and Elementary Technology subject to be examined. Time allocated for all papers will depend on their respective weight. In case of learners with special education needs, the time allocated for each paper will depend on their needs.

The papers will be structured as follows:

Component Weighting

COMPONENT	WEIGHTING
Paper 1 which measures knowledge and understanding (lower order thinking level) • Structured short answer questions.	Structured short answer questions will have 40% of the final marking of the assessment
Paper 2 which measures skills and advanced level of understanding (higher order thinking level) • Unstructured answer questions or extended essay questions.	Unstructured answer questions will have 60 % of the final marking of the assessment

3.4. Reporting to parents

The wider range of learning in the new curriculum means that it is necessary to think again about how to share learners' progress with parents. A single mark is not sufficient to convey the different expectations of learning which are in the learning objectives. The most helpful reporting is to share what pupils are doing well and where they need to improve.

4. RESOURCES

4.1. Material resources

For successful implementation of this SET syllabus, the material resource is required. Thus, the following minimum requirement should be met:
- The school infrastructures with its surrounding;
- Textbooks and other written materials (syllabus, charts, books, newspapers, shapes, etc…),
- A science kit
- Improvised teaching aid
- Whenever possible, ICT equipment including the internet network would be an additional asset.

4.2. Human resource

The effective implementation of this syllabus needs a joint collaboration of educators at all levels. Given the material requirements, teachers are expected to accomplish their noble role as stated above. However, teachers should be equipped with a strong pedagogical content knowledge (PCK) and enough teaching experience. Furthermore, a science and elementary technology teacher should be creative and able to improvise since many of teaching aids can be found around the school and hand-made by the teachers themselves.

On the other hand, school head teachers and directors of studies should be trained on the use of Competence-based syllabus then, they will be able to make a follow-up and assess the teaching and learning of this subject due to their profiles in the schools. These combined efforts will ensure bright future careers and lives for learners as well as the contemporary development of the country.

Skills and attitudes required for the teacher of SET:

- Engage pupils in variety of learning activities,
- Apply appropriate teaching and assessment methods,
- Adjust instructions to the level of the learner,
- Creativity and innovation, makes connections/relations with other subjects,
- Show a high level of knowledge of the content,
- Develop effective discipline skills to manage adequately the classroom,
- Good communicator, Guide and counsellor,
- Passion for children teaching and learning.

5. SYLLABUS UNITS

5.1. Presentation of the Structure of the syllabus units

Science and Elementary Technology subject is taught and learned in lower and upper primary education as a core subject. At every grade, the syllabus is structured in Topic Areas, and then further broken down into Units. The units have the following elements:

1. Unit is aligned with the Number of Lessons.
2. Each Unit has a Key Unit Competence whose achievement is pursued by all teaching and learning activities undertaken by both the teacher and the learners.

3. Each Unit Key Competence is broken into three types of Learning Objectives as follows:

a. *Type I:* Learning Objectives relating to Knowledge and Understanding (*Type I* Learning Objectives are also known as Lower Order Thinking Skills or LOTS)

b. *Type II a*nd *Type III:* These Learning Objectives relate to acquisition of skills, Attitudes and Values (*Type II* and *Type III* Learning Objectives are also known as Higher Order Thinking Skills or HOTS) – These Learning Objectives are actually considered to be the ones targeted by the present reviewed syllabus.

4. Each Unit has a Content which indicates the scope of coverage of what a teacher should teach and learner should line in line with stated learning objectives

5. Each Unit suggests Learning Activities that are expected to engage learners in an interactive learning process as much as possible (learner-centered and participatory approach).

6. Finally, each Unit is linked to Other Subjects, its Assessment Criteria and the Materials (or Resources) that are expected to be used in teaching and learning process.

In all, the syllabus of Science and Elementary Technology for lower primary level has got 5Topic Areas (Elementary Technology, Our environment, Information and Communication Technology (ICT), The human body, Power and Energy. As for units, they are 9 in P1, 8 in P2 and 10 in P3.

5.2. Science and Elementary Technology for Primary One (P1)

Key Competences at the end of Primary One

At the end of P1, learner should achieve the following main competences:

- Explain the use of tools and materials that are used at home and at school;
- Make various toys, materials and teaching and learning aids;
- List and classify ICT basic tools and use a radio, telephone and television;
- Identify sources and importance of water, washing light clothes and clean raw food;
- Distinguish between domestic animals and wild animals that can be found in the area in which the school is built, their importance and also show an insect body parts;
- Differentiate cultivated plants and natural vegetation in the school area;
- Differentiate various types of wastes and the importance of cleaning our surrounding;
- Differentiate the main parts of human body, their functions and appropriate hygiene;
- Differentiate natural materials from artificial (man-made) materials.

P1 SET UNITS TABLE

Topic area: Elementary Technology				
Science and Elementary Technology: Primary One		**Unit 1: Materials and Tools used at home and at school**		**Number of periods: 12**
Key Unit Competence: Explain the use of tools and materials that are used at home and at school				
Learning Objectives				
Knowledge and understanding	**Skills**	**Attitudes and values**	**Content**	**Learning Activities**
• List materials used the most at school • Identify the groups of various tools and materials used at home. • List various items needed for cleaning home materials • Explain the importance of various tools and materials used at home.	• Differentiate materials used often at school depending on their uses. • Clean various objects used at school. • Group tools and materials used at home basing on their uses. • Clean various tools and materials used at home.	• Take good care of various materials used at school • Put back various school materials after using them. • Take good care of various tools and materials used at home. • Put back various tools and materials used at home in their appropriate place.	**School materials and their uses:** • Writing materials (pens and exercise books). • Drawing materials (pencils and drawing pads/ books, rubber, sharpener • Storing school materials (school bag, locker, desk, drawer) • Cleaning materials (soap, water, duster, bloom, bucket, basin…) • Reading materials • Time telling objects (Clock, bell, alarm) **Cleaning materials used at school**:	Learners: • Observe and touch various materials used at school. • Group discussions to find out the names and uses of materials used at school. • Clean various school materials. • Observe and touch various tools and materials used in their homes • Group discussions to discover the names and use of tools and materials used at home

			• Washing, wiping, sharpening pencils **Materials and Tools used at home and their uses:** • Kitchen and eating utensils (cooking pots, spoons, knives, table knives, forks, mugs, cups and plates. • Agricultural tools (for digging) • Storage materials at home (store, cupboard, boxes, shelves, tables... • Other objects/materials: clothing, sleeping materials etc. **Cleaning home tools and materials** (washing, dusting, wiping, mopping).	• Clean various tools and materials used at home

Links to other subjects: *P1 Social Studies: Our Village; Hygiene at Home and in the Village; Body and Clothes Hygiene.*

Assessment criteria: *Ability to correctly explain the usefulness of objects and utensils used at school and at home.*

Materials: *Pen, pencil, coloured pencils, chalk, coloured chalk, painting brush and paint,paper, a blackboard, a cupboard, a locker, a duster, water, manila paper, books, chairs, learning aids and materials, a table, plates, dishes, forks, cups, pans, a pounder/mortar, spoons, brooms, a basket, a mop, toilet paper, a hoe, a machete, a spiked hoe, a wheelbarrow, clothes, a knife, an iron bar, etc*

Topic area: Elementary technology				
Science and Elementary Technology: Primary One		Unit 2: Toys, various materials and teaching and learning aids		Number of periods: 10
Key Unit Competence: Make various toys, materials and teaching and learning aids				
Learning Objectives				
Knowledge and understanding	Skills	Attitudes and values	Content	Learning Activities
• Differentiate materials depending on their uses in making various toys and teaching aids. • Know and explain how a cow and person are moulded. • Know and explain how a toy airplane (kite) is made from paper, sticks and thread.	Make the following toys: • Paper airplane • Box • Ball made with local materials • Puppet glasses • Toy car • Moulding a cow and a person using clay or mud. • Making a toy airplane (kite) using paper, sticks and thread.	• Careful use of various materials such as razor blade, scissors and sorghum sticks to avoid getting hurt • Demonstrate interest and curiosity in making toys on his/her own instead of buying them. • Value the toys and teaching aids made and keep them safely and properly.	**Making toys, materials and teaching/learning aids:** • **In paper:** abox and an airplane • **In banana fibers:** a playing ball doll • **With Sorghum sticks:** Puppet glasses • **With hard paper boxes, bottle tops and sticks**: a car • **With plastic materials (plastic bag) sticks and thread:** a kite • **In clay**: cow, a person, dog	• Collect materials required to make a toy box and a toy airplane. • Make a toy ball and big puppet glasses • A toy car, a kite, • Mould a cow and a person • Play the following game: direct the ball with the foot.
Links to other subjects: Physical Education and Sports, Social Studies, Environment and Arts and Crafts				
Assessment criteria: Ability to perfectly make toys and teaching aids (a box, airplane, ball, puppet glasses and a car)				
Materials: Scissors, razor blade, paper, banana fibre, hard paper box, sorghum stalks, sticks, bottle tops, cello tape, clay, wet mud, plastic paper and a thread.				

Topic area: Elementary Technology				
Science and Elementary Technology: Primary One		**Unit 3: Basic ICT tools**		**Number of periods: 12**
Key Unit Competence: List and classify basic ICT tools and use a radio, telephone and television				
Learning Objectives				
Knowledge and understanding	**Skills**	**Attitudes and values**	**Content**	**Learning Activities**
• List basic ICT tools • Differentiate audio ICT tools (recorders and loud speakers) • Distinguish audio ICT tools from a television • Distinguish sound amplifiers from visual ICT tools (television, computer) • Explain the uses of audio ICT tools (sound amplifiers) and visual ICT tools	• Explain the uses, functioning and how to operate basic ICT tools • Differentiate recorders from loud speakers • Use loud speakers in a particular situation • Use a television by themselves. • Explain the use of a telephone, radio and television. • Switching on and switching off a telephone, radio and television	• Take care of loud speakers and television • Use loud speakers and television at appropriate time and in the right way • Show curiosity to know the use and how to use a telephone, radio and television • Have curiosity to know where sound and images are produced from • Be careful in using a telephone and a television	**Audio and visual ICT tools:** Radio, Television, Mobile phone, Landline telephone/ fixed telephone, computer, loud speakers, microphone, Camera. **Details about audio ICT tools** Radio, Telephone, loud speakers, Micro-phone. **Details about visual ICT tools,** Television, camera, computer	Learners: • Observe and share ideas about the difference between audio ICT tools and a television. • Share ideas on how to plug in to a power source different ICT tools (radio or television • To switch on or to switch off a radio, television, a phone, computer and a camera. • Share ideas on the use of telephone, radio, camera and television

• Provide explanations on a telephone, camera and ways of taking pictures & videos and recording sounds. • Show how to switch on and switch off a radio, how to change channels of a radio, how to increase or reduce volume of a radio • Show how to switch on or switch off a telephone	• Use a television and radio in daily life. • Keep properly a telephone, a radio and a television while and after using them.		**Telephone, Radio and Television:** • Uses • Operating them (switching on, switching off, changing channels, decreasing and increasing sound volume, inserting and removing batteries, plugging to the power source)	• In small groups, share ideas on the usefulness and usage of a telephone, radio and television

Links to other subjects: *Mathematics*

Assessment criteria: *Ability to correctly list different audio and visual ICT tools and use effectively a telephone, radio and television.*

Materials: *Radio, Television, Mobile phone, fixed telephone/ landline, computer, loudspeaker, microphone, camera*

Topic area: The Environment				
Science and Elementary Technology: Primary One	Unit 4: Water		Number of periods: 8	
Key Unit Competence: Identify sources and importance of water, washing light clothes and clean raw food				
Learning Objectives				
Knowledge and understanding	Skills	Attitudes and values	Content	Learning Activities

• Name different sources of water
• List types of water: clean water and dirty water.
• Explain the importance of water
• Explain how to wash light clothes
• Explain how to wash raw vegetables and fruits.
	• Identify different sources of water
	• Demonstrate steps in washing clothes and cleaning raw food.
	• Washing own handkerchief
	• Washing hand towel
	• Washing one's socks
	• Cleaning vegetables
	• Cleaning sweet potatoes, irish potatoes or carrots.
		• Curiosity about water sources
		• Conserve different water sources
		• Demonstrate cleanness of clothes
		• Always clean raw foods and sensitise others.
			• Sources of water
			• Types of water
			• Importance of water
			• Steps followed while washing clothes
			• Steps followed when cleaning raw food.
				Learners
				• Visit different water sources and discuss about them in groups in order to know those water sources.
				• Brainstorm about water sources
				• Washing light clothes such as handkerchief, underwear, hand towel, socks, cleaning raw food (sweet potatoes, Irish potatoes, carrots, vegetables.
				• Play the following game:
				  Running while carrying water.
				  Drinking clean water.

Links to other subjects: *Social studies, P1: our house; body hygiene and clean clothes; cleanness at home and in the community (Village level/ umudugudu).*				
Assessment criteria: *Ability to correctly distinguish sources of water, list its importance, appropriately clean cloths and different types of food.*				
Materials: *Streams, rivers, lakes, dams, dirty water, clean water; tools required for cleaning raw food, basin, soap, handkerchief, hand towel, socks, sweet potatoes, Irish potatoes, carrots and vegetables.*				

Topic area: Environment				
Science and Elementary Technology: Primary One		**Unit 5: Animals**		**Number of periods: 4**
Key Unit Competence: Distinguish domestic animals from wild animals that can be found in the area in which the school is built, their importance and also identify an insect main body parts.				
Learning Objectives				
Knowledge and understanding	**Skills**	**Attitudes and values**	**Content**	**Learning Activities**

• Name different animals found in the school area
• Name different insects found in the school area
• Identify and show the body parts of insects
• List different domestic animals and wild animals with their roles in environment.
	• Distinguish between domestic animals and wild animal characteristics
	• Show differences that exist between different insects based on their body parts.
		• Awareness about domestic and wild animals
		• Interest in knowing different insects with their body parts.
			Types of animals
			• Domestic animals
			• Wild animals: Insects with their body parts
			Importance of domestic and wild animals
				Learners:
				• Discuss in groups with the aim of differentiating different animals, where they live and their roles/importance in the environment.
				• Play the following games:
				  Animals' homes/ shelters
				  Guess which animal is it?
				  Let's mime animals
				• Collect selected insects and keep them in transparent bottles.
				• Observe / touch those insects to see their body parts.

				• Compare and sort insects based on their body parts. (For example insects with or without wings, those with many or few legs)
				• Discuss in groups while naming different insects and their body parts.
				• Play the following game: "The spider"

Links to other subjects: *Agriculture, Biology*

Assessment criteria: *Ability to correctly distinguish domestic animals from wild animals found in the school area, their importance and also identify insects' body parts.*

Materials: *Cow, sheep, goat, rabbit, dog, Pig, duck, bat, mice, chicken, lizard, fish, snake,fly, butterfly, bee, mosquito, mole rat, pictures of animals that cannot be found, a transparent bottle.*

Topic area: Environment				
Science and Elementary Technology: Primary One	**Unit 6: Plants**			**Number of periods: 6**
Key Unit Competence: Differentiate cultivated plants and natural vegetation in the school area				
Learning Objectives				
Knowledge and understanding	**Skills**	**Attitudes and values**	**Content**	**Learning Activities**
• List plants found in the school area. • List the cultivated plants and non-cultivated plants.	• Group plants in cultivated plants and non-cultivated plants.	• Develop curiosity to learn groups of plants found in the school area.	Types of plants: • Cultivated plants: Beans, maize, sorghum, banana plants, eucalyptus, tea, coffee, pear, avocado • Non-cultivated plants (Natural vegetation)**:** *Acanthus pubescens* (Ibitovu),Black jack (inyabarasanya), African basil (Umwenya), goat apple (Intobo),Black berries (Inkeri), Aloe vera (Igikakarumba), Shittim wood (Umugenge), Monkey rope (Umufatangwe), Garlic (Igitungurusumu)	Learners • Visit the school surrounding to collect different types of plants which grow in the area. • Uproot some plants of different types and bring them to school • Discuss about plants and group them based on whether they are cultivated or not cultivated.
Links to other subjects: Agriculture, Biology, Environmental Science				
Assessment criteria: Ability to correctly name plants and their groups (cultivated plants, non-cultivated plants) from the school area.				
Materials: *Beans, maize, sorghum, banana plants, , Acanthus pubescens* (Ibitovu) *scotch grass (umucaca), eucalyptus (Inturusu),Acanthus pubescens* (Ibitovu), *euphorbia, tea, , black jack,* African basil (umwenya), Aloe vera (igikakarumba), Wondering jew (Uruteja)Ginger (Tangawizi), Knob wood (Ntareyirungu)				

Topic area: Environment				
Science and Elementary Technology: Primary One		Unit 7: Waste and Hygiene		Number of periods: 7
Key Unit Competence: Differentiate various types of wastes and the importance of cleaning our surrounding				
Learning Objectives				
Knowledge and understanding	Skills	Attitudes and values	Content	Learning Activities

• Explain the different categories of wastes and how best they can be managed.
• State advantages of hygiene.
	• Sweep /remove wastes and putting them in dustbins
	• Make use of broomstick, mopping rag, a piece of cloth or sponge
		• Get used to sorting different wastes
		• Avoid being cut by metallic items or broken bottles which have been thrown away.
		• Able to clean the surrounding
			Categories of wastes:
			 * Decomposing waste
			 * Non decomposing waste
			Waste that can be burnt
			Waste that can't be burnt
			Toxic wastes
			 Ways of managing wastes
			 Ways of cleaning a home and its surrounding
			Importance of cleaning our surrounding:
			*Avoiding diseases caused by lack of hygiene.
			 * Look clean
				Learners:
				• Clean/ remove wastes from within and around the school.
				• Sort wastes according to their types: Waste that can decompose and Waste that can't decompose
				• Cleaning the school and its surroundings: to sweep, removing wastes, collecting wastes, mopping, washing window/door glasses,
				• Discuss and find out the importance of hygiene
				• Play the following games:
				  * Collecting wastes
				  * Let's do cleaning
				  * A good environment/place

Links to other subjects: Social studies, P1 hygiene at home, in the village and in the environment				
Assessment criteria: Ability to do hygiene within environment. For example cleaning.				
Materials:Water, broomstick, towel, soap, sponge, compost pit, mopping rag.				

Topic area: The human body				
Science and Elementary Technology: Primary One		**Unit 8: The Human Body**		**Number of periods: 7**
Key Unit Competence: Differentiate the main parts of human body, their functions and appropriate hygiene.				
Learning Objectives				
Knowledge and understanding	**Skills**	**Attitudes and values**	**Content**	**Learning Activities**
• Identify the main parts of the human body. • List the functions of the parts of human body • - Explain how to clean the main parts of the human body.	• Show the main parts of the human body. • Compare the functions of the main parts of the human body • Make use of water and soap to clean one's body. • Practice physical exercises	• Awareness about one's main body parts and their functions. • -Keep clean • Get used to bathing every day. • Develop the discipline of practicing physical exercises every day.	Main parts of human body: Head, Trunk, Arms and legs The functions of main human body parts. Taking care of human body parts: * Cleanness: taking a bath, washing hands focusing on nails, * Brushing teeth, * Physical exercises.	**Learners:** • Observe/touch the main human body parts • Discuss to find out the functions of body parts • Play the following games: * Simon says, * Using sensory organs, * Miming animals, * Make the king laugh • Discuss to find out how human body parts can be cleaned • Taking a bath/shower (whole body) or clean some parts of the body: Washing hands and nails, Brushing the teeth

				• Do physical exercises
				• Play the following game: Cleaning one's hands properly

Links to other subjects: *Biology: the human body, Physical Education and sports; Social studies, P1/ Body and clothes hygiene.*

Assessment criteria: *Ability to correctly list and show the main human body parts and explain their functions and how they should be cleaned.*

Materials: *Photos and pictures that show the main human body parts, water, basin and soap, ball, jump rope/skipping rope, tooth brush, tooth paste*

Topic area: Resources and state of materials					
Science and Elementary Technology: Primary One		**Unit 9: Natural and artificial materials**			**Number of periods: 4**
Key Unit Competence: *Differentiate natural materials from artificial (man-made) materials*					
Learning Objectives					
Knowledge and understanding	**Skills**	**Attitudes and values**	**Content**		**Learning Activities**
• Define natural materials • List some natural materials • List some artificial materials	• Differentiate natural materials from artificial materials.	• Demonstrate curiosity to know the difference between natural materials from artificial materials	• Natural materials: • Soil, stones, wood, water, minerals, wool, animal skin and fur, sand, clay • Artificial materials (man- made materials): Various buildings, ship, fork, plate, soap, glass, paper, cement, car, roads, bridges,		Learners: • Discuss to find out various natural resources and artificial (man-made) materials. • Sort out various natural resources and man-made materials.
Links to other subjects: *Physics: State of matter*					
Assessment criteria: *Ability to correctly differentiate natural resources from artificial (man-made) materials*					
Materials: *Soil, stones, wood, water, minerals, wool, animal skin and fur, sand, clay,various buildings, cars, roads, bridges, ship, fork, plate, soap, glass, paper, cement.*					

5.3. Science and Elementary Technology for Primary Two (P2)

Key Competences at the end of Primary Two

At the end of P2, a learner should achieve the following main competences**:**

- Use and keep properly tools used at home and at school;
- Make toys, various materials and teaching and learning aids;
- Differentiate the key parts of the computer and use properly the computer;
- Recognise the presence of air and explain its characteristics, importance and differentiating the types of wind, its effects and how to prevent its dangers;
- Explain the importance of soil, things that destroy soil and effects of water on soil;
- Identify different parts of plant, their functions and differentiate groups of plants depending on their uses;
- Discover the sources of light and heat and the relationship between light and the shadow;
- Identify the human sensory organs, their functions and hygiene.

PRIMARY TWO UNITS TABLE

Topic Area: Elementary Technology					
Science and Elementary Technology, Primary Two		Unit 1: Tools and materials used at home and at school			Number of periods: 6
Key Unit Competence: Use and keep properly tools used at home and at school					
Learning Objectives					
Knowledge and understanding	Skills	Attitudes and values	Content		Learning Activities
• Explain the use of various home tools and materials. • Explain the uses of various tools and materials used at school	• Differentiate tools and materials used at home according to their uses. • Clean the kitchen and dining utensils. • Clean properly home tools and materials. • Differentiate tools used at school and their uses. • Proper use of writing materials • Proper use of materials to be written on. • Proper use of other various materials used at school	• Taking good care and hygiene of home tools and materials. • Take initiative of cleaning and caring of materials used at home • Prevent possible accidents caused by home tools and materials. • Taking good care of tools and materials used at school • Take initiative of cleaning and caring for materials used at school • Carry notebooks in school bag	Home tools/materials and their uses: • Kitchen and dining utensils • Agricultural (garden) tools • Storing materials at home • Caring and cleaning of home tools and materials. School materials and their uses: • Writing and drawing materials • Materials to write on. • Storing materials at school • Cleaning materials		• Recall the home tools/materials and their uses • Bring at school some home materials • Properly clean the home tools and materials • Clean the dining utensils - Group discussions to find out the functioning of every school material • To clean the writing board

	• Cleaning the writing board • Covering notebooks • Sharpening the pencils	• Keep the school materials in the allocated places	• Other materials Caring and cleaning of school materials.	• To cover the notebooks • To sharpen pencils • To wash and clean the chairs/desks • To write using a pencil • To write using a colored pen

Links to other subjects: Social studies, P2: Social Studies (Our school), P1: Our house; Hygiene of our homes and village

Assessment criteria: Ability to effectively use and properly keep tools and materials used at home and at school

Materials: Water, soap, wet and dry sponge, chairs, pens, pencils, chalks, duster, writing board, cupboard, table, notebook, sharpener and a rubber.

Topic Area: Elementary technology				
Science and Elementary Technology, **Primary Two**		**Unit 2: Toys, various materials and teaching and learning aids**		**Number of periods: 8**
Key Unit Competence: Make toys, various materials and teaching and learning aids				
Learning Objectives				
Knowledge and understanding	**Skills**	**Attitudes and values**	**Content**	**Learning Activities**
• Explain how to make an airplane toy (kite), a bird sculpture toy and a goat sculpture toy. • Explain how to make geometric figures (square, rectangle) airplane toy, car toy, wall clock toy hanged in homes.	• Make a bird and geometric figures (square, rectangle) • Make an airplane toy using papers • Make a car toy, • Make a wall clock toy • Make a bird sculpture and goat sculpture using clay.	• Prevent them from using sharp materials (razors, scissors, sorghum sticks…) • Develop curiosity and willingness to make toys themselves instead of buying them • Value the fabricated toys and properly keep them.	Toys and materials production: • In papers: bird, geometric figures (square, rectangle) • In sorghum sticks, tree sticks and papers: airplane toy, car toy. • In boxes waste: Wall clock toy • In plastic (empty plastic bottle): airplane toy • In clay: Bird sculpture, goat sculpture.	• Make bird toy, geometric figures (square, rectangle) using paper • Make airplane and car toys using sorghum sticks, tree sticks and papers • Make a wall clock toy using boxes • Make airplane using empty plastic bottle • Make a bird and goat using the clay.
Links to other subjects: *Physical Education and Sports, Social Studies: Environment, Creative arts and performance.*				
Assessment criteria: *Ability to perfectly make toys, various materials and teaching and learning aids:* Bird, geometric figures (square, rectangle),airplane toy, goat, car toys *and the clock.*				
Materials: *Pair of scissors, razor blade, papers, boxes, sorghum sticks, tree sticks, glue, plastic bottle.*				

Topic Area: Information and Communication Technology (ICT)			
Science and Elementary Technology, Primary Two	Unit 3: Computer my Friend		Number of periods: 12
Key Unit Competence: Differentiate the key parts of the computer and use appropriately the computer			
Learning Objectives			

Knowledge and understanding	Skills	Attitudes and values	Content	Learning Activities
• Name the external parts of a computer • Explain the functions of computer parts • Explain how to maintain a computer and the health habits to its user.	• Identify the external parts of a computer and explain their functions. • To put into practice the strategies for avoiding dangers caused by improper use of computers • To follow the proper instructions while using a computer and after using it.	• Properly take care of computer parts. • Show curiosity to use a computer. • Display a sense of awareness of the dangers associated with using computers plugged to an electrical power source.	• Main external parts of a computer (desktop, laptop, XO laptop) • Maintenance of a computer • Functions of main parts of a computer (XO Laptop) • proper sitting posture while using a computer • Dangers of improper sitting posture while using a computer.	• Group discussions intended to list external parts of the computer and their functions. • Play the following games: Manzi/Mukamanzi says-Exercise theproper sitting posture while using a computer • Discuss dangers of improper sitting posture on life while using a computer.

Links to other subjects: Mathematics, *English*	
Assessment criteria: *Ability to correctly list the main external parts of a computer, explain their functions and proper use of the computer.*	
Materials: Computer (desktop, laptop, XO laptop computers)	

Topic Area: Environment				
Science and Elementary Technology, Primary Two		Unit 4: Air and wind		Number of periods: 8
Key Unit Competence: Recognise the presence of air and explain its characteristics, importance and differentiating the types of wind, its effects and how to prevent its dangers.				
Learning Objectives				
Knowledge and understanding	**Skills**	**Attitudes and values**	**Content**	**Learning Activities**
• Identify and explain the characteristics of air • List the importance of air in daily life • Explain the relationship between air and wind • Identify the types of wind • Explain the importance of air and wind in the environment • Explain the dangers of wind and how to prevent them.	• Find out the existence of air • Compare the effects of air and wind on environment • Prevent the dangers of wind in the environment (schools, homes, hospitals…)	• Display curiosity of learning the importance of air • Appreciate the importance of air in our environment	• Main characteristics of air: Air occupies space, has no shape, has no color and has no smell. • Importance of air to living organisms, vehicles, to light fire. • Relationship between air and wind • Types of wind: Light(slow) wind**,** breeze(moderate) wind**, strong** (storm) wind and speedy(cyclone)wind • Advantages and disadvantages (effects) of wind**:** Drying clothes, creating cool environment, provide fresh air, destroy plants and houses.	• In groups of two: pumping the ball to prove the presence of air, to wind up a paper using a fan • Practical work: Demonstrate that in the said empty bottle there is air. To pump air using bicycle pump and try to block its end using finger. • Practical work to demonstrate the characteristics of air using bicycle pump, balloons, plastic bottle, air pump: * To fill the balloons or plastic bottle with air, seal well and press all sides * To pump air into the ball, balloons or bicycle tyre * To observe the air in a trans-parent bottle

			• Prevention of dangers of wind: Building fences, planting trees in our environment	* To smell the air in a bottle or in the classroom • Discuss in small groups the relationship between air and wind • Discuss in small groups and identify the use of air in the daily life • Use the fan to prove the presence and force of wind • Discuss in small groups to identify types of wind, its effect on environment and how to prevent them

Links to other subjects: *Social studies***:** *weather; Biology: Respiratory system; Physics: State of matters*

Assessment criteria: *Ability to correctly identify and explain the characteristics of air, its importance and differentiate the types of wind and how to prevent its dangers.*

Teaching aid: *Bicycle pump, transparent bottle, bucket filled with water, fan (Agahungizo), balloons, plastic bottle, ball, bicycle tyre*

Topic Area: Environment				
Science and Elementary Technology, Primary Two		Unit 5: Soil		Number of periods: 10
Key Unit Competence: Explain the importance of soil, things that destroy soil and effects of water on soil				
Learning Objectives				
Knowledge and understanding	Skills	Attitudes and values	Content	Learning Activities
• Identify types of soil • List and explain uses of soil • List the things that destroy soil • List advantages and disadvantages(effects) of water on soil • List measures to prevent soil damage	• Discover the various types of soil • Differentiate the uses of soil depending on their types	• Appreciate the importance of water on soil	**Types of soil**: Loam, clay and sand **Uses of soil** (According to their types) • **Loam:** cultivation (growing of crops), insulating, building • **Sand:** building • **Clay:** Making bricks, pots, decorations, cementing. **Things that destroy soil** • Rain water, wind (storm) • Fire, non-degradable wastes (wastes which do not rot). **Advantages and disadvantages of water on soil** **Advantages (good effects)** • Watering the soil for cultivation **Disadvantages (bad effects)**	• To visit various sites in the school environment with different soil types and take different soil samples depending on different soil types. • Discuss and explore on different types of soil identified in visited area and state their uses (observe, touch, wet, make bricks…) • To visit the area affected by erosions and discuss in groups the advantages and disadvantages of water on soil (observe, touch)

			• Heavy rain causes some narrow wavy channels on the land • Water washes away fertile soil due to soil erosion	

Links to other subjects: *Agriculture (Soil science), Social Studies, Environment*

Assessment criteria: *Ability to correctly identify different types of soil, its uses and factors that lead to its degradation*

Materials: *Different types of soil, water, hoe, pictures and photos of soil, various sites where erosions occurred.*

Topic Area: Environment				
Science and Elementary Technology, Primary Two		Unit 6: Plants		Number of periods: 8
Key Unit Competence: Identify different parts of plant, their functions and differentiate groups of plants depending on their uses				
Learning Objectives				
Knowledge and understanding	Skills	Attitudes and values	Content	Learning Activities
• List parts of a plant • Explain the functions of each part • Identify groups of plants according to their uses. • List the importance of plants	• Differentiate all parts of a plant • Grouping plants according to their uses.	• Display curiosity in differentiating parts of a plant according to their uses. • Appreciate the use of the plant • Understanding the use of every plant found in the school area.	• **Parts of the plant**: Roots, Stem (and branches), leaves, flowers, fruits. • **Groups of plants:** Food crops, Cash crops • **Uses of plants**: Medicinal plants, Ornamental plants (for decoration), Plants for fire wood and Timbers, Fencing plants.	• Uproot different plants carefully and bring them to school (young plants, flowering plants, plants with fruits) • Discuss in groups with aim of identifying parts of the plant and functions of every part to the plant • Discuss and group plants according to their uses.
Links to other subjects: *Biology (Botany; study of Plants))*				
Assessment criteria: *Ability to correctly identify parts of plant, their functions and differentiate plant groups according to their uses.*				
Teaching aid: *Various plants from the school area, Well drawn and named plant charts*				

Topic Area: Energy				
Science and Elementary Technology, Primary Two		Unit 7: Light and heat		Number of periods:14
Key Unit Competence: Discover the sources of light and heat and the relationship between light and the shadow				
Learning Objectives				
Knowledge and understanding	Skills	Attitudes and values	Content	Learning Activities
• List the sources of light • Identify the relationship between darkness and light • Identify the source of shadow • Explain the advantages and disadvantages of light • List the sources of heat • Explain the advantages and disadvantages of heat • Identify the types of thermometers	• Identify the sources of light and the sources of heat • Differentiate darkness and shadow • Compare the length of shadow according to the time of day (morning, midday and evening) • Estimate time by observing the shadow	• -Prevent accidents caused by heat • Prevent dim and brightest light while reading • Avoid looking at the sun without recommended e glasses • Develop the discipline to avoid the dangers of light and heat • Prevent accidents caused by heat and light • To develop the skill of	**Light, darkness and shadow** • Sources of light • Meaning of darkness • Relationship between light and the shadow • Importance of light • Bad effects of dim and brightest light **Heat** • Sources of heat • Importance of heat	Group discussion to find out: • Various sources of light • Importance of light • Proper behaviour to avoid the dangers of dim and brightest light • To make a dark room using opaque materials like clothes • Produce a shadow using the source of light (torch light, candle light) • Measure the height of the shadow of a tree in the school environment and at different hours of the day (morning, midday, evening) • Group discussion to find out the difference between darkness, shadow and light. • Experiment: To put on different sources of light (candle, spirit lamp, electrical bulb) with the purpose of finding out the relationship between sources of light and sources of heat.

• Explain the use of the thermometer • Explain the relationship between the sources of light and sources of heat • List the dangers of heat and light.	• Establish the relationship between the sources of light and sources of heat • Use properly the objects or sources of light and sources of heat • Measure the body temperature using the clinical thermometer • Prevent dangers of light and heat.	measuring body temperature using clinical thermometer without any help • To develop the culture/habit of regularly measure his/her body temperature.	• Dangers of heat • Types of thermometers (clinical thermometer, laboratory thermometer, meteorological thermometer)	• Group discussion to find out sources of light which are not sources of heat. • Experiment to establish the difference/relationship between the light and heat using candle, spirit lamp and electric bulb. • Group discussions to find out the advantages and dangers of heat • Group discussion on how to prevent the dangers of heat • Use a clinical thermometer (Calibrate the thermometer before using it, put it under arm pit, wait for at least two minutes, read the temperature), compare temperature readings for different pupils. • Measure the temperature of various objects (air, soil, water) during different hours of the day (morning, mid-day, evening) and compare the readings.

Links to other subjects: *Physics (Energy), Mathematics*

Assessment criteria: *Ability to correctly establish the relationship between the sources of light and heat and prevent the dangers of heat and light*

Teaching aid: *Sun, torches, fire, candles, spirit lamp, petrol lamp, electric lamp/bulb, matchbox, gas lamp, fire wood, boxes, opaque curtains, ruler, moon, stars, thermometers, pens, papers, soil, boiling water.*

Topic Area: Human body				
Science and Elementary Technology, Primary Two		Unit 8: Human Sensory organs		Number of periods:6
Key Unit Competence: Identify the human sensory organs, their functions and hygiene.				
Learning Objectives				
Knowledge and understanding	Skills	Attitudes and values	Content	Learning Activities
• List the human sensory organs • Explain functions of human sensory organs • Explain how to take care of sensory organs	• Detect and recognise various sounds, colours, smells and kinds of taste.	• Develop good and proper behaviours for taking care of the human sensory organs	• Human sensory organs: eye, ear, tongue, skin, nose • Functions of the sensory organs: Sight (seeing) (e.g., identification of people, objects and colors, dangerous and pleasant things in the environment) Hearing (different sounds and their effect on the listener) Tasting (distinction between desirable and unpleasant things to chew or swallow) Smelling (nice or nasty effect on the breathing person) Touching (detect contact with pleasant, unpleasant and dangerous objects in the environment, protecting the human body, regulate the human body temperature)	• Observe various objects in the classroom and identify their colours • Make noise and sound in the classroom and pupils detect the source and cause. • Smelling on different objects: flowers, body lotions, washing soap, perfume and identity the object according to its smell. • Identify objects by touching it with child's eyes closed. • Differentiate foods and drinks according to their tastes. • Share ideas on how to keep healthy human sensory organs.

			• Ways of keeping human sensory organs healthy	• Play the following game: Manzi/Mukamanzi says, touch your ….(name of sensory organ).

Links to other subjects: Biology (The human body)
Assessment criteria: Ability to correctly differentiate human sensory organs and provide their functions
Materials: Human body sensory organs: eye, ear, tongue, skin, nose, sugar, salt, water, spoons/spatulas and cups.

5.4. Science and Elementary Technology for Primary Three (P3)

Key Competences at the end of Primary Three

At the end of P3, learner should achieve the following main competences:

- Make various toys, materials and teaching and learning aids;
- Use mobile phone in calling, sending short messages and in ICT in general;
- Perform Typing turtle and Write activity, take picture, videos and record sound by using Record activity;
- Prepare and store drinking water;
- Identify types of soil, types of erosion and prevent soil erosion;
- Differentiate types of animals based on the backbone;
- Explain the relationship between Joints, Muscles and Bones and how to maintain their health;
- Explain different types of Power/energy;
- Identify different electronic devices and the use of electricity;
- Discover magnetic forces and characteristics of a magnet and distinguish between magnetic and non-magnetic objects.

P3 UNITS TABLE

Topic area: Elementary Technology				
Science and Elementary Technology: Primary Three		Unit 1: Toys, basic materials and teaching aids		Number of periods: 6
Key Unit Competence: Make various toys, materials and teaching and learning aids				
Learning Objectives				
Knowledge and understanding	**Skills**	**Attitudes and values**	**Content**	**Learning Activities**
• Explain how to make a duster, neck scarf, mat, school bag and geometry figures (square, rectangle, triangle) • Explain how to make a car in wires and mould a pot in clay.	• Knit a chalk board duster • Knit a mat and school bags • Knit a neck scarf • Make figures (square, rectangle, and triangle) in papers and boxes • Making a car in wires • Moulding a pot	• Pay attention when using materials that might harm and hurt. (razorblade, scissors, needle, crochet and wires) • Show interest and curiosity in making toys instead of buying them. • Value toys and teaching aids made and properly keep them.	• Making a chalk board duster and neck scarf (Using single and complex loops) in threads or in pieces of clothes. • Weaving a mat, school bags in grasses and banana fibers. • Make figures (square, rectangle and triangle) using papers or boxes • Moulding a pot using soil clay. • Make a car in wires.	• Make a chalk board duster and a neck scarf using fibres • Knit a mat and a school bag in grasses or in banana fibres • Make figures (square, rectangle and triangle) using papers or boxes • Make a car in wires. • To mould a pot using soil clay.
Links to other subjects: Physical education and sports, Social studies, environments, household chores/housework, mathematics, geometry, and creative arts.				
Assessment criteria: Ability to perfectly make chalk board duster, neck scarf, a mat, school bag and geometric figures (square, rectangle, and triangle), a car in wires and moulding a pot in soil clay				
Materials: Needles, crochet (for knitting), threads (small and big), pieces of clothes, cotton, scissors, razor blade, papers, banana fibres, boxes, grasses, clay, stone clay, broken piece of a pot, water, wires, plastic materials which can provide tyres (example: bottle covers).				

Topic Area: Information and Communication Technology (ICT)					
Science and Elementary Technology: Primary Three		**Unit 2: Use of telephone**			**Number of periods: 8**
Key Unit Competence: Use mobile phone in calling, sending short messages and in ICT in general					
Learning Objectives					
Knowledge and understanding	**Skills**	**Attitudes and values**	**Content**		**Learning Activities**
• Name the parts of a mobile phone keypad. • To place calls and save telephone numbers. • To check phone contacts, dialed calls, received calls and missed calls in his/her mobile phone. • To take and save pictures using a mobile phone. • Use telephone to buy goods and services, pay and send money using a mobile phone	• Identify the main parts of mobile phone keyboard. • Call and write short messages, send and receive short messages using a mobile phone • Follow the procedure to take and save pictures using a mobile phone • Follow the procedure to buy goods and services, pay and send money using a mobile phone.	• Be excited and curious to learn how to use mobile phone in different activities. • Appreciate all the mobile phone technologies.	• The parts of phone keypad • Typing, sending and receiving short messages • Saving numbers and calling • Taking pictures and recordings • Mobile phone based transactions (Mobile Money, Tigo Cash, Electricity buying, buying TV subscription like Star Times).		• Pupils identify the various parts of a telephone keypad. • Pupils do exercises on writing and reading short messages. • Pupils do exercises on writing a telephone number, saving it, searching and calling it. • Pupils do exercises on saving a received call number or missed call number. • Pupils do exercises for buying things, paying and sending money using a telephone.
Links to other subjects: *Mathematics*					
Assessment criteria: U*se conveniently a mobile telephone in calling and sending short messages and use it in different mobile phone based transactions.*					
Materials: *Mobile phone*					

Topic Area: ICT					
Science and Elementary Technology: Primary Three		**Unit 3: Computer my Friend**			**Number of periods: 7**
Key Unit Competence: Perform Typing turtle and Write activity, take picture, videos and record sound by using Record activity					
Learning Objectives					
Knowledge and under-standing	Skills	Attitudes and values	Content		Learning Activities

• Identify the parts of computer Keyboard in Typing Turtle
• Identify parts of text Editor in Write Activity of an XO Laptop.
• Identify different ways of text formatting (font size, font colours, and underline a word)
• Identify special keys of an XO laptop keyboard used in Write Activity
• Identify the parts of a computer used to take pictures, to record an audio and to take a video
• Explain how to take pictures, record sounds and videos
	• Type a letter (upper and lower case letter) and use special keys found in Typing Turtle
	
	• Differentiate the Toolbar and Text area parts of the Write Activity program
	• Use keyboard to type letter, words, and sentences in the Text area of the Write activity of an XO laptop
	• Format text (font size, font colour, font type, and underline a word)
		• Be interested in using a computer.
		• Be motivated in using a computer to write texts.
		• Be curious in using the Toolbar and Text area of the Write activity
		• Enjoy taking self-photos and taking other people's photos,
		• - Be more interested in using ICT tools especially computers.
			Program to use the keyboard (Typing Turtle activity):
			 * Parts of an XO laptop keyboard.
			 * Letters, special characters and signs used in Typing activity.
			
			Write activity:
			  • Parts of the Write activity toolbar.
			  • Parts of the keyboard.
			Parts of XO laptop for Record activity:
			• Taking pictures
			• Recording sounds
			• Taking videos
					• Exercise on Typing a letter and word in Typing Turtle.
					• Exercise on typing a text containing capital and small letters in Typing Turtle.
					• Practical exercises on using special characters found on the keyboard in The Write Activity program.
					• Practical exercise on writing letters, syllables words, sentences and paragraphs in the Write activity.
					• Exercises on text formatting (font colour, font size, font type and underline)
					• Exercise on taking pictures, recording audio and video in Record activity.

			Rename and delete:	• Exercise on deleting and
• Explain how to name, delete photos, audio and videos.	• Take a photo, record sound and video, • Open, rename and delete a picture, sound and video.		**Rename and delete:** • A photo • Sound • Picture	• Exercise on deleting and renaming records in record activity.

Links to other subjects: Mathematics
Assessment criteria: Write and format text using XO laptop programs, Properly take pictures and audio using an XO laptop
Materials: XO Laptop

Topic Area: Our Environment			
Science and Elementary Technology: Primary Three	Unit 4: Drinking Water		Number of periods: 4
Key Unit Competence: Prepare and store drinking water			
Learning Objectives			

Knowledge and understanding	Skills	Attitudes and values	Content	Learning Activities
• Explain ways of preparing drinking water • Explain ways of storing drinking water	• Proper cleaning of utensils/materials for storing water. • Boil/prepare drinking water. • Use detergent (Sur'Eau) in water to kill germs. • Store well boiled water.	• Have discipline of always drink well boiled / clean water. • Get used to properly store drinking water.	**Preparation of drinking water by:** • Boiling water • Filtering water • Using disinfectant (Sur'Eau) for cleaning water. **Store drinking water:** • Put drinking water in well cleaned materials/utensils for • Proper handling of drinking water.	• Clean materials/utensils for storing water. • Boil water in a metal dish/ saucepan. • Put detergent in water for cleaning. • Proper storing of water

Links to other subjects: Biology: Small insects; Social Studies: Home Hygiene and village Hygiene

Assessment criteria: Ability to correctly prepare and store drinking water.

Teaching aid: Detergent (example; Sur'eau), Saucepan, stove and charcoal, Jerry can, bottle, cup, water filter, water and a matchbox.

Topic Area: Our Environment				
Science and Elementary Technology: Primary Three	Unit 5: Soil		Number of periods: 10	
Key Unit Competence: Differentiate types of soil, types of erosion and prevent soil erosion.				
Learning Objectives				
Knowledge and understanding	Skills	Attitudes and values	Content	Learning Activities
• Identify types of soil. • Identify and explain the types of erosion. • Identify methods and techniques to prevent erosion	• Differentiate types of soil • Differentiate types of erosion. • Prevent soil erosion around my home and school.	• Contribute in prevention of soil erosion around home and school. • Appreciate different ways of preventing soil erosion around the environment	**Types of soil:** Loam, clay and sand **Types of erosions:** Splash erosion and Wind erosion Sheet erosion and Rill erosion Gully erosion and Tunnel erosion **Ways of preventing soil erosion:** • Mulching • Terracing • Planting trees and forest. • Constructing dam and wells to avoid erosion	• School visit in various areas that show clearly each type of soil • School pupils do field trips in areas with signs of erosion • Group discussions intended to differentiate types of soil erosion (observe/touch) • Visiting areas to find various methods of soil erosion prevention and then have group discussions to talk about the observations made. • **Project:** Practice the following activities in the school gardens as measures for preventing and controlling soil erosion: • Plant threes, • Make terraces, • Mulching (gusasira).
Links to other subjects: Agriculture/soil; Social studies, environment				
Assessment criteria: Ability to correctly identify types of soil erosion and prevent erosion				
Teaching materials: Hoes, spades, grasses for planting, grasses to be used for terracing.				

Topic Area: Our Environment				
Science and Elementary Technology: Primary Three	Unit 6: Animals			Number of periods: 6
Key Unit Competence: Differentiate types of animals based on the backbone				
Learning Objectives				
Knowledge and understanding	Skills	Attitudes and values	Content	Learning Activities
• List all the animals surrounding our environment	• Distinguish between animals with a backbone (Vertebrates) and animals without backbone (Invertebrates)	• Show interest in knowing animals with or without backbone living in surrounding environment.	• Vertebrates/ Animals with a Backbone: Cow, Hen, Lizard, Rabbit, Sheep, Goat, Dog, Pig, Duck, Bat, Rat, Fish, Snake, Mole, Toad, … • Invertebrates/ Animals without Backbone: Housefly, Butterfly, Bee, Mosquito, maggot, Earthworm, Black Ant.	• Visit a place where animal reared with an aim of identifying vertebrates in the school area. • List down examples of Vertebrates and Invertebrates. • Group discussion to identify Vertebrate and Invertebrate animals using pictures and photos of different animals living within our Environment.
Links to other subjects: *Biology: Vertebrates and Invertebrates.*				
Assessment criteria: *Ability to distinguish between animals with a backbone(vertebrates) and animals without a backbone (Invertebrates)*				
Teaching aids: *Cow, sheep, Goat, rabbit, Pig, Duck, bat, rat, Hen, Lizard, fish, snake, housefly, Butterfly, bee, mosquito, mole rat… pictures, photos of animals that cannot be easily obtained.*				

Topic Area: Human Body				
Science and Elementary Technology: Primary Three		**Unit 7: Muscles and Bones**		**Number of periods: 8**
Key Unit Competence: Explain the relationship between Joints, Muscles and Bones and how to maintain their health				
Learning Objectives				
Knowledge and understanding	**Skills**	**Attitudes and values**	**Content**	**Learning Activities**
• Identify the major human body bones • Identifying the major muscles of human body. • Explain ways of maintaining healthy Joints, Muscles and Bones.	Distinguish between joints, Muscles and Bones of Human Body	• Be curious and excited on how to keep and maintain healthy muscles, bones and joints.	**Joints, Muscles and Bones:** • **Definition of human body joints**. • **Human Body Bones:** Bones of the Human Head, Bones of the Human Trunk, Bones of Human Arms and bones of human Legs. • **Muscles of Human body:** Muscles of the Human Head, Muscles of the Human Trunk, Muscles of Human Arms and Legs. • **The relationship between Joints, Muscles and Bones**. • **Take proper care of Joints, Muscles and Bones:** Balanced Diet, Physical Exercises.	• Group observation and discussion on photos/pictures to find out the difference between joints, muscles and bones of human body • Group discussions to find out the relationship between Joints, Muscles and Bones. • Group discussions to find out ways or means of taking proper care of Muscles, Joints and Bones of a Human Body. • Play the following game called: Manzi/ Mukamanzi, says.
Links to other subjects: *Biology: Human Body.*				
Assessment criteria: *Ability to correctly explain the relationship between Muscles, Joints and Bones and taking Proper Care of them/ keeping them Healthy.*				
Teaching aid: *Pictures/ Photos showing Human Body Muscles, Joints and Bones.*				

Topic Area: Power and Energy				
Science and Elementary Technology: Primary Three		**Unit 8: Types of Energy**		**Number of periods: 10**
Key Unit Competence: Explain, identify and differentiate different types of energy				
Learning Objectives				
Knowledge and under-standing	**Skills**	**Attitudes and values**	**Content**	**Learning Activities**
• Explain the meaning of energy. • Identify different types of energy. • Outline the use of energy and where energy is used.	• Differentiate various types of Energy used in our daily life.	• Show interest and curiosity in appreciating the importance of different types of energy. • Appreciate the usage / applications of energy in various areas.	**Meaning of Energy:** The Ability to do work effectively. **Types of energy and examples of where energy is used:** • Heat energy: cooking, drying, Ironing… • Sound energy: When a radio is transmitting, it quakes. • Electrical energy: Putting on Lights, switching on a radio/ receiver, switching on the TV • Solar Energy: Solar calculators, Solar Energy. • Magnetic energy: Attracting metals • Mechanical energy: Lifting and Carrying a bag of Cement, pushing a Wheel barrow, riding a bicycle, lifting up a hoe when digging. • Chemical energy: Burning a paper	• Practice different exercises in group discussions with an intention of demonstrating the importance of different types of energy: • Burning a paper to ash. • Tuning a radio set loudly at a high volume and learners in groups touch it as they feel how it is shaking or quaking. • Lifting up a heavy object, • Blowing off pieces of paper on the table, • Spreading fresh leaves on iron sheets, switching on a torch • Attracting or pulling metals using a magnet.
Links to other subjects: *Physics/ power and Energy.*				
Assessment criteria: *Ability to identify various types of energy and different examples where they're applied.*				
Teaching aids: *A radio set speaker, heavy object to lift up, papers, fresh tree leaves, a torch, copper, iron, a magnet and a matchbox.*				

Topic Area: Power and Energy				
Science and Elementary Technology: Primary Three		Unit 9: Electricity		Number of periods: 5
Key Unit Competence: Identify the uses of electricity and different electrical equipment that use electricity				
Learning Objectives				
Knowledge and understanding	Skills	Attitudes and values	Content	Learning Activities
• Define electricity. • Outline the uses of electricity. • List domestic and school materials that use electricity. • List the dangers from electricity • Explain how to prevent dangers from electricity.	• Proper usage and handling of different materials that use electricity. • Prevent dangers from electricity (electricity shocks, burns and fire) by practicing precautionary measures and safety strategies.	• Appreciate the use and help of materials that use electricity • Take care and caution on the usage of electronic devices and other materials that use electricity.	• Meaning of electricity. • Uses of electricity: Lighting, Cooking, using computers, and other various machines • Electronic devices and other materials that use electricity. • Dangers from electricity. • Ways to prevent and minimize dangers of electricity.	• Group discussions to find out the uses of electricity and electronic devices. • Individual practice on connecting, disconnecting, turning on/off, switching on/off various materials that use electricity. • Group discussions to find out the dangers from electricity (poor handling and use of electricity) and find out ways to prevent those dangers.
Links to other subjects: Physics/Energy				
Assessment criteria: Ability to correctly connect, disconnect, switch on and off and use appropriately different electronic devices.				
Materials: Electronic devices: Computer, Telephone, Flat Iron, Refrigerator, Torch, Electric cooker,Hot Air conditioner, Television Set, Radio.				

Topic Area: Power and Energy				
Science and Elementary Technology: Primary Three		**Unit 10: Magnet**	**Number of periods: 6**	
Key Unit Competence: Discover magnetic forces and characteristics of a magnet and distinguish between magnetic and non-magnetic objects				
Learning Objectives				
Knowledge and understanding	**Skills**	**Attitudes and values**	**Content**	**Learning Activities**
• Define a magnet • Explain the characteristics of magnetic forces • List magnetic and non-magnetic materials • Explain the dangers of magnetic forces. • List other different materials that act as magnets.	• Recognise the magnetic forces • Distinguish between magnetic and non-magnetic objects • Apply precautions against the dangers of magnetic forces.	• Cautious while handling or using magnetic objects.	• Meaning of a magnet: A material/Object that can attract iron or other iron containing materials. • Magnetic forces and their characteristics: Like poles of a magnet repel each other and unlike poles attract each other. • The magnetic field of an object • Non-magnetic objects (paper, glass, wood, plastic materials,). • Magnetic objects: Material containing iron. • Dangers of magnetic forces: Destroy Property: ATM Cards, Electronics, Identity Cards, Cassette/Video Compact Discs, DVDs, Flash Disks,	• Bringing magnets closer to different objects and materials made out of iron, copper, glasses, wood, plastics, with an objective of demonstrating and discovering magnetic objects and non-magnetic objects. • Placing a paper, glass, wood, or plastics in the middle of the magnet and other magnetic objects. • Bringing closer to each other two or three magnets with an objective of observing and discovering what happens. • Group discussions on the dangers of magnetic forces on electronic objects and other different materials.

			• Materials which act as a magnet: Loud Speakers (speakers) and screwdrivers.	

Links to other subjects: *Physics/ Power and Energy*

Assessment criteria: *Ability to correctly explain magnetic forces, characteristics of magnet and identify magnetic and non-magnetic objects.*

Materials: *Magnet, Different wooden materials, plastic materials, glass utensils, Stones, Metallic objects, screw drive, papers, glass, wood, plastic, coin of 100, metallic door, metallic barrels, staples, ATM cards or National Identity cards, a big Radio set/ receiver, CD, flash disk, Radio tapes*

6. REFERENCES

- National Curriculum Development Centre, Elementary science and technology, Primary 4, Kigali, 2007.
- National Curriculum Development Centre, Teacher's guide to Uganda primary schools, Integrated science syllabus, 2000.
- Oxford University Press, Elementary Science and Technology, students book 4, 5 and 6, 2010.
- Rwanda Basic Education Board, Science and Elementary Technology Curriculum for upper primary, 2010.
- WANDERA Alice et all., Elementary science and technology, students book 4, 2010.
- Ikigo cy'Igihugu gishinzwe Integanyanyigisho; Integanyanyigisho y'Ubumenyi n'Ikoranabuhanga mu mashuri abanza,1997.

7. APPENDIX

Subjects and weekly time allocation for lower primary level

Subjects in Primary 1– 3		Weight (%)	Number of periods (1 period=40 min)		
			P1	P2	P3
1.	Ikinyarwanda	27	8	8	8
2.	English	23	7	7	7
3.	Mathematics	20	6	6	6
4.	Social and Religious Studies	13	4	4	4
5.	Science and Elementary Technology	7	2	2	2
6.	Creative Arts: Music, Dance and Drama, Fine arts and crafts	7	2	2	2
7.	Physical Education and Sport	3	1	1	1
Total number of periods per week		100	30	30	30
Total number of contact hours per week			20	20	20
Total number of contact hours per year (39 weeks)				780 hours/year	