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Environmental Science Education Curriculum for Outdoor Learning in Cameroon's English-Speaking Primary Schools. A Pilot Project for Mission Schools in Limbe 1 Sub Division-Cameroon

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Dedication

This project is dedicated to all teachers in English-Speaking Primary Schools in Cameroon.

Abstract

Outdoor learning is an effective method of instruction that exposes learners to authentic hands-on experiences that are meaningful to them and contribute to their academic success. This also motivates them to be environmental stewards that contribute to sustainable development in the nation. With the increase in environmental issues facing the country due to natural factors and human impact, there is need for education of citizens to positively influence their decision towards choices and actions that will curb these problems in the nation. Beginning at a foundational level of education is important to gradually impart the knowledge, skills, attitudes and participation of pupils as they progress through the academic ladder and interact in the community in which they live. This project focused of developing Environmental Science Education curriculum for Cameroon's English-Speaking Elementary schools. Developing lessons for teachers was necessary to solve problems related to lack of time and resources necessary to teach lessons in the outdoor setting. The lessons are also tools for encouraging best practices in environmental education at school and in the community as they focus on common environmental issues in the community. A pilot test is the first step in the implementation of this rich curriculum, followed by modifications and large-scale implementation at the national level. This curriculum project is beneficial to both systems of education in Cameroon as its focus is on outdoor learning in EE which could be applied to other subjects. Finally, the integration of the different EE topics into other subjects and topics is important to broaden knowledge in concepts and apply in different real-life situations.

TABLE OF CONTENTS

List of Tables

List of Figures

CHAPTER ONE

INTRODUCTION

Background

Education is a driving force for successful development of citizens and the nation. It facilitates human resource development that leads to nation-building through the application of skills, knowledge and attitudes for the benefits of individuals and the society at large. The school system can foster or hinder development of learners, depending in part upon teachers' access to the appropriate tools and procedures, which ultimately impact the developmental progress of the nation. Quality school leadership and instruction with available resources can contribute to achieving the goal of education, which is to support learners in developing the knowledge, skills and attitudes needed to become self-sufficient and decision-makers for a sustainable future. A school curriculum is a foundation for successful implementation of goals and objectives of schools, resulting in learner competency, self-reliance and skills that are integral to the needs of learners and the society.

Education in Cameroon has transitioned from the pre-colonial and colonial eras to the post-colonial era, and the curriculum has also changed from meeting the needs of its colonial masters to training and integrating the Cameroonian people into a working population. The current educational curriculum of Cameroon has been focusing on the needs of ruralization, as well as bilingualism and harmonization of both English and French educational systems, toward "achieving a school system that is better suited to meet the community and national need." To achieve this, the teaching programs have been revised according to the competence-based approach to learning that focuses on helping learners gain competency in the skills required in the work force and to survive in any environment. Yet there is need for further updating the

school curriculum, as well as a need for ongoing review and modifications, in order to stay current with changing times and ensure students succeed as the innovators of the future.

One area where change is particularly needed is in the teacher-centered approach to instruction. Learners are still viewed as passive in the process and considered as empty vessels to which knowledge is being poured. This has affected the quality of education necessary for a nation to develop. The lack of experiential learning with instruction occurring only within the four walls of the classroom limits the potential of the teachers and learners that could be unveiled through hands-on teaching and learning strategies that encourage creative and critical thinking. John Dewey (1938), the founder of progressive education, believed in learning through experience. This experience can be even more meaningful outdoors in a nontraditional setting where all the senses, intelligences and a range of learning environments are contributors to learning. These learning experiences can lead to intellectual, moral, physical, social and spiritual growth.

Experiential learning can be particularly relevant to Environmental Science. Environmental Science is one of the subjects that promotes interaction with the environment, and the outdoor environment provides a wealth of opportunities for relevant learning experiences. In Cameroon, the Environmental Science curriculum focuses on environmental literacy, problem solving and individual/collective decision making for improving the environment and other sectors in the economy. Yet like other subjects, Environmental Science is typically taught through a teacher-directed, indoor approach. However, learning would be greatly enhanced if teachers used learning materials and experiences from the local school yard like the different types of crops, flowers and animals that live in the local environment. Outdoor experiential learning would make the curriculum more relevant for students and expose them to new

opportunities and thinking, improving the quality of the Environmental Science curriculum, while also providing opportunities to connect to other subject areas. Slavich and Zimbardo (2012) describe the multidimensional importance of experience in learning in the following way:

> Experiential lessons provide students with an opportunity to experience concepts first-hand and, as such, give students a richer, more meaningful understanding of course concepts and of how they operate in the real world... They enhance the affective quality of the course content. This occurs both when students are engaged in solving problems that are part of the activities and when they are analyzing, sharing, discussing, and reflecting on their personal reactions... It can significantly improve students' memory for concepts insofar as the information gets stored in autobiographical memory... Experiential lessons have the ability to shape students' beliefs about learning and about the self... They can lead to significant personal insights, including a greater awareness of one's personally held perspectives—as well as an improved awareness of other people's experience—with the possibility to enhance these attributes through critical reflection (p.594).

Dewey (1938) speaks of the necessary relation between the process of actual experience and education. Extending such teaching and learning opportunities to include outdoor experiential learning of Environmental Science has potential to not only improve the quality of education, but also contribute to a more sustainable future for Cameroon. Before Western education and civilization was introduced in Cameroon, there existed functional education which provided a means of survival, prepared children for adulthood and integration into the society. Topics related to different areas of life were taught to the younger generation for their survival

and for the benefit of future generations. Some of these topics included crafts, trading, hunting, farming. This pragmatic and productive method of education led to socially responsible citizenry in this agricultural economy. The introduction of western education diverted the focus of education which affected their environmental knowledge and responsibility. Education was for skills needed to work for colonial masters.

Today, Cameroon faces numerous environmental issues: poor water quality, poor hygiene and sanitation, improper waste disposal and management, poaching, industrial pollution, and inadequate awareness of environmental-related impacts on the land because of humans' activities. These environmental issues are addressed in the environmental science curriculum. But often, the instructional delivery falls short, due to teachers' lack of knowledge and skills regarding environmental issues, and due to the teacher-centered, knowledge-focused approach. This teacher-centered instructional focus stems from methods of instruction introduced during colonial education in Cameroon, where traditional methods of learning in and through the outdoors was replaced by structured classroom learning. There is a need for a revised curriculum that encourages teachers to depart from their use of local didactic teaching methods that are commonly used in Cameroon toward more interactive and participatory modes of learning. By doing so, the curriculum can better capitalize on children's intrinsic interest in the natural world and actively engaging them in educational processes that support enthusiasm for lifelong learning (Hoody, 1996). Through a revised Environmental Science curriculum that draws on outdoor experiential learning, there would be an opportunity for integrating into the curriculum a stronger focus on the range of Environmental Education aims, beyond knowledge, such as attitudes, skills, and participation in environmental issue investigations, decision-making, and problem solving.

Purpose

In light of the recent update of the general curriculum for primary education to encourage leaner-centered instruction, there is a need to support and encourage teachers toward using more experiential and learner-centered forms of instruction. In particular, the current Environmental Science curriculum does not draw from outdoor and locally-relevant experiences and materials, nor is it aligned with what is needed to support a citizenry that is knowledgeable and competent to cope successfully with environmental issues and contribute in decision making to solve these issues individually and collectively. Thus, the purpose of this project is to re-design the Environmental Science curriculum for Cameroon English Speaking Elementary schools to include learner-centered outdoor lessons and hands-on activities, and to more firmly ground the curriculum in effective Environmental Education practices as well as more culturally sustaining practices. This will be accomplished through a pilot project focused the Mission schools in Limbe I Sub Division, as that is the most feasible avenue for change at this time, in light of the political climate within the country.

Definition of Terms

Curriculum

Curriculum refers to the total learning experiences of individuals not only in school but society as well (Bilbao et al., 2008).

Curriculum Development

Curriculum development is defined as planned, a purposeful, progressive, and systematic process to create positive improvements in the educational system (Alvior, 2014).

Environmental Science

Environmental Science is the field of science that studies the interactions of the physical, chemical, and biological components of the environment and the relationships and effects of these components with the organisms in the environment.

Environmental Education

Environmental Education is a learning process that increases people's knowledge and awareness about the environment and associated challenges, develops the necessary skills and expertise to address the challenges, and fosters attitudes, motivations, and commitments to make informed decisions and take responsible action (UNESCO, Tbilisi Declaration, 1978).

Experiential Education

Experiential education is a process through which a learner constructs knowledge, skills and values from direct experiences (Dewey, 1938).

Outdoor Education

Outdoor education entails learning in and through the natural world. It includes building relationships with the earth through understanding the natural world and the place of humans within the natural world (Gilbertson et al, 2006).

Place-Based learning

Place-based learning that is rooted in what is local---the unique history, environment, culture, economy, literature, and art of a place (Smith and Sobel, 2010).

Significance of the Study

With the growing environmental issues facing Cameroon and in light of the immense challenges facing Cameroon that stretch across human rights, politics, and the economy, this curriculum is one small contribution, that when combined with other efforts to improve education and support the development of environmental literacy among its citizens, can contribute to a more sustainable future for Cameroon.

CHAPTER TWO

REVIEW OF LITERATURE

Introduction

This chapter will focus on a brief history of Cameroon's education system, the different levels of schools in Cameroon, the status of environmental science and environmental education in Cameroon, the value of outdoor learning, and effective environmental education practices**.**

History of Cameroon's Educational System

Indigenous Education in Cameroon

There existed indigenous form of education in Cameroon before introduction of formal education by the missionaries. Gwanfogbe (1993) asserts that indigenous education was focused on producing honest, respectable, skilled, and co-operative individuals who could fit into the social life of the society and enhance his/her growth. Indigenous education had no schools or buildings or formal organization of either nation or local educational system (Farrant, 1980). The physical environment influenced the content of their curriculum and the teaching method. Instruction could take place anywhere depending on the activities the indigenous people carried out at a given time like growing of crops, hunting, naming ceremonies, story-telling under a tree, the manufacturing of tools made from the environment like bow and arrow and hoes. They were taught characteristics of seasons and how to determine the beginnings of each season by observing atmospheric changes, the appearance or disappearance of certain fauna and flora (Gwanfogbe, 1993). Some nature study and or Environmental Education topics included study of animals, plants, weather, soils and seasons which improved their knowledge and skills and were applicable in real-life situations. Children learned from the environment and benefited from its

resources. Parents and elders were responsible for informal education of their children and other children in their community with the aim of preparing them to become self-reliant and benefit from it. They believed the education of children was a not limited to parents but a collective responsibility of elders in the society. Indigenous education was functional as every child could engage in activities that were beneficial for their survival.

Pre-Colonial Education

Cameroon was founded around 1472 by Fernando Po, a Portuguese navigator. The name of the country derives from the term used for the Wouri River by Portuguese explorers/ navigators led by Fernando Po. Reaching the Cameroon coast near the modern port city of Douala around 1472, those explorers named the river *Rio dos Camaroes* ("River of Prawns") after the variety of crayfish they found there. This name later was applied to the coastal area between Mount Cameroon and Rio Muni**.** Education in Cameroon during the pre-colonial era was aimed at evangelization with missionaries coming from Britain. These early missionaries used education as an instrument to spread the word of God by creating the first primary school in Bimbia around 1884. Before Germany annexed Cameroon in 1884, 15 primary schools were created with a total of 368 pupils and were run by London Baptist Missionary Society.

Colonial Education

Germany, France, and Britain shaped the educational system in Cameroon between 1884-1960. Cultural colonialism in Cameroon affected structural reforms in the educational system directly and indirectly. In 1884, Germany colonized Cameroon. The Education Law of April 1910 stated the intension of Germans to use education as a tool to foster the spread of their culture in the country. German language was the only medium of instruction in the five years of

compulsory primary education, with payment given to mission schools on the condition that they would expand German language and culture.

Germany was the primary colonizing influence until 1916, when Cameroon was divided between France and Britain after they defeated Germany in World War I. The French received a major share (East), while the British got the west. The education system shifted to reflect the colonial heritage of Britain and France, with English as the main language of instruction in British Cameroon, and French the main language of instruction in French Cameroon. During the French Era of 1914-1960, the Policy of Assimilation was used in the educational system with a centralized administration from France. French was the only language of communication even though the missionaries were still present. The French created a ministry of National Education to improve the quality of education in Cameroon and provided a metropolitan curriculum adapted to the Cameroonian context. During this era, children attended primary school for six years. The British used indirect rule to train temporary civil servants for colonial exploitation during their reign between 1919-1961. This was done through a decentralized educational administration dictated by British policy in Nigeria. Education was free at the primary level and the curriculum reflected the British educational system.

Post-Colonial Education

This era which began in 1960is marked by different reforms at the different levels of education to improve the educational system and toward the development and progress of the national economy. During the years between 1960 and 1972, integrated and participatory approaches were used as teaching methods, stemming from the influence of agricultural activities. Ruralization was one of the strategies used to try to keep pace with the rapidly changing world and the need for social development after independence.

In 1961, when Cameroon received its independence, bilingualism was introduced. The intent of bilingualism was to harmonize both educational systems. English and French were introduced at the foundational (primary) level of formal education, as it is the level believed children can easily adapt to new these languages given that Cameroon is a multilingual country comprising 247 indigenous languages and needed official languages of communication in the nation. These official languages were imposed in administrative, instructional, and evaluative levels. Yet, at the time the education system in Cameroon did not embrace true bilingualism, and in practicality, individuals were educated in their home colonial system (French or English), with little cross interaction with the other system. The 1995 Education Forum and the 1998 Law on Education were used toward achieving harmonization of both English and French systems of education. National unity and integration were facilitated through bilingualism. Bilingual schools were created in both educational systems with both languages instituted at all levels of the school curriculum.

In 2001, the UN Committee on the Rights of the Child identified several problems with the education system in Cameroon, including: rural/urban and regional disparities in school attendance; limited access to formal and vocational education for children with disabilities; children falling behind in their primary education; a high dropout rate; lack of primary school teachers; and violence and sexual abuse against children in schools. In 2018, there was a national curriculum update, toward incorporating more learner-centered instructional approaches and ensuring relevance of curriculum to learners and the country as a whole.

Governance and Levels of Schooling in Cameroon

The French and English systems of education are headed by three ministries: The Ministry of Basic Education for Nursery and Primary schools, the Ministry of Secondary

Education for Secondary Schools, and the Ministry of Higher Education for Universities. The Cameroon educational ladder starts from kindergarten (lasting for two years) and primary school (six years of compulsory schooling), to secondary school (five years) and high school (two years), and finally to tertiary (university). The different schools are owned by either the government, missions or private individuals who use governmental curriculum. The academic year runs from September to June, at which time end-of-year-examinations are administered. In addition, there are vocational studies programs aimed at unemployed people, which are overseen by the Ministry of Employment.

Kindergarten and primary are the foundational levels of education in both Anglophone and Francophone systems of education in Cameroon. Kindergarten is for children ages four to six years, while primary is for children ages six to twelve. The Constitution affirms that the State shall guarantee the child's right to education, and that primary education is compulsory. Since 2000, primary education has been free, but families must pay for uniforms, book fees, and other needs deemed necessary. In the Cameroon English-speaking education sub-system, pupils leaving primary school enter secondary school after passing the Government Common Entrance Examinations (and obtaining a First School Leaving Certificate) in Class 6 (now) or 7 (formerly). The reason for reduction of the number of years spent in English system of education from seven to six years was for structural harmonization of both English and French sub-systems of education. The harmonization at the level of primary education started in 2006/2007 academic year.

In Anglophone system of education, secondary education is divided into two cycles: the lower secondary cycle, which is 5 years in length and begins at age 12, and the high school cycle, which is 2 years in length and begins upon completion of lower level. The General

Certificate of Education (GCE), both Ordinary and Advanced levels, are the two most common qualifying exams in the Anglophone part of Cameroon. Students who graduate from a five-year secondary school program must sit for the GCE Ordinary Level, and those who graduate from a two-year high school program must sit for the GCE Advanced Level. There is a slight difference between the Anglophone/ English system of education and the Francophone/ French system of education. The lower secondary cycle (Brevet) in French system is four years in length while the upper secondary cycle (Lycée) is three years in length and concludes with the completion and passing of the Baccalaureate national examination.

Tertiary education is highest level in the academic ladder. It begins at age 18 and upon completion of High School. The bachelor's degree in the English system is three years in length, the master's degree is two years in length, and PhD three years in length. In the French system, Diplome d'etudes Universitaires Gennerales (DEUG) is the first level and lasts for two years. This can be followed by one year of License which is equivalent to a bachelor's degree. Maitraise, which is equivalent to a master's degree, is two years, while Doctorat is three years and equivalent to PhD.

Environmental Science Curriculum in Cameroon Schools

Cameroon has a wealth and diversity of globally important habitats, species and natural resources and is considered Africa in miniature because of its diversified ecological zones and linguistic and sociocultural background. In the late 1990s, the Cameroon government through the Ministries of Environment and Nature Protection, Forestry and Wildlife, and Basic and Secondary Educations, and in line with UNESCO policy on Education for Sustainable Development (2009a, 2009b), introduced Environmental Education into education policy to enhance critical thinking, problem-solving, and effective decision-making skills, for informed

and responsible decisions towards natural resources conservation (Nchia et al., 2017). This was done in response to severe environmental degradation, which has led to extinction of some plants and animals, land degradation, poor hygiene and sanitation, deforestation and biodiversity loss, among many others.

Environmental Education is one of the many subjects taught in primary schools in Cameroon with a curriculum that includes some of the pertinent environmental issues of the economy like pollution, poor waste disposal, and agricultural practices. It targets individuals of all ages and walks of life and focuses on practical approaches to current environmental issues. Many teachers teach Environmental Science education like any other subjects and in the four walls of the classroom. The teacher-centered approach of learning has been dominant until the school year 2018/2019, when the curricula for all subjects were revised to be more learner-centered. At this time, the name Environmental Education was changed in the curriculum to Environmental Science, although despite the name change there was not much content change in the curriculum. Cameroon's twin Ministries of Basic and Secondary Education are beginning work toward revising textbooks to include more issues on environmental protection and sustainable development. However, while the focus on environmental issues remains, there continues to be little use of the outdoors nor the local environment as content or context for teaching.

Environmental Issues Facing Cameroon and Efforts to Address Them through Environmental Education

Environmental pollution is increasingly a problem in Cameroon like in most African countries and in the world at large, where the environmental consequences of development

cannot be ignored. The major forms/types of pollution in Africa include indoor and outdoor air pollution, land pollution and water pollution. The pollution of waters in Cameroon is concentrated near the urban areas where waters loaded with sewage are used by people in the city. Such pollutions are a real health risk for both aquatic life and humans who make use of the waters of Cameroon. Water pollution also affects rural areas. Poor people, who cannot afford to protect themselves from the negative impacts of pollution, often end up suffering the most.

Cameroon's natural resources are consistently exploited, resulting in land deterioration. Forests in Cameroon contain about 300 different species of trees that are sold overseas. Cash, food crop prices and timber sales are the motivation behind the profitability of farming and logging activities that cause deforestation. The effects of deforestation in Cameroon are many: the erosion of agricultural lands; drying up water bodies during dry seasons; desertification; disappearance of plant and animal species; and modifications of both local and regional climatic conditions. Global warming through its effect on the global carbon cycle is likely to affect agricultural activities and economic growth (Gbetnkom, 2005). Given that Cameroon's economy is based on crop cultivation, there is a need to reduce deforestation through more sustainable yet efficient methods for the people of Cameroon. Cameroon still lacks a sustainable development approach that both meets the needs of its people and protects its extraordinary biodiversity.

Cameroon has an obligation to the next generation to preserve the environment. The United States has partnered with the Cameroonian government and local and international non-governmental organizations on issues such as illegal logging, wildlife trafficking, and unsustainable commercialization of the bush meat that threatens endangered animals. As a founding partner of both the Congo Basin Forest Partnership and the Central African Forest Commission, Cameroon promotes the conservation and sustainable management of the Congo

River Basin ecosystem. U.S. government agencies, such as the USAID, through its Central African Regional Program for the Environment, the U.S. Forest Service, and the U.S. Fish and Wildlife Service have small but important environmental partnerships with Cameroon as well. The Environmental Security Program of the U.S. Department of Defense promotes cooperation among military and non-military stakeholders in water and environmental security. The program encourages dialogue among partner countries to raise awareness of scientific and technical environmental challenges.

There are also different non-governmental organizations (NGOs) that collaborate with the government and other international bodies to solve these environmental problems in the country. Some of these NGOs collaborate with schools to carry out projects that would be helpful in solving the pertinent environmental problems in the different regions of the country. The government has included environmental issues into the school curriculum as a method of increasing awareness and knowledge of these issues, providing students and teachers the opportunity to practically contribute to decision making related to these issues through environmental lessons. Through these efforts and the environmental school curriculum, schools can be more deeply rooted in the surrounding society, focusing on sustainable development, local knowledge and cultures rather than being cut off from society.

Experiential Outdoor Learning

Research in Environmental education strongly suggest the importance of learning experiences that occur in the natural environment as it is extremely important in developing students' environmental knowledge, attitudes and responsible actions (Ballantyne and Uzzell 1994; Ballantyne, Connell, and Fein 1998; Ballantyne, Fein, and Packer 2001a, 2001b; Ballantyne and Packer 2002; Bogner 1998; Lai 1999; Rickinson 2001; Tanner 2001). Authentic

outdoor learning experiences provide an excellent basis for environmental learning and skill-building. This is evident in a study carried out by Ballantyne and Packer (2002), who warn against over-structuring learning activities. Their study found that 'the use of worksheets, note-taking and reports were all unpopular with students, and did not appear to contribute greatly to their environmental learning (2002, p. 228). Also, Dettmann-Easler and Pease's (1999) review of research suggests that Environmental Education that is solely school-based is only moderately successful, and that the best approach for teaching environmental concepts and awareness is to incorporate outdoor activities.

Openshaw and Whittle (1993) further suggest the need for teachers and outdoor educators to balance "the students' desire for a structure within which they can feel comfortable and not threatened and the added excitement caused by the unexpected" (p. 64). Learning experiences in natural environments have been associated with increased levels of student motivation and achievement (Battersby 1999), as well as a greater likelihood that learning will be transferred to situations that students encounter outside of the school environment (Ballantyne, Fein, and Packer 2001b). In well-planned practical investigations, children's natural curiosity is channeled, and they are equipped with the strategies and processes to develop scientific ideas and concepts. These outdoor learning experiences can be very effective in developing students' content knowledge and cognitive skills. Quality outdoor experiences offer learners opportunities to develop their knowledge and skills in ways that add value to their everyday experiences in classrooms and in the community. According to Becker (2016), outdoor learning builds community and culture, raises expectations and standards, increases connection between students, and develops positive associations around school and the outdoors. Authentic outdoor learning in the form of environmental projects can help learners develop communication

skills, as they carry out problem solving activities in teams and the impact is significant with real experiences, risks, consequences and outcomes than in traditional setting. Outdoor learning can also result in more positive attitudes toward nature, as well as greater environmental awareness, and more positive environmental behavior (Becker, 2016).

Emmons' (1997) study of a five-day field course in Belize found that students' learning was facilitated by their shared and direct experience of the surroundings, as well as their teachers' role-modelling of their interests and likes about the forest environment. Research by Orion and Hofstein (1994) provides a strong rationale for preparatory work that introduces students to the cognitive (field trip and/or outdoor learning concepts and skills), geographic (outdoor setting), and psychological (field trip/outdoor learning processes) aspects of outdoor learning experiences. There are positive effects on pupils' motivation levels carried over to traditional indoor learning after the outdoor learning had concluded, which underscores the value of post-outdoor experience learning. Uzzell et al. (1995) emphasize the need for clear links to be made between outdoor activities ('the world of our physical surroundings') and indoor activities ('the world of the school'). Outdoor learning has much potential for improving learning and can be an integral way for improving Environmental Science instruction.

This project seeks to revise and reorient the Environmental Science curriculum to make it more learner-oriented through authentic outdoor learning experiences. By doing so, the curriculum can further the learning process and also contribute toward Cameroon's quest for a more sustainable future for its citizens.

Effective Environmental Education Practices

According to The Belgrade Charter adopted by a United Nations conference in 1976 (UNESCO-UNEP, 1978) the goal of Environmental Education is to develop a world population

that is aware of, and concerned about, the environment and its associated problems, and which has the knowledge, skills, attitudes, motivations, and commitment to work individually and collectively toward solutions of current problems and the prevention of new ones. This is also emphasized by UNESCO, who asserts that environmental education should include the following aims:

- Awareness and sensitivity about the environment and environmental challenges;
- Knowledge and understanding about the environment and environmental challenges;
- Attitude concern for the environment and help to maintain environmental quality;
- Skills to mitigate the environmental problems; and
- Participation for exercising existing knowledge and environmental related programs.

Similarly, the North American Association for Environmental Education (NAAEE)'s Excellence in Environmental Education – Guidelines for learning (K-12), described the major goals of EE: "EE should help learners to develop questioning and analysis, knowledge of environmental processes and systems, skills necessary for understanding and addressing environmental issues and personal and civic responsibility" (The National American Association for Environmental Education,1999). NAAEE defines EE as a process that aims to develop an environmentally literate citizenry that can compete in our global economy: has the skills, knowledge, and inclinations to make well-informed choices; and exercises the rights and responsibility of members of a community.

Achieving the goal of EE to provide an environmentally literate citizenry requires effective EE practices which are based on the following principles and guidelines provided by NAAEE (1993):

- The learner is an active participant in the learning process, learning is relevant to learners, and learning experiences are provided according to learners' developmental levels. Instruction is aimed at building learners' knowledge and skills;
- Independent thinking, effective responsible action, development of communication skills is emphasized during instruction;
- Different points of view and perspectives are incorporated to maintain a balanced approach to instruction; and
- Instructors focus on creating environmental awareness in learners, ensure early and continuous opportunities for learners to explore their environment. This helps learners to discover the world around them and to commit to ensuring environmental quality and quality of life.

The NAAEE Excellence in Environmental Education- Guidelines for Learning (K-12) presents the following strands which are effective in promoting progress towards sustaining a healthy environment, quality of life, and achieving the goal of environmental literacy:

1. Questioning, Analysis and Interpretation Skills.
2. Knowledge of Environmental Process and Systems
3. Skills of Understanding and Addressing Environmental Issues.
4. Personal and Civic Responsibility.

Use of these guidelines can contribute to improved instruction and further the goal of environmental literacy.

CHAPTER THREE

METHODS

The purpose of this project was to revise the Environmental Science curriculum for Cameroon English Speaking Elementary schools to include learner-centered outdoor lessons and hands-on activities, and to more firmly ground the curriculum in effective Environmental Education practices. This was accomplished through a pilot project focused on the Mission schools in Limbe I Sub Division, as that is the most feasible avenue at this time for change, in light of the political climate within the country. It may also serve to encourage outdoor Environmental Education in other regions in Cameroon in the future.

Site Selection

The Mission schools in Limbe I Sub Division were the most feasible avenue at the time, due to the political climate within the country and due to my prior work as a Head Teacher within the Mission schools and my ongoing connections within those schools. There are three main categories of Mission schools in Limbe 1: The Catholic Mission schools; the Baptist Mission schools; and the Presbyterian Mission schools. These three categories are headed by their different Educational secretaries and the government Inspectorate of Basic Education for Limbe 1 Sub Division. According to 2017-2018 school year statistics, there are 14 Mission schools in Limbe 1 Sub-Division with a total of 2873 pupils (1367 boys and 1506 girls) and 105 teachers (34 males and 71 females). Some of the teachers are permanent teachers while others are temporal teachers who can leave at the end of a school year if not accepted upon reapplication. The student-teacher ratio at these schools is usually 13 to 1, which is lower than the private and government schools.

These denominational elementary schools are divided into three levels: level 1 (Classes 1 and 2) with the age ranges of 6-7 years old; level 2 (Classes 3 and 4) with the age ranges of 8-9 years old; and level 3 (Classes 5 and 6) with the age ranges of 10-11 years old. Pupils who attend these schools primarily are the children of parents who attend these mission churches, while there are other children attending whose parents send them to mission school because they value the moral education taught by the schools. Many of these schools have school gardens and are easily accessible to outdoor spaces/sites like the Limbe Botanical Garden, The Limbe Wild life Center and The Atlantic Ocean for authentic environmental learning experiences. Due to some declining enrollment, there is the potential for a revised curriculum with meaningful outdoor experiences to draw in new students, particularly if curricular revisions result in improved academic performance and test scores or if the curriculum is seen as more relevant to learners or more aligned with traditional forms of education.

Curriculum Revision Grounding

The starting point was the current, existing Environmental Science curriculum used in the schools as well as the project aim. Educational theories of place-based learning and experiential education, as well as effective practices in Environmental Education, guided the curriculum revision. This guidance, which was highlighted in the Chapter 2 Review of Literature, is further referenced in this section. Further grounding was the existing scope and sequence for the Environmental Science curriculum and an informal needs assessment, both of which are explained in this section.

Existing National Environmental Science Curriculum

The curriculum revision project at hand was guided by the current Environmental Science Education curriculum for English-speaking primary schools in Cameroon, which is grounded in the Constitution of the Republic of Cameroon. The Constitution guarantees the rights of a child to education, as highlighted in the Law of 1998, which mandates educational guidelines for Cameroon. Also, the government of Cameroon developed a document that provides major orientations to all sectors of the society. This Growth and Employment Strategy Paper (GESP) of 2009 tasked the Ministries of Education to develop human capital to achieve its mission of becoming an emergent nation by the year 2035. Consequently, the national curriculum is designed to guide the development of competencies in the learners, set the foundation for learning, and further an emphasis on Science, Technology and Mathematics (STEM) toward national development. Also, the national curriculum is designed to help learners attain knowledge-based, skill-based and attitude-based proficiency upon graduation, thereby enabling them to cope with different paths at the end of the primary level and for continuous lifelong learning. Since Environmental Science is not among the compulsory subjects (English, French, and Mathematics) that require teachers to write and present weekly lesson plans to school administration, the lessons written will save time spent on lesson preparation and make it more feasible for teachers to implement the Environmental Science curriculum. And through the provision of lesson plans, it is possible to encourage teachers to implement environmental science in ways that are more experiential and Environmental Education-based than they might have on their own.

Needs Assessment

Given my experience as a head teacher of a private and mission school in Buea and Limbe respectively and given the lack of outdoor teaching and learning in Mission schools (as well as in primary education across Cameroon schools), I perceived a need for integrating authentic hands-on, outdoor learning experiences for the pupils in Cameroon's English-Speaking primary schools and to encourage effective environmental practices in the community. Prompted by my recognition of this need, I contacted a purposeful sample of six head teachers of mission, government and private schools in Limbe I and had an informal discussion with them to get their views pertaining to the current environmental science curriculum. The teachers with whom I spoke indicated being receptive to more outdoor teaching. However, they indicated there were barriers to doing so, including the lack of lessons designed to support outdoor learning experiences, the lack of time and resources, and also teachers' lack of skill and experience in using the outdoors for environmental science lessons. These teachers indicated that they were not only willing to complement classroom instruction with outdoor instruction, they were also eager to participate in training relating to outdoor environmental learning.

Given this expressed need, my original plan was to develop and implement teacher professional development in a cross section of schools, toward helping them develop skills to teach the Environmental Science curriculum outdoors. However, this could not be done due to current political instability in the region. Thus, the focus evolved to be the Mission schools, where there likely is more opportunity to begin the implementation of Environmental Education. The direction also changed from a focus on professional development to a focus on writing lesson plans that encourage hands-on outdoor experiences for pupils and teachers. Curriculum development provides an avenue for addressing the barriers of lack of lessons designed to

support outdoor environmental learning experiences, as well as lack of time and resources for delivering outdoor learning experiences. The long-term plan, which extends beyond my Master of Environmental Education program requirement, is to pilot test the lessons and prepare professional development for teachers that would be aligned with these modifications. This will hopefully be more feasible in the future when the economic and political environment becomes more stable. The long-term aim is that the curriculum will be used by other schools in Limbe 1 Sub-Division, extending out to the different regions of the country.

Development of Curriculum Goal

The following were the goals for this curriculum:

1. To encourage more outdoor experiential learning and use of local community settings (non-formal learning environments) in the instruction of the Environmental Science curriculum in English-speaking Primary schools in Cameroon.

2. To contribute to Environmental Education implementation in Cameroon schools by addressing the barrier expressed by teachers regarding a lack of lessons designed to support outdoor environmental learning experiences, as well as the barriers of lack of time and lack of resources.

The philosophy of this curriculum was based on the need for outdoor learning in environmental education to provide learners with hands on authentic experiences that will improve their knowledge skills and attitudes towards environmental education, facilitate their development, increase their test scores, encourage creativity and critical thinking, and improve their health through best environmental practices. This curriculum also used locally-relevant topics and encouraged a constructivist approach to learning, where the immediate needs of the society and

the level of knowledge of learners are considered important in the delivery of the lessons. All lessons were intended to be relevant to the needs of learners, the schools and the nation. It was hoped that these Environmental Education topics will prompt extensions, so that environmental learning is not limited to the Environmental Science curriculum, but extends into all subjects, so that students become good stewards of the environment for a sustainable future.

Curriculum Development Process

The existing Environmental Science curriculum was used as a starting point, along with overarching goal of incorporating more experiential outdoor learning. The curriculum scope and sequence were reviewed and revised. In consultation with the faculty committee for this project, it was determined that for the academic scope of this project (for meeting degree requirements), a subset of eight lessons would be developed for Level 1 Class 1. These lessons stem from the Environmental Science scope and sequence, and they were designed to encourage use of locally-relevant, experiential and outdoor learning. The revisions also were oriented to encourage collaborations between the schools and non-formal environmental educators in non-profit organizations and in the community, as well as the use of the outdoor school environment and available resources near the schools.

Once the revisions were completed, they were reviewed by a committee of faculty experts in Environmental Education, Science Education, and Early Childhood and Elementary Education. Further revisions of the curriculum and lessons were made based on their feedback. A pilot test was not feasible at this time but is intended to be conducted in all mission schools of Limbe 1 Sub-Division when the economy and political environment are stable. Additionally, the intention is to finish developing lessons for the remaining levels and classes. A second evaluation of the lessons is planned for after the teachers' pilot test the lessons. Finally,

modified lessons will be provided to all teachers of English-speaking regions in Cameroon through the Ministry of Basic Education. Additionally, there is a plan to develop teacher professional development to accompany the revised curriculum, but this too will happen after the region is more stable.

CHAPTER FOUR

RESULTS

Environmental Science Environmental Education Scope and Sequence for Level 1 Class 1

for Mission Schools in Limbe Sub Division I

Guiding Framework

Table 1: Scope and Sequence for Level 1 Class 1

Class (Grade Level)	Strand / Topics*	Expected Learning Outcomes*	Suggested Lesson Objectives (developed in the context of this project)
1	Immediate Environment	• Identify the components of the home and school environments • Demonstrate how to care for the home and school environment • Use appropriate ways to care for plants	• Use senses to explore, identify, and/or describe their local environment by its physical characteristics • Express wonder about the natural world around them and ask questions and seek answers through exploration • Identify places where they live and play within their community/local environment • Recognize various ways they depend on their home and school environment • Participate in activities to help demonstrate care and respect for their home and school environment
	Animals	• Identify and name domestic and wild animals • Recognize the different habitats of domestic and wild animals • Demonstrate how humans can stay away from the danger of wild animals	• List examples of wild and domestic animals • Provide a distinction between wild and domestic animals • Recognize that animals are living things that grow, reproduce and need a habitat for survival • Identify the ways in which animal's habitat provide for its basic needs or sustenance

			• Distinguish between positively interacting with domestic animals and enjoying wild animals from a safe and respectful distance
	Birds	• Recognize domestic and wild birds in their locality • Understand bird adaptation, habitat and care • Relate birds to other animals	• Recognize the different characteristics of birds • Describe two adaptations of birds- one physical and one behavioral • Extend knowledge and skills gained in identifying birds to practical activities and /or interactions with birds in their community
	Insects	• Describe various types of insects in the locality • Understand how to identify, hunt and protect insects	• Demonstrate how to hunt insects by practicing ant hunting around the school yard • Explore places in the school environment where insects (ants) can be found and explain why they can be found in such places. • Examine the physical characteristics of insects (ants) and explain how they behave
	Plants	• Identify different types of plants and flowers • Plant trees and flowers that are native, non-native but not invasive. • Care for plants and flowers and discuss their importance	• Explore plants/flowers in the school yard and label their parts • Describe the function of the basic parts of a plant • Illustrate how to plant them and care for them • Interview different people to learn how they successfully grow plants.
	Water	• Identify the different sources of water and	• Appreciate the gift of water to all living things

		how the quality of water is affected • Realize the need to protect and conserve sources of water	• Explain why water is important. • State at least three ways water can be used. • Recognize the importance of not wasting water and model how to use water efficiently.
	Pollution and Waste management	• Identify types of pollution • Demonstrate ways of preventing pollution • Use dust bins correctly and manage waste effectively	• Sort and identify items that are compostable. • Recognize the importance of composting as one part of the larger issue of waste management • Demonstrate a positive attitude towards pollution and waste management by practicing composting at school and at home.
	Environmental Hazards	• Identify environmental hazards • Identify strategies to prevent environmental hazards and protect the environment	• Identify different environmental hazards in Cameroon • Provide local examples of natural hazards in their city or region • Locate at least two places where natural hazards have occurred on a Cameroon map • Discuss different ways action can be taken to eliminate hazards

**Taken from the current Scope and Sequence for Environmental Science for Cameroon Schools*

Lesson Plan 1

Date: _____

Unit: Immediate Environment
Level: 1 **Class:** 1
Lesson: A nature walk in my environment / Exploring the environment
Envisaged Project: Pick different things found in their school yard. Use them to make a nature chart.
Enrollment: 20
Average Age: 6years
Duration: 30 mins
Objectives: By the end of the lesson, learners should be able to:

- Use senses to explore, identify, and/or describe their local environment by its physical characteristics
- Express wonder about the natural world around them and ask questions and seek answers through exploration
- Identify places where they live and play within their community/local environment
- Recognize various ways they depend on their home and school environment
- Participate in activities to help demonstrate care and respect for their home and school environment

Previous knowledge: Pupils can name different things found in their immediate environments
Resources: sticks, rocks, leaves, card boards, glue, crayons, picture of things found in nature, garbage can
Reference (s): http://courses.educ.ubc.ca/socials/projects/Environment(K).pdf; EE%20Curriculum%20For%20research/Kindergarten%20EE%20Curriculum.pdf

Table 2: A Nature Walk in My Environment/ Exploring the Environment

Stages	Content	Facilitating Activities	Learning Activities	Resources	Remark
Introduction 3mins	Take the pupils on a short nature walk in the school environment to explore, identify and describe the environment	-Ask learners to identify different things they see around them. -Classify them under natural and	Nature walk/ exploration, observation of the local environment using different senses and discussion	-The immediate environment. -Chart showing some natural and man-made objects found in the	

		man-made environments		immediate environment	
Presentation 17mins	-The environment is our surrounding. It is made up of things found in nature (like air, plants, water, animals, sun, land, sticks, leaves, rocks) and things made by man (like houses, cars, parks). -Natural environment provides valuable resources for our survival and for the benefit of other living things. -Our homes and school buildings provide shelter and safety from danger. We also use the playground at home and school for exercise and relaxation. -We learn about different things from our environment like plants, animals, rivers, home utensils and school facilities.	-Provide collection bags for the learners to collect at least three objects found in nature -Encourage them to use their four senses (without taste) to explore their environment. -Ask pupils to collect littered papers and other waste items in class -Pupils	Sort objects collected from nature according to color, size, shape. -The class will produce a nature chart at the end of the lesson - Pick garbage found in classroom to keep it clean	-Collection bags, natural objects from nature, drawing books, -Card boards, glue, crayons -Garbage cans for waste disposal	
Evaluation 10mins	-Name two objects made by man and two found in nature. -What are the different ways we use	Ask pupils questions at the beginning of the lesson to know their level of	Pupils work in pairs and in different groups to share their ideas from		

	things found in the environment? -Explain how we should care for our immediate environment	understandin g of the topic, during the lesson to check for understandin g and encourage critical and creative thinking, and at the end of the lesson to check if the objectives of the lesson have been attained Check if lesson can be applied to other disciplines and everyday life	exploring the environment. They also work as a team to sort objects and build a nature chart. -As a class they will keep the class clean by picking garbage to trash in the garbage can.		

Extension Resources:

Objects sorted from nature can be used for Math lesson to teach topics on shapes, colors, addition and subtraction. Also, for their drawing lesson, they can pick one object they learned about, draw and color in their drawing books. This is to help the pupils understand the concepts better and further reinforce connections that may contribute to, when combined with ongoing outdoor and environmental learning experiences, more positive environmental attitudes and behavior. An additional extension or assessment activity could involve using the image from the following website as a worksheet, where students circle natural v. human-made objects (https://www.pinterest.com/pin/571957221420934978/).

Lesson Plan 2

Date: _____

Unit: Animals
Level: 1 **Class:** 1
Lesson: The living world around us
Envisaged Project: Make an alphabet book of animal species. Have each child draw an animal for a letter of the alphabet and write a description of it. Put together as a book.
Enrollment: 20
Average Age: 6 years
Duration: 30 mins
Objectives:

- List examples of wild and domestic animals and provide a distinction between wild and domestic animals
- Recognize that animals are living things that grow, reproduce and need a habitat for survival
- Identify the ways in which animal's habitat provide for its basic needs or sustenance
- Distinguish between positively interacting with domestic animals and enjoying wild animals from a safe and respectful distance

Previous knowledge: Pupils can name some animals they know and or have seen
Resources: Pictures of domestic and wild animals, name cards, the school yard, zoo.
Reference (s): http://mpalalive.org/classroom/lesson/animals-around-us-kenya
Minnesota Department of Natural Resources (2005). Project Wild Minnesota. Early Childhood Supplement-www.projectwild.org.

Table 3: The Living World Around Us

Stages	Content	Facilitating Activities	Learning Activities	Resources	Remark
Introduction 3mins	Take the pupils outside and have them list all the animals that they see.	-Make one list of every species that was seen by the pupils. -Write them on cards	Using the cards, the pupils separate into two piles: one of wild animals, one of domestic.	Pictures of wild and domestic animals, the environment, name cards, the school yard, zoo.	

Presentation 17mins	-Animals are living things that grow, reproduce and need a habitat (food, water, space and shelter) for their survival. -Some animals are called wild animals (monkey, lion, elephants, tiger, giraffe) and other animals are called domestic animals (cats, dogs, rabbits). -A wild animal can live on its own, find its own food, water, space and shelter -A domestic animal needs people to provide habitat and care for its survival; it can't live on its own. - Domestic animals are friendly and used as pets by humans. -Wild animals are not friendly and could be seen in cages at	-Show pictures of animals and other living things - Demonstration of different habitat animals need for their survival. Hands on the stomach to represent food, hands on the mouth to represent water, hands spread wide to represent space and hands over the head to represent shelter. - Explain that humans interact with domestic animals because they are nice and friendly to us. Wild animals are not friendly and can easily harm us. Playing with them is not safe unless they are caged or kept in a	-Observation of picture showing living things. -Demonstration of different habitat - with a partner list words that describe wild animals and words that describe domestic animals -Share the words with the rest of the class		

	zoos and in the forest.	place that is safe for easy interaction with them like in the zoo.			
Evaluation 10mins	-From the list of animals indicated in the picture and a list of names of animals, match the animals to their names -Name your favorite animal and list the different habitat it needs to survive. -Explain why it is not safe to have a close interaction with a wild animal like a domestic animal.	-Presentation of pictures of some animals and names for pupils to match them correctly.			

Extension Resources:

- Plan a visit to the zoo and have students draw a scene where wild animals would be found and a scene where domestic animals would be found after the visit. (Drawing lesson)
- In an English lesson, the class can create an animal poem using the following guide:

  Line 1: Write the name of an animal (a noun).

  Line 2: Write two words describing an animal (adjectives).

  Line 3: Write three action words ending in "ing" (verbs).

Line 4: Write four words that relate to the animal such as its color or what it eats or where it lives.

Line 5: Write three more action words that end in “ing” (verbs).

Line 6: Write two words describing the animal (adjectives).

Line 7: Write one word (noun or the animal’s name). Write either the name of the animal or a synonym for the noun.

Helpful hints: Look at pictures or read about the animal you have chosen for your poem.

You may even want to observe the animal first before doing your poem. Make a list of

words that are related to the animal such as nouns, adjectives, verbs, and synonyms.

Begin each line with a capital letter and place a comma after each word.

Lesson Plan 3

Date: _____

Unit: Birds
Level: 1 **Class:** 1
Lesson: Bird Walk
Envisaged Project: Complete a bird picture as a class by placing a glue on a sketched bird. Using different food items like rice, bean, corn, etc., place the different items on the glue to differentiate the various parts of a bird. Label the bird.
Enrollment: 20
Average Age: 6years
Duration: 30 mins
Specific Objectives:

- Recognize the different characteristics of birds
- Describe two adaptations of birds- one physical and one behavioral
- Extend knowledge and skills gained in identifying birds to practical activities and /or interactions with birds in their community

Previous knowledge: Pupils can name common birds and recognize domestic and wild birds in their locality
Resources: Bird chart, Bird song
Reference (s): https://www.riverkeepers.org/wp-content/uploads/2016/07/Bird_Adaptations.pdf
Project Wild (2011). Growing up wild: Exploring Nature with Young Children. Ages 3-7

Table 4: Bird Walk

Stages	Content	Facilitating Activities	Learning Activities	Resources	Remark
Introduction 3mins	Let's take a walk outside to look for birds. Walk quietly, closely and name different birds you see.	Bird watching outdoors	Walking, listening and observing different birds, Counting of birds seen during the bird walk.	Bird chart, Bird song	
Presentation 17mins	Birds share several characteristics.	Action song that demonstrate	Action bird song with demonstrati		

	-All birds are warm-blooded and lay hard-shelled eggs. -They all have backbones, a four-chambered heart, and two legs. -Birds also have feathers that make flight easier. Long feathers on the wings and tail help birds balance and steer and other feathers provide insulation and protect birds from the sun's ultraviolet rays. Different species of birds have developed different types of wings, beaks, and feet to adapt to their lifestyles. These adaptations help birds live in their habitats and carry out their feeding methods in the most efficient way possible. Adaptation (features and behaviors) gives a good reason for what every bird looks like, and why it behaves the way it does. -Bird wings are largely adapted to fit a bird's flying and hunting style.	s special features birds must have to survive in their environment *see song lyrics in the extension section.	ons of how birds adapt to their environment		

	-A bird's feathers and coloration may help it fly, stay dry, attract a mate, or blend with its surrounding. -A bird beak is used for feeding, and it is shaped according to what a bird eats. -A bird uses its claws to get food. Different foot types allow birds to comfortably live in their habitats.				
Evaluation 10mins	-List common characteristics of all birds -Demonstrate two bird adaptations needed for their survival.	-Present the bird chart for pupils to use as guides to the answers. -Sing the bird song with the pupils as they demonstrate bird adaptations	- Oral responses, and bodily movements to respond to answers		

<u>Extension Resources:</u>

- Home connections of the lesson: Pupils take a walk in their neighborhood with a parent or guardian to see how many kinds of birds they can find, what the birds are doing and how their features look. Draw pictures of two different birds they watch and explain how they are similar and different from each other.

The Bird Song

(To the tune of "Here We Go Around the Mulberry Bush")

This is the way we flap our wings

Flap our wings, flap our wings.

This is the way we flap our wings,

Just like a dove.

(Continue in the same way with the following verses)

This is the way we peck at the worm…

Just like the robin

This is the way we use our talons…

Just like an owl.

This is the way we paddle our feet…

Just like a duck.

This is the way we drink our nectar…

Just like a hummingbird.

This is the way we scoop our fish…

Just like a pelican

This is the way we crack our seeds…

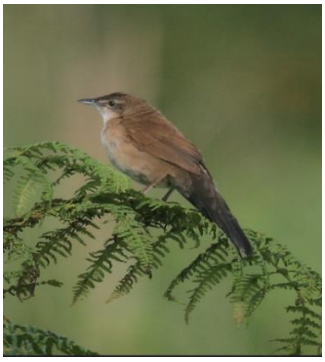
Just like a finch.

This is the way we catch our insects…

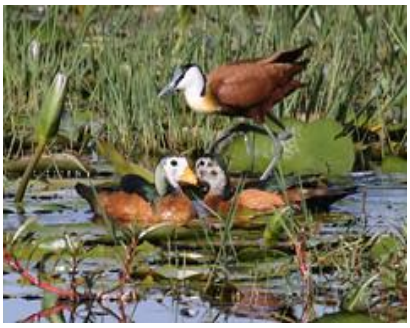
Just like a swallow.

Figure 1: Bird Species Found in Cameroon

Fan-tailed Grassbird

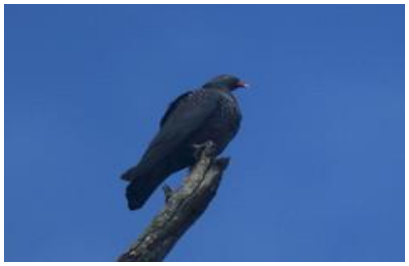


African Pygmy-Goose



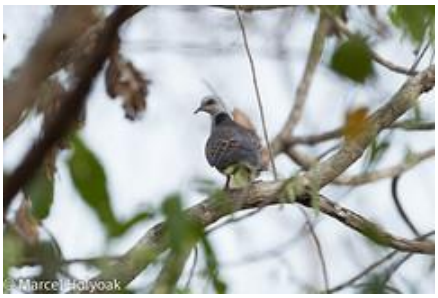
Gray Parrot

Cameroon Olive-Pigeon

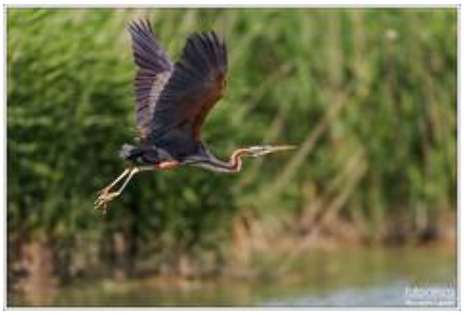


Black-Crown Crane

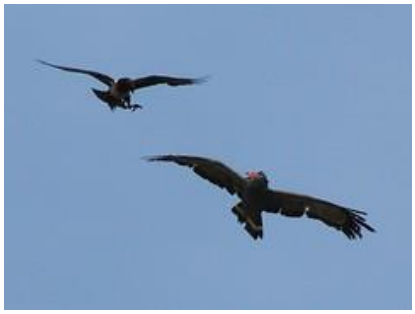
Adamawa Turtle-Dove



Purple Heron



African Harrier-Hawk



Retrieved from https://avibase.bsc-eoc.org/checklist.jsp?region=CM&list=clements

Lesson Plan 4

Date: _____

Unit: Insects
Level: 1 **Class:** 1
Lesson: Ants on Parade
Envisaged Project: "Big Ant Eyes"
Use cardboard egg cartoons to make a pair of ant eye glasses. Cut the cardboard to have two attached cups that could fit in a pupil's eyes. Poke a hole on either side and glue hard paper to form antennae. Tie a rubber band on both sides for support.
Enrollment: 20
Average Age: 6years
Duration: 30 mins
Objectives:

- Demonstrate how to hunt insects by practicing ant hunting around the school yard
- Explore places in the school environment where insects (ants) can be found and explain why they can be found in such places.
- Examine the physical characteristics of insects (ants) and explain how they behave

Previous knowledge: Pupils can identify, and name different insects found at home, in the farms and around the school environment.
Resources: Insect charts, paper plates divided into fourths with a marker, ant food items (ripe fruit, bread, meat)
Reference (s): Project Wild (2011). Growing up wild: Exploring Nature with Young Children. Ages 3-7

Table 5: Ants on Parade

Stages	Content	Facilitating Activities	Learning Activities	Resources	Remark
Introduction 3mins	-Names of different insects- ants, bees, termite, mosquito.	Take the children outdoors for an "Ant hunt"	A walk outside to observe ant behavior and learn insect characteristics	Insects charts	
Presentation 17mins	An ant's body is made up of head,	-Place the plate with ant	-Observe ant locate their food	Paper plates divided	

	thorax and abdomen. All ants live in small groups called colonies. Ants go through a four-stage life cycle- egg, larva, pupa and adult. It is easy to recognize an "ant hill," above the ground. Some ant colonies are found under the ground. Ants communicate by touching their antennae Ants and people have same basic needs: food, water, shelter, space, sanitation, care of young, etc. Ants can carry objects many times their size and weight in their mouths.	food besides an "ant hill" - Sing the insect song to name the parts of an insect	And how they behave when they find food -Share ideas and observations about ants	into fourths with a marker, ant food items (ripe fruit, bread, meat)	
Evaluation 10mins	-What was the most interesting thing you saw an ant do during	Provide guiding words like how they	-Discuss what they saw from observing ants		

	your observations? -where can we find ant colonies? -what are the main parts of an ant?	move, communicate,	-Describe where ant colonies could be found based. -Name the parts of an ant's body by singing the "Insect song"		

Extension Resources:

- Sing the following song with children to reinforce insect body parts: (To the tune of Head, Shoulders, Knees, and Toes):
- Home Connections: Your child is learning about ants and the way they live. Become an ant detective with your child and discover another world in your own yard.
- Journal: Help your child find an anthill or colony near your house. Be careful not to disturb it. Visit the colony each day for one week. Make observations with your child and ask questions about ants to prompt your child to share what he or she has learned in school. Help your child draw or write the story of your ant neighbors in his or her journal or Nature Notebook.

  If I Were an Ant: Find a quiet spot to sit with your child. Together, use your imaginations to complete the following statements:

  If I were as small as an ant...

  If I had six legs...

  If I were waiting inside a pupa (the cocoon in which a baby ant changes into an adult), I would think about...

Lesson Plan 5

Date: _____

Unit: Plants
Level: 1 **Class:** 1
Lesson: Parts of a plant
Envisaged Project: "My favorite plant"
Ask pupils to harvest a plant at home and bring to school. Plant them with the pupils in a safe area around the school and let them monitor and care for it by watering it every morning before the beginning of the school day.
Enrollment: 20
Average Age: 6years
Duration: 30 mins
Specific Objectives: Students will be able to:

- Explore plants/flowers in the school yard and label their parts
- Describe the function of the basic parts of a plant
- Illustrate how to plant them and care for them
- Interview different people to learn how they successfully grow plants.

Previous knowledge: Pupils can identify and name some plants in their home/school environment
Resources: The school yard
Reference (s): https://www.education.com/lesson-plan/parts-of-a-plant/

Table 6: Parts of a Plant

Stages	Content	Facilitating Activities	Learning Activities	Resources	Remark
Introduction 3mins	Identification of different plants and naming different parts of a plant in the school yard	Provide opportunities for pupils to observe and name different plant Identify a plant and ask your pupils whether anyone can tell you the different parts of a plant.	Observe, touch, and name different plants and parts of a plant	Plant in the school yard	

Presentation 17mins	Roots hold the plant into the soil. They take in water and minerals to help the plant stay alive. The stem is the part that carries water from the roots to the other parts of the plant. The flower helps the plant reproduce, making seeds that will grow into new plants.	Discuss the parts of the plants with your pupils.			
Evaluation 10mins	Name the different parts of a plant. What do the roots do? How do the roots help keep a plant alive? What purpose do leaves serve? What does the stem do? What do flowers do? Explain how you will care for a plant you will be planting.	Show one plant for pupils to see and respond to questions	Observe, and name the parts of a plant Explain how to care for a plant	A harvested plant	

<u>Extension Resources:</u>

- Un-scramble the letters in order to name each different part of this pretty plant (download activity from *https://www.education.com/worksheet/article/partsplant/?source=related_materials&order=1*

Lesson Plan 6
Date: _____

Unit: Water
Level:1 Class 1
Lesson: "Water for survival"
Envisaged Project: Weekly cleaning around water source found at school and or watering the school garden
Enrollment: 20
Average Age: 6years
Duration: 30 mins
Specific Objectives: Pupils should be able to:

- Appreciate the gift of water to all living things
- Explain why water is important.
- State at least three ways water can be used.
- Recognize the importance of not wasting water and model how to use water efficiently.

Previous knowledge: Pupils can state the different sources of water
Resources: Charts showing sources of water and the different ways water is used, word cards with uses of water, water song.

Reference (s):

Project Wild (2011). Growing up wild: Exploring Nature with Young Children. Ages 3-7
http://lessonplanspage.com/sciencessusesofwater2.htm/

Table 7: Water for Survival

Stages	Content	Facilitating Activities	Learning Activities	Resources	Remark
Introduction 3mins	**Sources of water** -Natural springs -Lakes and rivers -The ocean -Streams, -Wells -Rainwater	Present a chart showing different sources of water for pupils to identify and read aloud	Identify and read the different sources of water presented	Chart showing sources of water	
Presentation 17mins	Water is the essence of life on earth because all living things (plants and animals)	- Draw a picture to help students understand percentages.	-Pupils demonstrate their answers.	Chart showing different ways	

	need water to survive/ live. 75% of the earth is covered with water. Less than 3% of water is fresh water. 1% of the fresh water is available for use. -We drink water every day. - Fish live in water. - Plants need to be watered. Active living things are made up of water. Our bodies are made up of 65 to 70 percent of water. We consume water to stay healthy. We use water for drinking, bathing, washing of different items, cooking, farming, transportation When water gets polluted (contaminated), it becomes unhealthy for humans or other organisms There are different ways water can be misused: -Carrying more than we can use and throwing the rest away.	-Ask pupils to name the various ways they use water. -Write pupils' responses on the chalk board. -Review their responses and compare with the word cards and picture chart to ensure all uses have been stated. -Show the chart and ask pupils to say what they see. As pupils identify the various actions being per-formed, the word cards are placed beside them. -A brief discussion about how water can be misused. -Ask pupils to say why water is important and why it is necessary to use water without wasting it.	-Oral responses and group discussion. -Sing and demonstrate the water song	water is used, Word cards with uses of water, Water song.	

	-Taking baths and long showers. -Overwatering your lawn and or pants especially on a rainy day. -Running the water while brushing your teeth. It is necessary to conserve water so there can be enough for future use.				
Evaluation 10mins	- Why is water important? -List some of the ways water can be used. -State why we should not waste water?	-Ask the evaluation questions	-Think, discuss with peers, brainstorm, and respond to questions		

Extension Resources:

- Visit any water source around the school environment or in the community to understand how humans use the water and brainstorm ways the water source can be conserved.

The Water Song

(To the tune of "Here We Go Around the Mulberry Bush")

This is the way we brush our teeth

Brush our teeth, brush our teeth.

This is the way we brush our teeth,

With the help of water.

(Continue in the same way with the following verses)

This is the way we take our bath…

With the help of water.

This is the way we flush the toilet…

With the help of water.

This is the way we mop the floor…

With the help of water.

This is the way we hydrate our bodies (or drink our tea) …

With the help of water.

This is the way we water our crops…

With the help of water.

This is the way we cook our food…

With the help of water.

This is the way the fish can swim …

With the help of water.

Lesson Plan 7

Date: _____

Unit: Pollution and Waste management
Level: 1 **Class:** **1**
Lesson: "What can we compost?"
Envisaged Project: "Composting at school"
Compost near the school farm or trash pit by digging a pit beside a school farm or trash pit. Daily, the pupils will throw any compostable items into the compost pile for use in the school farm to add nutrients to the soil and to help plants grow well. Some of the compost should be added to the plants they planted during the plant lesson
Enrollment: 20
Average Age: 6 years
Duration: 30 mins
Specific Objectives: Pupils should be able to:

- Sort and identify items that are compostable.
- Recognize the importance of composting as one part of the larger issue of waste management
- Demonstrate a positive attitude towards pollution and waste management by practicing composting at school and at home.

Previous knowledge: Pupils can explain what pollution is and state the different types of pollution
Resources: The school's trash pit/ class trash can, list of trash items
Reference (s):
Composting in the classroom Soils and composting Explorations ... (n.d.). Retrieved from *http://www.wakegov.com/recycling/recycle/ftb/Documents/Lesson Plans/CIC_3_Rev.pdf*
DO THE ROT THING A Teacher's Guide to Compost Activities (n.d.). Retrieved from *http://www.cvswmd.org/uploads/6/1/2/6/6126179/do_the_rot_thing_cvswmd1.pdf*
Composting Goes to School Teacher's Guide (n.d.). Retrieved from *http://www.compost.org/English/PDF/Composting_Goes_to_School.pdf*

Table 8: What can we compost

Stages	Content	Facilitating Activities	Learning Activities	Resources	Remark
Introduction 3mins	Some items that are considered as trash are unused clothes	Have each student name	Identification, listing and sorting	The school's trash pit and the class'	

	and shoes, fruit peels and seeds, milk tin, shredded paper, leaves, sticks, plastics	one thing they throw away each day and write each item on half of the board. Take them to the school's trash pit/ can and let them identify some items trashed at school.		trash can, chalkboard	
Presentation 17mins	What is compost? Compost is any material that can decay and add nutrient into the soil. Composting reduce the amount of waste going into the landfills Some of the things we throw away, like aluminum cans and plastic bottles, do not decay. They are called non-biodegradable because the material they were made from does not decay easily. Banana peels, leaves, wood, and paper are all examples of biodegradable matter. Biodegradable	Explain to students that not all the items must go into the trashcan. Some can be recycled, reused, or composted. Explain to students that composting is a way to recycle organic (plant or animal) material.	Observation and discussion		

	matter can decay, or break down, and eventually becomes compost. Composting is a way of recycling the organic materials that the humans might throw away Items that can be composted Food waste and non-food items can be composted Food waste Such as orange peels, banana peels, potato peelings, bread crusts, eggshells, coffee grounds Non-food items Such as shredded newspaper, teabags, leaves, grass, and sticks. Key: Can be Composted: Leaves, branches, banana peel, vegetables, grass, hay, sticks, apple core				

	Cannot be composted: Oil, can, boots, books, cheese, bones, turkey, paint NOTE: Animal products such as cheese, bones, and turkey should only be composted in large-scale or commercial-type composting processes, not in classroom or residential compost bins				
Evaluation 10mins	From the list of trash items sort all items that are compostable. Retrieve handout from http://www.wakegov.com/recycling/recycle/ftb/Documents/Lesson Plans/CIC_3_Rev.pdf	On the other half of the board, write items that can be recycled, reused, compostable, and trashed. Go back through the list of brainstormed trash items and have the students sort the item that are compostable	Observation, sorting, composting		

<u>Extension Resources:</u>

- Students will play a relay game that reinforces their knowledge of what materials can and cannot be composted. Organize a compost relay race for pupils to sort compost items

from a pile of trash items to another end marked as a compost pile. Pupils should compete either in pairs or two large groups. Print and laminate the different trash items introduced in class and use for this activity. This could be done during physical exercise lesson or Math lesson to teach subtraction, sorting or grouping of like items. Note: There should be enough materials so that each student can choose an item during the relay.

- Schools can collaborate with Non-Governmental Organizations that focus on environmental practices to reduce pollution and manage waste. These organizations can collaborate with the schools to provide support and teach skills in composting.

Lesson Plan 8

Individual Lesson Plan on Environmental Science
Date: _____

Unit: Environmental Hazards
Level: 1 **Class:** 1
Lesson: "My service for a healthy environment"
Envisaged Project: Make different items from recyclable materials like milk or tomatoes tins, boxes (cartoons), newspapers, and plastic bottles. A display of the products in class, to the entire school and or during Parent Teacher Association (PTA) meetings
Enrollment: 20
Average Age: 6years
Time: 10:30 am- 11:30 am
Duration: 30 mins
Specific Objectives: Pupils should be able to:

- Identify different types of environmental service learning activities.
- Explain why it is important to carry out an environmental service in the community
- Realize the difference made on the environment and to the community through their services.
- Render environmental services in their community in different ways and settings

Previous knowledge: Pupils can identify different items that are hazardous to the environment
Resources: Community sites for service learning
Reference (s): https://www.learningtogive.org/resources/environmental-service-learning-toolkit

Table 9: My Service for a Healthy Environment

Stages	Content	Facilitating Activities	Learning Activities	Resources	Remark
Introduction 3mins	**Types of service learning** -Making a community/ school garden -cleaning around a community tap -tree planting along the streets	Ask pupils to state different ways they can render serves to the community	Brainstorm and discuss	The school yard and the community	

	- Picking trash along the beaches, rivers, streams, in the community -Weeding and removal of invasive species.				
Presentation 17mins	Environmental service learning is one of the ways we can render services to the community and keep our environment clean. Through this activity, pupils, teachers and community members learn from one another. It also encourages healthy living and development in the community. It is an authentic and hands-on experience that is life changing as it relates experiences to concepts taught in the classroom which is applicable in real life situations. Partnership is important for service learning. This gets other community members and	Choose one of the listed service learning types (Picking of trash in the community) and carry out the activity. This should be around the school and within class period. Also, it should be done under supervision of the teacher and other elders in organizations and the community. This is because they are young and need supervision while caring out this project. Community members present should be actively involved to motivate and	Participate in an activity as they render their services to the community while learning about different ways they can contribute to reduce environmental hazards and live in a healthy environment	The community (Any place closest to the school)	

	organizations involved in rendering services that are beneficial to the society. Examples of partners who can support directly (physically present and participating during the activity) or indirectly (financial and material support) to service learning in schools are: -The council -Community members -Chiefs and quarter heads -Parents -Non-Governmental Organizations -The Inspectorate of Basic Education - Other schools - Zoo, Botanic Garden, amusement parks (recreational centers) - Churches and social groups - Volunteers	encourage the pupils. -Split the class in groups of three or four and assign elders to lead the group to carry out the exercise			
Evaluation 10mins	-Name the different items you collected during this exercise? - What was the most common item found	- Provide water and soap for pupils and partners to wash their hands.	Discussion		

	while carrying out the activity? -What difference did this activity make to our environment? - Why is service learning important in our community?	- Ask questions for pupils to answer			

Extension Resources:

Pupils should collect trash around their homes with their friends and families and dump them in the right places. Also, with the help of their guardians, they should write a list of the different trash items collected. The pupils should bring at least two recyclable items collected that could be used for their class project.

CHAPTER FIVE

DISCUSSION

Summary

The final product of this project is the compilation of 8 lesson plans on Environmental Science Education for Class 1 pupils of Cameroon's English-Speaking Schools. The lessons are drawn from the eight topics found in the present Scope and Sequence for Level I. It is hoped that the lessons will be modified by teachers of other classes according to the grade levels of their pupils since most of the classes have similar topics. These lessons are unique in that they focus on hands-on learning experiences in an outdoor setting, a method that is not common with schools in Cameroon. Also, these lessons are written alongside some resources that will facilitate their teaching-learning process and motivate teachers who expressed their lack of time and resources to effectively teach EE lessons in the outdoor setting. Again, with the aim of writing the lessons to encourage effective EE practices at school and in the community, teachers can apply this method of teaching to other subjects. This will not only improve pupils' knowledge in the subjects, but also improve their academic performances and how they relate learning to real life situations.

From my experience as a school principal and classroom teacher, I realized the need for this curriculum with lessons and resources for effective and efficient teaching of EE. Teaching outdoors is uncommon with most schools in Buea and Limbe where I have been a school administrator and classroom teacher. Also, the informal needs assessment conducted with eight principals of some schools in Limbe confirmed my stance about the lack of outdoor learning in schools. They expressed the lack of time and resources as reasons for not using the outdoors for EE lessons. Thus, the goals of this curriculum were:

1. To encourage more outdoor experiential learning and use of local community settings (non-formal learning environments) in the instruction of the Environmental Science curriculum in English-speaking Primary schools in Cameroon.
2. To contribute to environmental education implementation in Cameroon schools by addressing the barrier expressed by teachers regarding a lack of lessons designed to support outdoor environmental learning experiences, as well as the barriers of lack of time and lack of resources.

Reflection on the Process

Six principals responded to an informal needs assessment which guided me in developing a scope and sequence for EE lessons. The updated Scope and Sequence was drawn from the past scope and sequence for EE in Cameroon's English-Speaking Schools. However, due to an upgrade of the Scope and Sequence, it was no longer necessary to use the one I developed but work on the upgraded one provided by the government. This changed the focus to the development of eight lesson plans for Level 1 (Class one).

Structuring the lessons to include the use of outdoors and available resources in the school environment and the community was necessary. This is because it is not a common practice in Cameroon's English-Speaking schools. Development of lessons to include authentic hands-on learning experiences in an outdoor setting has been my desire. This is because this method improves instruction, encourages creative and critical thinking, individual and collaborative problem-solving skills, and active citizenry which can foster development in the nation. For effective and efficient time and resource management, lessons have been written with supportive resources, most of which are easy to get at little or no cost. Most of the resources

are common and affordable. The goal is to limit the barrier to effective implementation of lessons by the teachers. I feel fortunate to have had supportive committee members who have contributed their expertise throughout this process of curriculum development. The implementation of the curriculum will begin when the economy is stable.

Reflection on the Significance

This project is significant in that it provides opportunity for teachers to use different teaching methods, combine teaching and learning in both in-door and outdoor settings and encourages authentic learning experiences which are meaningful and applicable in real-life situations. Teachers and pupils will be active participants during lessons with teachers acting as facilitators while learners control their learning experiences. Using this curriculum will be helpful for facilitating the understanding of abstract concepts taught as learners participate in first-hand learning activities. The lessons prompt opportunities for bring in different subjects (such as writing poems, singing, and math skills) to broaden pupils' knowledge and understanding of environmental concepts and also to encourage teaching across subject areas.

Community partnership and collaboration can be enhanced when schools connect and collaborate with resource persons in the community to facilitate teaching of some lessons. This could be done by either inviting experts/resource persons to teach lessons at school or field trips to community resource centers. Also, a participatory pedagogy will be introduced in schools to encourage teachers to be co-researchers in building relationships with households to gain funds of knowledge necessary for schools. This is an effective method that would be adopted from a qualitative research conducted by Luis C. Moll, Cathy Amanti, Deborah Neff & Norma Gonzalez (1992), where knowledge and resources in the community were useful and effective connections between homes and classrooms.

The curriculum is not limited to English-Speaking schools but could also be adopted by French-Speaking schools in Cameroon. This is one step in encouraging harmonization of both systems of education in the nation as has been one of the goals of education in Cameroon.

With the growing environmental issues facing Cameroon and in light of the immense challenges facing Cameroon that stretch across human rights, politics, and the economy, this curriculum is one small contribution, that when combined with other efforts to improve education and support the development of environmental literacy among its citizens, can contribute to a more sustainable future for Cameroon.

Future Plans

Implementation of the project will begin when the economy is stable as most schools have not been functioning effectively since the onset of the crisis in November 2016. There will be a professional development training session with the pilot school teachers. The aim is to guide them on how to teach the lessons and in a cost-effective and time-efficient manner.

I will also observe different lessons taught at the various pilot schools in order to identify teachers' difficulties during implementation of the lessons. I am also hoping to get feedback from teachers for modification of the lessons before implementation at the national level.

Conclusion

Given the many environmental issues in an agricultural nation like Cameroon, and the need for active citizenry that can contribute to solve these problems, implementing this curriculum will create an impact on the nation's economy through stewardship for a sustainable future. Also, some of the problems limiting outdoor learning and authentic hands-on experiences

have been resolved with the development of this curriculum. This curriculum is a gateway to achieving the goals of EE, improving academic performance and self-reliance.

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Appendix A

Current EE Curriculum for Cameroon's English-Speaking Schools

Class 1		Class 2		Suggested Methodology and Didactic Materials	
Environmental Science					
Expected Learning Outcomes	**Units / Contents**	**Expected Learning Outcomes**	**Teaching and Learning strategies**	**` Didactic Materials**	
Immediate environments - Home environment - School environment - Care of home and school environments	- Identify the components of the home/ school environments - Care for the home and school environment - Care for plants .	**Immediate environments** - Home environment - School environment - Care of home and school environments	- Describe the components of the home/ school environments - Care for the home and school environment - Appreciate their immediate environment - Care of plants	- Project method e.g. tree planting - Demonstration - Cooperative learning	Real objects, pictures, drawings, videos, cuttings, seeds, hoes, diggers, machettes, models, posters etc.
Animals - Domestic and wild animals. - Habitat and care	- Identify domestic animals - Recognise the different habitats of domestic animals - Stay away from danger	**Animals** - Domestic animals - Wild animals - Habitat and care	- Describe the different habitats of animals - Care for animals - Stay away from danger	- Demonstration./ Discussion. - Flipped classroom - Health talks - Role-play/simulation - Team work - Talk from vetererinary doctor	Cage, water, soap, gloves, pictures, drawings, videos, posters etc.
Birds - Domestic and wild birds - Habitats and care	- Recognize domestic and wild birds in their locality	**Birds** - Domestic birds - Wild birds - Habitats of birds and care	-Describe the different habitats of birds. -	- Demonstration./ Discussion. - Flipped classroom - Out door visits - Health talks - Role-play/simulation - Team work	Cage, water, soap, gloves, pictures, drawings, videos, posters etc.

Class 1		Class 2		Suggested Methodology and Didactic Materials	
Environmental Science					
Expected Learning Outcomes	**Units / Contents**	**Expected Learning Outcomes**	**Teaching and Learning strategies**	**` Didactic Materials**	
Insects - Types of Insects -Useful and harmful insects	- Describe the various types of insects in the locality. - Protect insects	**Insects** -Types Insects - Useful and harmful insects	- Classify insects. - Protect insects	- Demonstration/ Excursions - Discussions - Flipped classroom	Pictures, drawings, videos, insect box, etc.
Plants -Types of plants -Types of flowers - Care for plants	-Identify different types of plants and flowers - Plant trees and flowers - Care for plants and flowers	**Plants** - Types of Plants - Flowers –Uses of flowers	- Describe plants and flowers according to their characteristic - Plant trees and flowers - Care for plants and flowers	- Demonstration// Excursions - Discussion. - flipped classroom	Pictures, seeds, seedlings, cuttings, hoes, diggers, machetes, manure, used tyres, bags/plastics/buckets, videos
Water - Sources of water - Care of water sources	-Identify the different sources of water -Protect sources of water	**Matter** - Water -Good sources and bad sources - Care of the sources of water	- Describe the different states of matter - Distinguish the sources of water Protect the sources of water	- Demonstration . Excursion - Discussion - Cooperative learning	Real Objects, pictures, drawings, videos, models, posters etc.
Pollution and waste management - Pollution -Waste management	- Identify types of pollution Demonstrate ways of preventing pollution - Use dustbins correctly	**Pollution and waste management** - Types of polution - Prevention - Waste management	-Differentiate types of pollution -Describe ways of preventing pollution - Use dustbins correctly	- Demonstration/ Excursion - Discussion/ - Outdoor lessons to enable learners observe	Real Objects, pictures, drawings, videos, models, posters etc.
Environmental hazards - Environmental hazards - Environmental care	- Identify environmental hazards - Identify strategies to protect the environment	**Environmental hazards** - Hazards in the locality	- Describe how environmental hazards can be prevented - Protect the environment	- Role-play/simulation - Educative talks - Team work	Sketches, pictures, drawings, videos, cuttings, seeds, seedlings, hoes, machetes, watering cans, water, bottles, masks, gloves, etc.

Class Three		Class Four		Suggested Methodology and Didactic Materials	
Birds - Domestic and wild birds - Main features	- Describe birds according to their features - Show love for preserving birds	**Birds** - Domestic and wild birds - Habitat and care for birds	- Differentiate domestic and wild birds in the locality - Describe the different habitats of birds - Differentiate their mood of feeding - Practise conservation	- Project method. - Experimentation Demonstration - Excursion - Discussion	- Real objects - Specimens - Charts/Pictures - Magazines - Models - Community resources
Fishes - Types - Parts	- Identify the various types of fishes - Describe the different parts of fishes - Show love for healthy eating habits	**Fishing** - Tools - Methods	- Identify the various tools of a fisher man. - Describes the methods of fishing - Show love for healthy eating habits	- Project method. - Experimentation - Demonstration - Excursion. - Discussions - Flipped classroom	- Real objects - Specimens - Charts/Pictures - Magazines - Models - Community resources - Recycled material
Insects - Types	- Classify insects according to their usefulness - Conform with environmental ethics	**Insects** Characteristics	- Differentiate the various types of insects in the locality - Protect insects	- Project method. - Experimentation - Demonstration - Excursion. - Discussions - Flipped classroom	- Real objects - Specimens - Charts/Pictures - Magazines - Models - Community resources
Plants - Seeds - Seed dispersal	- Identify the various types of seeds - Describe the characteristics of seeds - Explain the various agents of seed dispersal.	**Plants** - Types - Flowers - Greenery	- Differentiate plants and flowers according to their characteristic- - Plant trees and flowers - Care for plants and flowers	- Project method. - Experimentation - Demonstration - Excursion. - Discussions - Flipped classroom	- Real objects - Specimens - Charts - Pictures/Magazines - Models - Community resources - Recycled material -

Class Three		Class Four		Suggested Methodology and Didactic Materials	
Matter - State - Water	- Describe the various states of matter - Associate different sources of water to their uses. - Explain qualities of potable water. - Show interest in drinking water regularly	**Matter** - Water - The school water source	- Care for the school water source - Protect the sources of water - Show interest in drinking water regularly	- Project method. - Experimentation - Demonstration - Excursion. - Discussions - Flipped classroom	- Real objects - Specimens - Charts - Pictures - Magazines - Models - Community resources - Recycled material
Pollution - Types	- Describe the different types of pollution - Differentiate between organic and inorganic waste. - Practise waste separation	- Pollution - Waste management	- Differentiate types of pollution. - Describe ways of preventing pollution. - Dispose of dirt/waste responsibly	- Project method. - Experimentation - Demonstration - Excursion. - Discussions - Flipped classroom	- Real objects - Specimens - Charts - Pictures - Magazines - Models - Community resources - Recycled material
Environmental Hazards	- State environmental hazards in the locality - Demonstrate awareness on how environmental hazards affect people and other living things. - Analyse problems related to environmental hazards	- Hazards in the locality	- State environmental .hazards in the locality - Describe some prevention measures - Discuss some coping mechanisms - Protect the environment	- Project method. - Experimentation - Demonstration - Excursion. - Discussions - Flipped classroom	- Real objects - Specimens - Charts/Pictures - Magazines - Models - Community resources - Recycled material
Soils - Types of soils - Characteristics of soil	- Conduct simple experiments to bring out the characteristics of different types of soils - Raise awareness on environmental protection	**Planting** - Planting of Trees, Grass and Flowers	- Show concern for the protection of the environment. - Raise awareness on environmental protection - Propose an environmental campaign	- Project method. - Experimentation - Demonstration - Excursion. - Discussions - Flipped classroom	- Real objects - Specimens - Charts/Pictures - Magazines - Community resources