EFFECT OF LANGUAGE OF INSTRUCTION, SCHOOL LOCATION AND GENDER ON PUPILS' ATTITUDE AND ACHIEVEMENT IN ENVIRONMENTAL EDUCATION IN CAMEROON

BY

BRENDA NACHUAH LAWYER
REG N0: PG/Ph.D/10/57722

A THESIS SUBMITTED TO THE DEPARTMENT OF ARTS EDUCATION, FACULTY OF EDUCATION, UNIVERSITY OF NIGERIA, NSUKKA, FOR THE AWARD OF A DOCTOR OF PHILOSOPHY (Ph.D) DEGREE IN CURRICULUM STUDIES.

SUPERVISOR: DR. J. C. ADIGWE

OCTOBER, 2013

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CERTIFICATION

This is to certify that, this study on: ñEffect of Language of Instruction, School location and Gender on Pupilsô Attitude and Achievement in Environmental Education in Cameroonò was carried out by **Brenda Nachuah Lawyer**, a postgraduate student in the Department of Arts Education, Faculty of Education, with Registration Number **PG/Ph.D/10/57722**, to complete the requirements of research work for the award of the degree of Doctor of Philosophy in Curriculum Studies. The work embodied in this thesis is original and has not been submitted in part or full, for any other degree in this or any other University.

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BRENDA N. LAWYER
STUDENT

DR J. C. ADIGWE
SUPERVISOR

APPROVAL

This thesis, submitted in partial fulfilment of the requirements for the award of a Doctor of Philosophy (Ph.D) degree in Curriculum Studies, to the Department of Arts Education, University of Nigeria, Nsukka has been approved

BY

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Dr J. C. ADIGWE
Supervisor

.....

Internal Examiner

.....

External Examiner

.....

PROF. UJU C. UMOH
Head of Department

.....

PROF. I. K. IFELUMNI
Dean, Faculty of Education

DEDICATION

This work is dedicated to my late beloved husband

Adjoffoin Peter Diangha,

who encouraged me to venture into this but unfortunately could not see the end.

ACKNOWLEDGEMENTS

This research would never have gone through without the support of some individuals. Obviously, my singular effort could not have produced a piece of work like this. I received academic, financial and moral support from my teachers, family and friends respectively.

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ABSTRACT

The purpose of this study was to investigate the effect of language of instruction, school location, and gender on pupilsô attitude and achievement in environmental education in Cameroon. It sought to find out the relative effect of French and English as languages of instruction, rural and urban location of schools, and gender (male or female) on pupilsô attitude and achievement in environmental education. The study adopted the quasi experimental design specifically, the non randomised pre-test- post test control design. Thirteen research questions and their corresponding hypotheses were formulated to guide the study. The population for the study was 31,996 pupils comprising 15,966 boys and 16,030 girls from 134 primary schools in Fako Division. The sample for the study was 291 class six pupils pupils (153 girls & 138 boys), from the nine sample schools. Multi-stage sampling consisting of the stratified, simple random, purposive and cluster sampling techniques were used for the selection of the schools and classes for the experiment. An Environmental Education Achievement Test, (EEAT) and an Attitude Scale (ATS) were designed and used for data collection. Data were subjected to descriptive and inferential statistical analysis using means and standard deviation and Analysis of covariance (ANCOVA). Means and standard deviation of scores were used to answer the research questions, and the null hypotheses were tested using ANCOVA. The results revealed that pupils taught environmental education in English had a higher achievement scores than those taught in French; Pupils from rural schools achieved better than the pupils from urban schools; male pupils achieved better than the female pupils. Results also indicated that English pupils have more positive attitudes towards environmental education than the French pupils; urban pupils had more positive attitudes towards environmental education than their rural counterpart; and female pupils had more positive attitudes towards environmental education than males. There was no interaction effect between language of instruction and location; language of instruction and gender and school location and gender on pupils achievement in environmental education. The results however revealed that there was a significant interaction effect between language of instruction and school location on pupilsô attitudes towards environmental education. No significant interaction effect was seen between language of instruction and gender and school location and gender on pupilsô attitude towards environmental education. Lastly, it was discovered that there is a significant interaction effect between language of instruction, school location and gender on pupilsô achievement in environmental education. Based on the results, it was recommended amongst others that more emphasis should be placed on teachersô communication skills in the planning and designing of teacher training programs and that curriculum planners should consider locations when developing syllabuses. One of the recommendations was for teachers and educational authorities to encourage the female pupils to take their lessons in environmental education seriously so as to improve their achievement and that parents should help encourage children at home so they can develop more positive attitudes towards environmental education. It was also recommended that workshops be organised regularly for the teachers in Fako Division to acquaint them with the necessary skills for the effective teaching of environmental education concepts.

CHAPTER ONE

INTRODUCTION

Background to the study

The environment has become one of the major concerns in the world today. This is as a result of the increase in population over the years and manôs quest for more comfort and luxury in form of development, which is exerting a lot of pressure on the environment. Lambi (2001) explains that the environmental problems confronting human civilisations today are enormous and range from the pollution of land and water resources, to the widespread deforestation and biodiversity loss, and the over-exploitation of planetary resources against the back drop of an increasing global population. According to Nwafor (2007), these problems result from the fact that humans have taken control of the things of the earth, (both living and non living) and subdued them to the extent of destruction rather than preservation of the environment which God gave him to control and rule. Lambi (2001) also emphasizes that the major environmental problem today is the fact that human activity is taking resources from the environment faster than nature can replenish them, and producing wastes faster than the earth can absorb them.

Many of these problems are the result of irresponsible environmental behaviour which is highly influenced by the attitudes people possess (Meinhold & Malkus, 2005; Ramsey & Rickson, 1976). In other words, peopleôs decision making is also guided by the values and attitudes they possess (Rennie, 2005, 2007). It is evident from this fact that if

nothing is done in future to remedy the situation; life on earth will be difficult if not impossible.

Lambi (2001) points out that, environmental problems may be driven by many factors including economic growth, population growth, urbanization, intensification of agriculture, rising energy use and transportation. Poverty also, still remains a problem at the root of several environmental problems. The majority of the people of this planet, earth, especially Africa live below the poverty line, and her environment is now in a state of chaos such that some have called the manipulation of the environment an irreversible human experiment (Caldeira, 2003).

Cameroon is not free from these environmental problems, despite its high economic growth relative to the population; it is still facing a familiar string of environmental problems, which are tightly connected to socio-economic factors that afflict the population. According to the United Nations Organisation estimates for 2009, Cameroon's population is placed at 19,522,000. The population is youthful with an estimated 40.9% under 15years and 96.7% under 65years. The birth rate is estimated at 34.1 births per 1,000 people, while the death rate stands at 12.2. The life expectancy is 53.69 years (52.89 years for males and 54.52 years for females). (United Nations, 2009)

The only way there may be a possibility of reversing the human effects on the environment, and improving the quality of life is by changing the way of life to be compatible with that of the natural environment, that is, managing the natural resources in a sustainable manner. Present generations while extracting the resources necessary for

their wellbeing from the environment should ensure that the needs of future generations are guaranteed (Lambi, 2001). This implies that man can no longer continue consuming the existing resources and producing waste at the rate it is doing now without control as our human population continues to grow at an alarming rate. Sustainable development is an appropriate option towards a solution to this dilemma.

The introduction of Environmental Education (EE) in primary schools in Cameroon in 1996 was considered to be one of the best ways of involving this very powerful and most concerned group in the environmental protection and conservation process. It was incorporated into the school curriculum so that pupils and students would learn about the environment, develop skills to investigate and solve issues in the environment, acquire attitudes of care and concern for the environment, adopt behaviours and practices which protect the environment and finally understand the principles of ecologically sustainable development (Living Earth Foundation, 2006).

The World Wide Fund for Nature (WWF), an international Environmental Education charity group was involved in producing the 1996 Environmental Education curriculum package for Cameroon primary schools which was in use from 1996 to 2001 when it was modified and a new one was introduced. The need to fully involve children and youths who are the main stakeholders of the environment is more than just an imperative. The young people have a lot to do with environmental protection and conservation given how long they still have to live on planet earth. That is why the introduction of Environmental Education in primary schools is seen to be the most important tool in the effort towards

the conservation and protection of the environment. Despite the fact that the young people are owed a sustainable environment in the years to come, they are also supposed to be involved in its conservation and protection, hence the necessity of instilling positive attitudes towards the environment in them.

It is worth noting that young people, with their enthusiasm and energy, can have an important influence on others, notably their friends, peers, parents, extended family members and the society as a whole. It should not be forgotten that it is the young people who have more to gain or lose by either addressing or ignoring the development of more sustainable ways of doing things. They are therefore likely to be good ambassadors, for todayôs young people are those who will be the farmers, industrialists, teachers, administrators and politicians of tomorrow.

These environmental problems, whose effects are so enormous on manôs survival, can be explained by political, cultural, social, historical and religious causes or factors for the world, Africa and Cameroon. From a historical point of view, the coming of the colonial masters to Africa in general and Cameroon in particular had a great influence on their behaviour, attitudes and educational systems. Cameroon had a complex history of colonialism. After the Berlin Conference of 1884, it was formally colonised by Germany. Cameroon is a multilingual country comprising 247 indigenous languages; two official languages and Cameroon Pidgin English (see Breton and Fohtung, 1991; BoumNdongo-Semengue and Sadembouo, 1999). According to Ngoh, (1996) the First World War brought to an end German colonial authority, but ushered in a dual British and French

colonial mandate that partitioned the country into two: Britain ruling a fifth of it together with its larger colony, Nigeria, and France governing the rest of the country. Various linguistic and political policies were adopted during the colonial period and that shaped the development of the colonial languages of English and French.

Language is the primary means of communication among people. It is a central topic of study in cognitive psychology because it is closely connected with perception, memory, thinking, problem solving and other mental processes (Moore, 2001). Consequently, to study pupilsô achievement in environmental education it is important to consider the language of instruction used in teaching environmental education concepts to the pupils.

Teachers communicate with learners to bring about learning. Language of instruction may or may not be the official language of the country or territory. Where the first language of students is different from the official language, it may be used as the medium of instruction for part or all of schooling (Moore, 2001; Borich, 2011). Bilingual or multilingual education may involve the use of more than one language of instruction. UNESCO considers that "providing education in a child's mother tongue is indeed a critical issue". Language of instruction and hence effective communication is therefore one of the aspects to consider when teaching and learning are expected to be effective, producing individuals who can think critically and make decisions that can solve real life problems. It is also possible that being a male or female might affect achievement of pupils and students when using particular languages.

Gender is one of the factors that might affect pupilsô achievement in school; it refers to being a male or a female. The relationship between gender and student achievement has not been given much attention in educational studies in Cameroon. Gender has been associated with school participation more than with achievement. It is common practice in most cultures that the woman stays in the home and it goes with the saying that ña womanôs place is in the homeò. The few women who have been to school have proven this wrong and so it is important to find out their achievement in school especially in particular subject areas.

Care for the environment needs some values that an individual must possess to be able to protect the environment. To protect the environment, people should be interdependent, compassionate, nurturing so that they can have positive feelings towards the environment. Based on the socialisation theory, Zelenzny, Chua & Aldrich (2000), discovered that female pupils and female secondary school students perform significantly stronger in environmental attitudes and greater participation in pro-environmental behaviours than their male counterparts. This is because females socialise better than males and when these attitudes are brought to the classroom they are expected to affect the achievement of these students in one way or the other. The South West Region in general and Fako Division in particular, has a population with more females than males and the pupil population has a gender distribution of 15,966 boys and 16,030 girls (South West Regional Delegation for Basic Education, 2012; appendix I). The population of female pupils in Fako Division is more than that of males, so if the attitude of girls

towards the environment is positive it will be good for the area considering their numbers.

School location simply refers to where the school is and in this study the urban and rural locations were considered. The location of schools is said to have a lot to do with what and how children learn. The rural school children have very few distractions; however, they lack some basic facilities that motivate the pupils to learn. Some localities in Fako Division still lack basic necessities like electricity, and so modern facilities like the computers, radios and television cannot be used in such areas. Pupils learn through a lot of observation and modelling and these facilities are good for such. Conversely the urban children are exposed to these modern technologies and they learn from them but at the same time some of the facilities constitute a distraction for them. Environmental education is a subject that needs a lot of practical experience, pupils learn best when they see, hear and touch. The children in urban areas might have problems understanding some issues about the environment because they have never had an opportunity of seeing, for example, an elephant, a tiger, or some types of trees. But a child from a rural area who has seen all of the above will understand the concepts and issues better and faster. Therefore it is a necessity to investigate the effect of school location (urban and rural) on pupilsô attitude and achievement in environmental education.

An attitude can be defined as a positive or negative evaluation of people, objects, events, activities, ideas or just about anything in your environment (Zimbardo et al., 1999). Attitudes are expected to change as a function of experience. They are shaped by our experiences (Crooks and Stein, 1991). Learning is defined by most researchers as a

change in behaviour resulting from experience (Santrock, 2000). Experience can be obtained in the classroom (lessons from teachers, ie language of instruction), friends (gender), environment (urban or rural location of school) and others. Attitudes influence how people see the world and the attributions they make to explain events (Wade and Tavris, 1990). Attitudes help us to appraise people, objects and situations, thus providing structure and consistency to our social environment. Improvement of the current condition of the environment depends on the changing of peopleôs attitudes towards positive reflection upon themselves and also on their surroundings. Environmental attitudes are therefore a big concern in significant environmental education research (Bradley, Waliczek, &Zajicek, 1999; Clarke, 1996; Dienno& Hilton, 2005). The attitude of pupilsô towards their environment and environmental education could be affected by the language used in disseminating the concepts to the pupils, the gender of the child and the location of the school. Positive attitudes will most likely have similar effects on the achievement of pupils in environmental education.

Cary, J. Roseth, W. J. David, & T. J. Roger (2008), define academic achievement as performance on task with measures including comprehension, quality and accuracy of answers of tests, quality and accuracy of problem solving, frequency and quantity of desired outcome, time or rate to solution, time on task, level of reasoning and critical thinking, creativity, recall and retention and transfer of tasks. It refers to a successful accomplishment or performance in particular subject areas. It is indicated as grades, marks and scores of descriptive commentaries. Academic performance refers to how students accomplish different tasks given to them by their teachers in a fixed time or

academic year (Hawis and Hawes, 1982). This study focuses on the academic achievement in the form of grades and marks in examinations, Since learning is supposed to be the acquisition of new knowledge, skills, attitudes and values, or preferences and may involve synthesizing different types of information leading to behaviour modification.The curricular concept of integrating or connecting school subject areas has gained significant attention in recent years as a plausible solution to develope a more relevant approach to teaching and learning (Emeh,2006, Enu, 2005, Cheek, 1992, Adelman, 1989) It therefore implies that a change in the pupilsô behaviour should be assessed before concluding that Environmental Education knowledge, skills and attitudes have been transmitted to the pupils.

In a study carried out by Chongong (2002), on the evaluation of the extent of implementation of the 1996 Cameroon primary school Environmental Education Syllabus in Fako Division, it was discovered that syllabus coverage ranged between 41 and 90%, while pupilsô achievement in EE skills and positive environment attitudes were found to be low. It is imperative therefore to investigate the plausible factors that might influence the change in behaviour that will positively affect pupilsô attitude and achievement in environmental education in Fako Division.

Statement of the Problem

The primary school pupils whose activities can greatly determine how our immediate environment will be in future, form a greater fraction of the active population as revealed by the 2009 Cameroon population statistics. As a result, Environmental Education was

introduced into the primary school curriculum to create and reinforce environmental awareness amongst the pupils so that they could develop a positive change in behaviour towards the environment, by emphasizing cognitive achievement and acquisition of attitudes, values and the skills relevant to sustainable environmental attitudes and behaviour.

Environmental Education is taught in Cameroon primary schools as a basis for instilling environmental awareness in the younger population. In Fako Division like in most areas around the country, the attitude and behaviour of people especially the youths, towards the environment is not what is expected. Living Earth reports still show that there is indiscriminate hunting, felling of trees, reasons fishing and dumping of waste in some areas of the Division. The question is ñwhat could account for these negative attitudes when environmental education is being taught in schoolsò. Could the language of instruction have an effect on their understanding of the concepts in environmental education? If so, is gender and school location of any importance to their attitudes and achievement in environmental education? Consequent on the above question, this study set out to find out whether language of instruction, school location and gender, among other factors, have effects on pupilsô attitudes and achievement in Environmental Education in Fako Division.

Purpose of the Study

The main purpose of this study is to investigate the effect of language of instruction, school location and gender on pupilsô attitudes and achievement in environmental education.

Specifically, this study seeks to determine:

1. The effect of language of instruction on pupilsô achievement mean scores in Environmental Education.
2. The effect of school location on pupilsô achievement mean scores in Environmental Education.
3. The effect of gender on pupilsô achievement mean scores in Environmental Education.
4. The effect of language of instruction on pupilsô attitude mean scores towards Environmental Education.
5. The effect of school location on pupilsô attitude mean scores towards Environmental Education.
6. The effect of gender on pupilsô attitude mean scores towards Environmental Education.
7. The interaction effect of language of instruction and school location on pupilsô achievement mean scores in Environmental Education.
8. The interaction effect of language of instruction and gender on pupilsô achievement mean scores in Environmental Education.

9. The interaction effect of school location and gender on pupilsô achievement in Environmental Education.
10. The interaction effect of language of instruction and school location on pupilsô attitude mean scores towards Environmental Education.
11. The interaction effect of language of instruction and gender on pupilsô attitude mean scores towards Environmental Education.
12. The interaction effect of school location and gender on pupilsô attitude mean scores towards Environmental Education.
13. The interaction effect of language of instruction, school location and gender on pupilsô achievement mean scores in Environmental Education.

Significance of the study

The findings of this study are expected to have both practical and theoretical significance. The study should be beneficial to teachers, curriculum designers, pupils, policy makers and the community.

The results may help teachers to use the appropriate language of instruction to disseminate the concept of environmental education to pupils so that meaningful learning is ensured. Language is a major component of verbal communication in the classroom and also a basic contributor to effective teaching and learning. A consideration of the language of instruction, the location of the school and gender is necessary for the effective teaching of Environmental Education because this might also help the pupils to understand easily and make meaning out of what is taught.

The results of this study might help curriculum designers in planning and designing the curriculum with regards to the language of instruction that is best understood by the pupils and teachers, even if it is not one of the official languages. It is also believed that the results will guide them in the selection of teaching methods, teaching materials and learning activities according to their availability, depending on the location of the school (rural or urban).

The results of the studyis also expected to lead to immense prospects for improvements in pupilsô achievement in Environmental education, since it is directed at finding the appropriate language of instruction to be used in the teaching and learning of Environmental education concepts. The results will lead to the choice of the appropriate language which will enable pupils understand their lessons well and consequently improve their achievement in environmental education.

The findings are expected to help policy - makers to make appropriate decisions with regards to the existing political, economic and socio - cultural diversities and backgrounds of pupils to create an enabling environment that will support and motivate the young people to learn Environmental Education and understand the environmental crisis in Cameroon.

The community is also expected to benefit from this study because the pupils will act positively in the environment after understanding environmental education concepts. A better understanding of EE will change their attitudes and behavior towards the environment and the community as a whole will benefit from the changes.

Generally, the results of this study shall help to expand the body of knowledge in the area of pupil achievement and attitudes towards environmental education as supported by the views of Vygotsky, Bandura, Piaget and Bronfenbrenner.

Scope of the study

The study will be limited to investigating the effect of language of instruction, school location and gender on the achievement and attitudes of pupils in Environmental Education in Fako Division of Cameroon. It takes into consideration urban and rural locations of schools, English and French as languages of instruction, and the gender of pupils.

The content scope of the study consists of the eight topics from the environmental education syllabus for classes five and six. The topics are; living things, transpiration, the seed, seed germination, the plant, pollution, environmental hazards and waste disposal.

Research Questions

The following research questions were posed to guide the study.

1. What is the effect of language of instruction on pupilsô mean achievement scores in environmental education?
2. What is the effect of school location on pupilsô mean achievement scores in environmental education?
3. What is the effect of gender on pupilsô mean achievement scores in environmental education?

4. What is the effect of language of instruction on pupilsô attitudes towards environmental education?
5. What is the effect of school location on pupilsô attitudes towards environmental education?
6. What is the effect of gender on pupilsô attitudes towards environmental education?
7. What is the interaction effect of language of instruction and school location on pupilsô mean achievement scores in environmental education?
8. What is the interaction effect of language of instruction and gender on pupilsô mean achievement scores in environmental education?
9. What is the interaction effect of school location and gender on pupilsô mean achievement scores in environmental education?
10. What is the interaction effect of language of instruction and school location on pupilsô attitude towards environmental education?
11. What is the interaction effect of language of instruction and gender on pupilsô attitude towards environmental education?
12. What is the interaction effect of school location and gender on pupilsô attitude towards environmental education?
13. What is the interaction effect of language of instruction, school location and gender, on pupilsô achievement in environmental education?

Hypotheses

The following null hypotheses were tested at 0.05 level of significance:

H_{01}: There is no significant difference between the mean achievement scores of pupils taught environmental education in English and French languages in Fako Division.

H_{02}: There is no significant difference between the mean achievement scores of rural and urban pupils in environmental education in Fako Division.

H_{03}: There is no significant difference between the mean achievement scores of male and female pupils in environmental education.

H_{04}: There is no significant difference between the attitude mean scores of pupils taught environmental education in English and in French.

H_{05}: There is no significant difference between the attitude mean scores of rural and urban pupils in environmental education.

H_{06}: There is no significant difference between the attitude mean scores of male and female pupils taught environmental education.

H_{07}: There is no significant interaction effect of language of instruction and school location on pupils mean achievement scores in environmental education.

H_{08}: There is no significant interaction effect of language of instruction and gender on pupils mean achievement scores in environmental education.

H_{09}: There is no significant interaction effect of school location and gender on pupils mean achievement scores in environmental education.

H_{010}: There is no significant interaction effect of language of instruction and school location on the mean scores of pupilsô attitude towards environmental education.

H_{011}: There is no significant interaction effect of language of instruction and gender on the mean scores of pupilsô attitude towards environmental education.

H_{012}: There is no significant interaction effect of school location and gender on the mean scores of pupilsô attitude towards environmental education.

H_{013}: There is no significant interaction effect of, language of instruction, school location and gender on the mean scores of pupilsô attitude towards environmental education.

CHAPTER TWO

REVIEW OF RELATED LITERATURE

This chapter presents a review of related literature under the following: conceptual framework, theoretical framework, the review of empirical studies and summary of the literature reviewed.

Conceptual Framework

- The Concept of the Environment.
- Concept of Sustainable Development.
- Concept of Environmental Education.
- Concept of Language of instruction.
- Concept of Achievement.
- Concept of Attitude.
- Concept of School location.
- Concept of Gender.
- Environmental Education in Cameroon.

Theoretical Framework

- Theories of Constructivism by Lev Vygotsky and Jean Piaget
- Theory of Social learning by Albert Bandura
- Bronfenbrennerôs Ecological Theory of Development.

Review of related Empirical studies

- School Location and pupilsô achievement.
- Language and pupilsô achievement in Environmental Education.
- Gender and pupilsô achievement.
- Gender, school location and achievement in environmental education

- Attitudes towards the teaching and learning of Environmental Education
- Extent of Implementation of Environmental Education in Cameroon.

Summary of Literature Review.

Conceptual Framework

Concept of the Environment

The Intergovernmental Conference on Environmental Education (1977) noted that the concept of ôthe environmentô includes a complex of natural, built and the social components in the life of man. The social components constitute a set of cultural, moral and personal values, as well as interrelations among people in labour and leisure activities.

In the UNESCO/UNEP conference of 1985, the environment was defined as anything around man which influences his activities. These include the climate, vegetation, soils, wildlife, water and air. It refers to this as the physical environment and says that it has a profound impact on people and how they organize their activities.

Otiende (1991) defined the environment as the home with its human population and its physical surroundings. According to him, the environment includes our homes, localities, man-made and physical surroundings. It includes the relationships and interactions existing amongst the physical and man-made surroundings, and the human population. The relations that exist between man and his surroundings include the cultural factors of

language and values; hence an understanding of the culture will help the children understand their environments.

Living Earth Foundations (1999) defines the environment to include the things, conditions and circumstances that surround where we live. This introduces us to different aspects that make up the various types of environment that make up the whole:

- The natural or physical environment, made up of features such as mountains, rapids, waterfalls, rivers, streams, plants and animals.
- The social and cultural environment, which includes the norms, religions, myths, beliefs, customary practices and social institutions in various communities as they influence natural resources.
- The technological environment which includes industrial activities, machines and utensils as they affect natural resources.
- The human environment comprising people and their activities in the other environments.

Living Earth Foundation (2006) defines the environment as a resource which man relies upon for the provision of food, heat and other materials essential for living. This means that the environment refers to all that is around us right across the universe including water, air, plants, animals and soils. It is evident from the above definitions of the environment that the cultural values and practices including the beliefs of a people are all part of the environment. The environment for the purpose of this study constitutes the

immediate surroundings and the cultural values and practices including the beliefs of the people of Fako Division in general and primary school pupils in particular.

The environment is given various appellations including habitat, ecosystem, nature, surroundings, and the biosphere. This is because its components interact with each other and the destruction of any individual component can cause undesirable imbalance in the natural system. The environment or surroundings include all the factors that influence growth, behaviour, and development; it also involves a complex interaction between the natural and social phenomena (Otiende, 1997).

There are some complex interactions that link the earthôs major environments together with the biosphere (the zone of air, land and water at the surface of the earth that is occupied by organisms) as the focal point. The biosphere is the life zone of the earth and includes all living organisms, including man, and all organic matter that has not yet been decomposed. It is structured into a hierarchy known as the food chain. All life is dependent upon the first tier (producers) of the food chain. Energy and mass are transferred from one level to another of the food chain. The biosphere can be divided into ecosystems that represent the interactions between a group of organisms forming a trophic pyramid and the environment or habitat in which they live. The ecosystem is the specific biological community and its physical environment interacting in an exchange of matter and energy (Cunningham and Saigo, 2001).

This interaction links the biosphere to other components of the environment. Life processes involve a large number of chemical reactions some of which either extract or

emit gases from and to the atmosphere. The biosphere will not exist without the hydrosphere as all living organism need water for the evolution and sustenance of life. The biosphere is also intimately connected to the geosphere through soils which consist of air, mixture of mineral matter, organic matter and water.

The anthrosphere (human population) also interacts with the biosphere, but its interactions pose a threat to the biosphere through habitat destruction, especially by the destruction of tropical rainforests (deforestation). This is driving thousands of species each year to extinction, thus reducing biological diversity. Manôs activities, geared towards development and better living standards are a threat to all the components of the environment. Poor farming methods and the use of fertilizers by man degrade the soils and reduce its ability to provide food for the producers that make up the base of the food chain in ecosystems. (Living Earth Foundation, 2006)

The ecosystem cannot function well if one trophic level either of producers or consumers is destroyed; so it is necessary that all the organisms that make up the food chain be present and in their adequate numbers. The construction of roads, houses and other infrastructure leads to the destruction of forests and other natural features. The use of cars and industrial machines result in the emission of gases that pollute the atmosphere. The minerals used in the soils as fertilizers eventually get into water bodies in soluble form and pollute them too. This gives a clear proof that if any component of the environment is affected, the rest are also affected because they depend on each other for survival.(Living Earth Foundation, 1999)

The above relationships amongst the components of the ecosystem, lead us to the conclusion that there is a relation between man and his environment and that man depends on the environment for his survival and livelihood. With the level and rate of development and population growth rate in the world today, it is very difficult for man to stop the indiscriminate exploitation of natural resources. The only way out is to exploit sustainably such that the future generations will also be able to live comfortably on earth. Sustainable management of the environment is only possible when the population is aware environmentally and knows the meaning of environmental conservation and protection. One of the ways is education by the use of our schools beginning with primary schools when the children are still young. Environmental Problems are the reason for conservation so the next section looks at the various environmental problems and those that affect Fako Division in particular.

All organisms - plants and animals (including man), depend upon the environment for their life and its continuation. The organism also tends to change and affect its surroundings in many ways, which in turn may affect the organism itself. Thus, the activities of the organism to a large extent, determine its own environment. A careful observation will reveal that a close interaction between the organism and the environment is essential to satisfy the basic necessities of the organism. In the study of the environment, the living world is the main theme with man as the central figure. (Santrock, 2004). One of the first things man needs is knowledge of the existing environmental problems or issues and their nature so as to better plan how to manage them for sustainability.

Chiras (2001) explains that climate change is one of the biggest environmental problems in the world today and is becoming a huge economic and social issue. There is still an ongoing global temperature increase and with it the world is coming very close to a so called "climate change tipping point", a 2C global temperature increase, after which climate change will go out of control in the form of frequent extreme events, floods, drought, hunger and even new diseases. He further says that deforestation is also a major environmental problem, despite the progress in reducing the massive clearance of the Amazon rainforest. It is a very serious issue in many African (Cameroon inclusive) and South American countries as well as Indonesia. Deforestation also contributes to the climate change issue- not only does burning forests release greenhouse gas emissions but it also leaves less trees to absorb carbon emissions from the atmosphere.

Pollution, especially air and water pollution, is and remains a major environmental problem for many developing countries, though it can also be found in some parts of the developed world. China, for instance, is experiencing huge air pollution issues in many of its cities while India is experiencing huge water pollution issues (large Indian rivers such as Ganges being heavily polluted). Last but certainly not the least is the huge loss of biodiversity. This occurs everywhere in the world because animal and plant species cannot cope with the many changes in the natural environment which affects the smooth functioning of the ecosystems in which they live. There is a decline in the population of many species, some of which are already critically endangered and might soon be extinct. Climate change is believed to be the major factor behind global biodiversity loss though

there are also some other important factors contributing to this negative trend such as habitat loss, poaching and others. (Santrock, 2000)

The continued increase in human population has a lot of negative effects on the environment as many people need more space to build houses, set up industries and hence reduce habitats for animals and modify the existing ones. People need to become much more aware of the current environmental issues, realise that our environment is degrading very rapidly and that we cannot survive all alone, without ecosystems rich in plant and animal life since our whole existence depends on the smooth functioning of the ecosystems that make up our immediate environment. These problems account for the evolution and development of the concept and principles of sustainable development.

Sustainable Development

The World Commission on Environment and Development (WCED) report, ñOur Common Futureò (1987), defined sustainable development as ñDevelopment that meets the needs of the present without compromising the ability of the future generations to meet their own needsò. In other words, since development means improving peopleôs lives, sustainable development will mean progress in human wellbeing that can be extended or prolonged over many generations rather than just a few years (Cunningham , 2005). The Rio Declaration on Environment and development (1992) affirms in the first principle that humans are the centre of concern for sustainable development, and are entitled to a healthy and productive life in harmony with nature. This implies that man is the main actor in the process of sustainability and as such is responsible for the equitable

use of the natural resources that assure his livelihood. He has to ensure that present generations meet their needs without compromising the ability of the future generations to meet their own needs.

According to Chiras (2001), sustainable development is a means of meeting present needs in ways that do not impair future generations and other species from meeting their own needs. He continues that sustainable development is a process designed to create lasting relationships between humans and the environment, ones that protect and restore ecosystems rather than destroy and deplete them. Environmental protection is therefore vital to the success of any stateôs local or national development plan. Chiras also says that sustainable development refers to improvements or advancements in human wellbeing that are enduring. Environmental protection is therefore vital to the success of any Countryôs national development plan. Chiras further argued that attaining a sustainable society may ultimately depend on sharing knowledge and possibly on a redistribution of the planetôs limited resources so that all of its inhabitants get a fair share. This is a utopian ideology which in practical life is swept under the carpet of human greed for riches and economic prosperity. According to Nebel and Wright (1993), for humans to reach a sustainable balance, there needs to be a much higher level of environmental understanding and regard throughout the world; this they say can be achieved through Environmental Education. Gwena (1992) believed that with proper education, it is possible to become aware of and be knowledgeable about environmental issues and the problems they pose, and also take responsive actions about such problems. It is on these premises therefore, that Environmental Education was introduced as one of the ways of

attempting solutions to environmental problems and striving for environmental sustainability.

To be truly enduring, the benefits of sustainable development must be available to all humans rather than to just a few members of a privileged group. This will therefore provide a solution to the dilemma of how we can continue improvement in human welfare within the limits of the earthôs natural resources, (Cunningham & Saigo, 2001). Many ecologists regard ñsustainable developmentò as impossible in the long run because of the limits imposed by non-renewable resources and the capacity of the biosphere to absorb our wastes. But, supporters of sustainable development assure us that both technology and social organization can be managed in ways that meet essential needs and provide long term growth with natural limits, if we use environmental knowledge in our planning. This knowledge can be acquired through EE (Cunningham, 2005). Consequent upon the above, advocates of sustainable development concern themselves with strategies designed to meet all human needs, not just the need for a clean and healthy environment, but also the need for respectable work, good pay, recreation, peace, freedom from harm and a host of other factors.

Meter (1999) came up with a cyclical Pressure-State-Response (PSR) model, showing that for development to be sustainable, there should be a balance in the interaction between the environmental condition, human activities, societal strategies and the benefit derived from the ecosystem. The diagram below illustrates the PSR model of sustainable development.

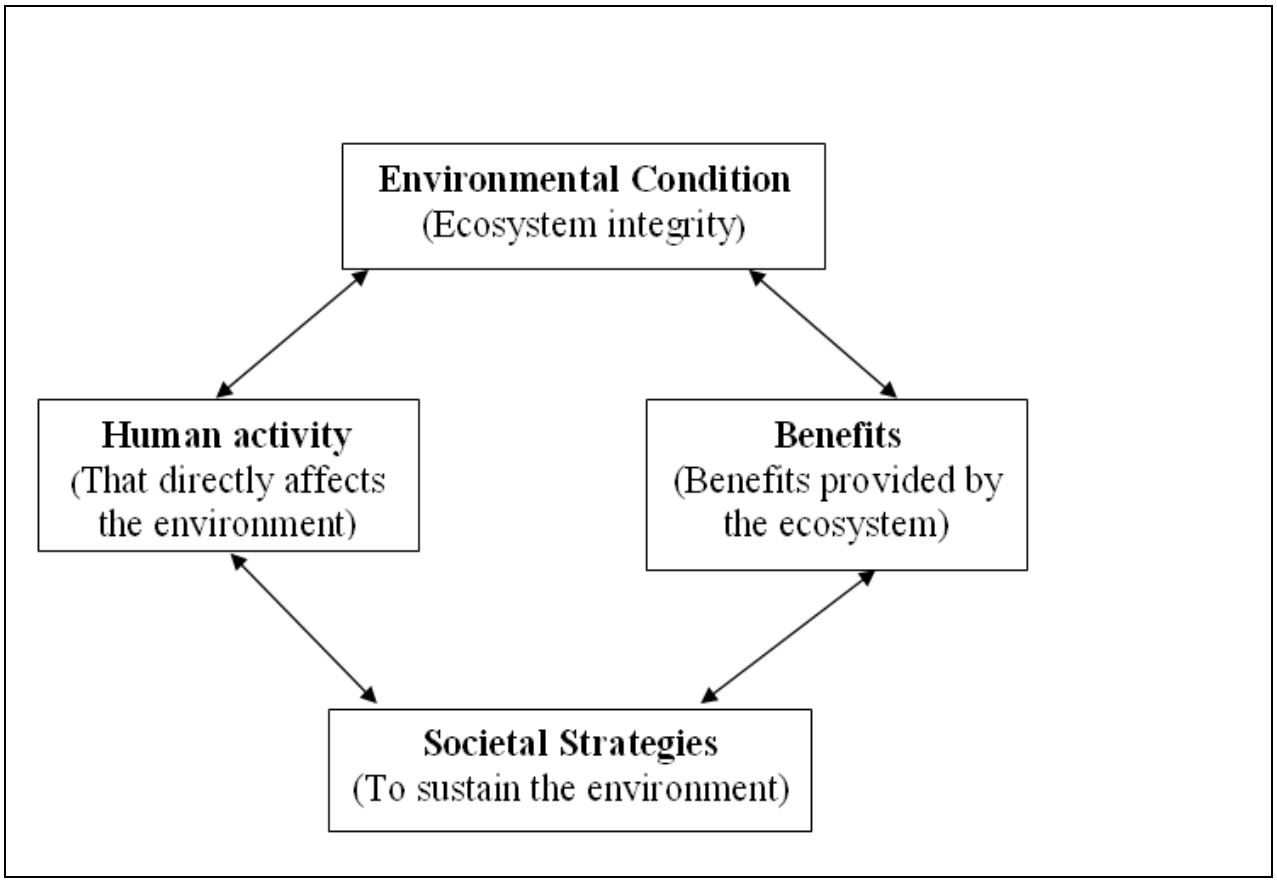

Fig. 1: Cyclical PSR Model for Sustainable Development. (Source: Meter, 1999)

According to this model, the environment is under the influence of human activities because of the benefits that come out of it. Man should also have strategies that sustain the environment from any negative effect of his activities so that the environment remains undamaged. The environment is supposed to provide man with all that he needs for survival but man on the other hand, should ensure the integrity of the environment. This can only be done if man is aware of what happens in the environment and how it functions so as to guard against making it to suffer. Environmental Education is one of the ways of creating this environmental awareness in man, therefore enhancing attitudes and achievement in environmental education will equip man and the society to sustain the

environment. The model is a guide to man to carry out human activity in such a way that the ecosystem is not affected and the benefits are obtained to ensure satisfaction of needs. The youth of Fako Division are also supposed to extract resources from the environment in such a way that the ecosystems are not affected negatively so as to ensure sustainability.

According to Chiras (2001), sustainable development is based on ten key principles which derive from three areas, ecology, social thought and ethics and economics. They are as follows:

- Humans depend on the environment for countless goods and services that are essential for the day-to-day living and the functioning of the economy.
- The renewable and non-renewable resources that support our lives have very real limits.
- Living sustainably, means finding ways of prospering within limits.
- The future of the biosphere, upon which humans depend, is in our hands.
- Intergenerational equity calls on us to live in ways that honour the needs of future generations.
- Intragenerational equity calls on us to act in ways that honour the rights and needs of all people alive today.
- The notion of ecological justice says that all species have a right to a clean environment and adequate resources.

- Building a sustainable society will require participation by governments, businesses and individuals.
- Environmental protection and sustainable development shall require the cooperation of all participants.
- To create a sustainable society, we must focus on strategies that address the root causes of environmental problems.

In order to meet the development challenges therefore, UN member states came up with the Millennium Declaration that was adopted by 189 nations and signed by 147 Heads of States and Governments during the UN Millennium Summit in September, 2000. The Declaration contained actions and targets from which the Millennium Development Goals (MDGs) are drawn. The MDGs are eight, intended to be achieved by the year 2015, and they respond to the worldôs main development challenges. The MDGs synthesize, in a single package, many of the most important commitments made separately at international conferences and summits of the 1990s. They also recognize explicitly the interdependence between growth, poverty reduction and sustainable development.

The seventh MDG is to ensure environmental sustainability by integrating the principles of sustainable development into country policies and programs and reversing the loss of environmental resources. This has motivated international organizations, nations, communities and individuals to take EE seriously because it is the best way to spread information and carry out activities to promote and ensure sustainable development. This study on attitudes and achievement of pupils in environmental education checks the

effectiveness in the teaching of EE to ensure acquisition of necessary skills in pupils for sustainable behavior towards the environment.

Concept of Environmental Education

Concern and research about the environment over the last 25 years has experienced cyclical changes. A flurry of initial interest in the 70s was followed by rapid decline. In fact, not much academic research has been done since that time. However, the present decade is witnessing a renewed interest in ecological issues. The National Anxiety Center reports that among the issues making up its top ten worry list are five dealing with the environment (Schlossberg, 1990). The present wave of interest, however, appears to be much more pervasive and centered in the consumer marketplace (Berger, 1991).

Probably, the historical development of environmental concerns has no single root, it is polyphyletic in origin. Lowe and Goyder (1983), consider the first national environmental group to be The British Commons, Open Space and Footpaths Preservation Society, dating back to 1865. However, one of the earliest historical evidences of organized environmental action can be traced back to an even earlier 17th century mass movement of people in some villages of the Thar Desert in India. Inspired and organized by local religious leaders, the people sacrificed their lives to save trees from wanton felling (Cowshish, 1985). Lowe and Goyder (1983) identify major periods when concern for the environment was being articulated in the West. These periods were the 1890ôs, late 1950ôs and the 1970ôs. These periods grossly coincide with the developmental phases of American environmental education (Kirk, 1985).

Only 25 years ago, the term ôenvironmental educationô was relatively unknown and poorly understood. But now, it has grown into a worldwide movement. Unprecedented interest and activity have been generated not only among educators but also among conscious citizens, social and political leaders. Therefore, the development of environmental education constitutes a fascinating subject of research within the history of education. It is essential for educational practitioners to understand the origin, course and future of EE to appreciate its nature, character and progress.

Environmental educationô is defined in its broadest sense to encompass the following; raising awareness, acquiring new perspectives, values, knowledge and skills, and formal and informal processes leading to a changed behaviour in support of an ecologically sustainable environment. In this regard, it develops skills, knowledge and values that promote sustainable environmental management. It is not confined to formal schooling but occurs also in a wide range of non-formal education settings.

Environmental Education is a complex process, covering not just events, but a strong underlying approach to society building as a whole. It provides people with the awareness needed to build partnerships, understand NGO activities, develop participatory approaches to urban planning, and ensure future markets for economic business. It also enhances critical thinking, problem solving and effective decision-making skills, on environmental issues to make informed and responsible decisions.

According to the International Union for the Conservation of Nature and Natural Resources (IUCN, 1970), and Palmer (2003) Environmental Education is the process of

recognizing values and clarifying concepts in order to develop skills and attitudes necessary to understand and appreciate the inter relatedness among man, his culture and his biophysical surroundings. Palmer (2003) further explains that Environmental Education also entails practice in decision-making and self-formulation of a code of behavior or conduct about issues concerning environmental quality.

Environmental Education, if properly understood, should constitute a comprehensive lifelong Education; and one that is responsive to changes in a rapidly changing world. It should prepare individuals for life, through an understanding of the major problems of the environment, and the provision of skills, attitudes, values and attributes needed to play a productive role towards improving life and conserving the environment, with due regard given to ethical values (UNESCO, 1986). The North American Association for Environmental Education (NAAEE), defines EE as a process which promotes the analysis and understanding of environmental issues as the basis for effective education, problem solving, policy making and management. The purpose of EE is to foster the education of skilled individuals able to understand educational problems and possessing the expertise to devise effective solutions to them.

Environmental Education is a relatively new field of study introduced into the Cameroonôs educational system in order to enhance young peoplesô awareness of environmental issues at all levels of education. It is a new approach in education meant to foster proper environmental management (Living Earth Foundation, 2006). It is education about the environment and for the environment. It is hoped that this will bring some

solutions to the deteriorating relationship between man and the environment. Through environmental education, it is believed that man would be able to acquire the mechanism through which all the needs from the environment will be obtained and the needs of future generations ensured (Palmer, 2003).

Environmental Education is a learning process that increases peopleôs knowledge and awareness of the environment and its associated challenges. It helps people to develop the necessary skills and expertise to address these challenges and fosters attitudes, motivations and commitments to make informed decisions and take responsible actions towards the environment (UNESCO, Tbilisi Declaration, 1978). Environmental Education therefore, refers to organized efforts to teach about how the natural environment functions and, particularly, how human beings can manage their behaviour and ecosystems in order to live sustainably (Living Earth Foundation, 1999). The term is often used to imply education within the school system, from primary to post-secondary. However, it is sometimes used more broadly to include all efforts to educate the public and other audiences, including print materials, websites, media campaigns, etc. Related disciplines include outdoor education and experiential education. Cunningham and Saigo (2001) noted that environmental education enhances critical thinking, problem-solving and effective decision-making skills. It teaches individuals to weigh various sides of environmental issues to make informed and responsible decisions.

Cunningham and Saigo (2001) state that ñEE is meant to improve understanding among the general public, of the natural and man-made environments and relationships between humans and their environment, including global aspects of environmental problemsò. The values and ethics surrounding environmental protection must continue to be addressed through education, so that environmental understanding and participation becomes automatic in our lives. Without this, the focus of environmental management will tend to be on repairs and temporary fixes, rather than longer term solutions.

In all the above definitions of EE, there are five components that are common to most if not all of them. This means that a good definition of EE must contain these five components. They are as follows:

- Awareness and sensitivity to the environment and environmental challenges.
- Knowledge and understanding of the environment and environmental challenges.
- Attitudes of concern for the environment and motivation to improve or maintain environmental quality.
- Skills to identify and help resolve environmental challenges.
- Participation in activities that lead to the resolution of environmental challenges.

Environmental Education began to emerge in its present form due to the enormous technological growth which has embraced every field of human knowledge and its applications resulting in a drastic transformation of the environmental situation. Examples of these include nuclear physics, with its devastating capacity and potential for long-term pollution, agriculture, which uses pesticides and fertilizers indiscriminately,

medical sciences whose life saving drugs have reduced the mortality rate and produced a subsequent rise in population. These areas along with a change in the outlook of the social sciences have all contributed to the drastic transformation of the human environment. Many of these impacts took place after World War 2.

In 1992, the United States, Mexico, and Canada signed a Memorandum of Understanding (MOU) on EE, which serves as a framework for developing, coordinating, and implementing joint Environmental Education and training activities. In the MOU, Environmental Education is defined as ñ A Permanent process in which individuals and the community gain awareness of their environment and acquire the knowledge, values, skills, experiences and also the determination which will enable them to act (individually and collectively) to solve present and future environmental problems.

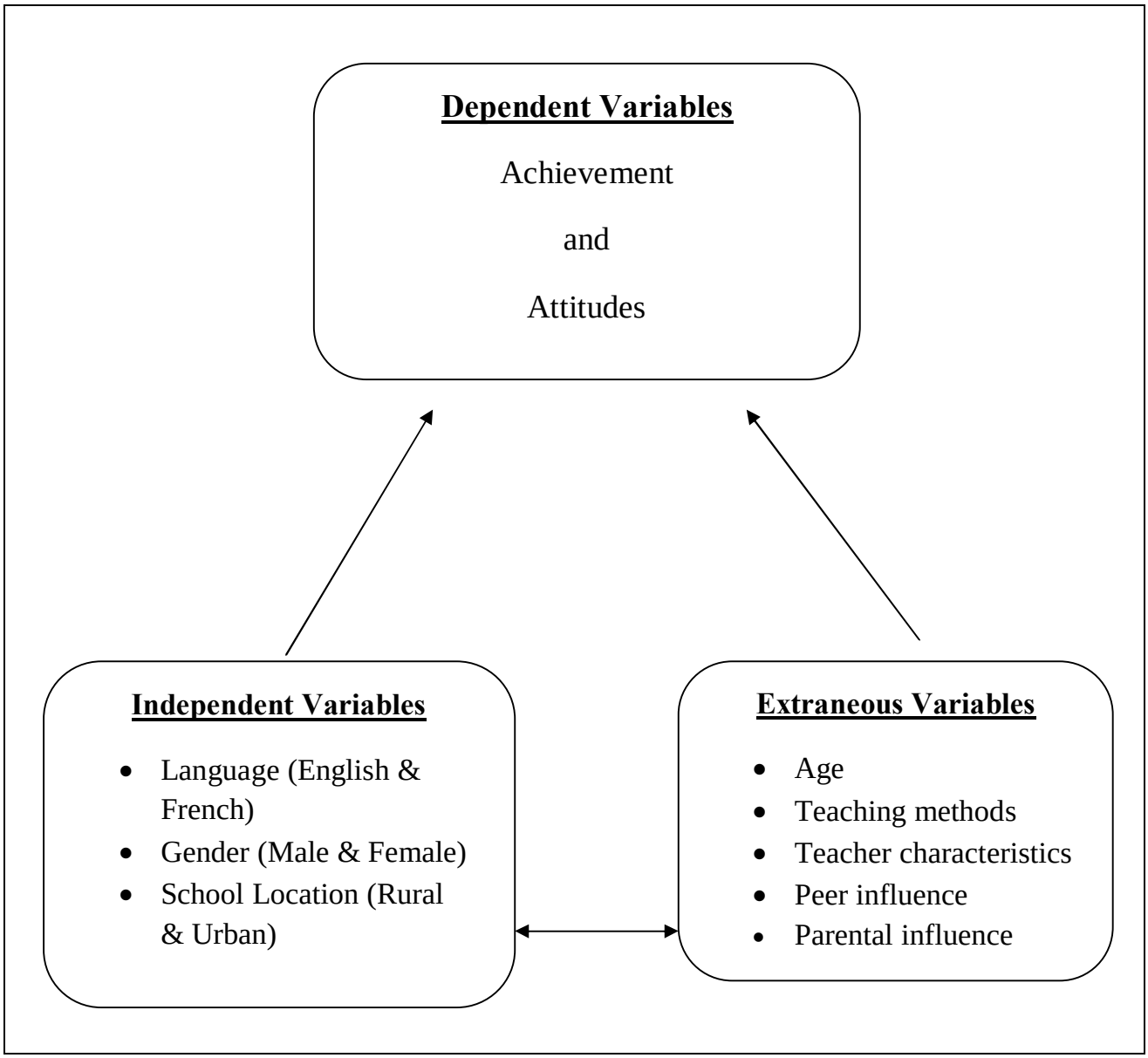

Fig 2: A schema showing the relationships between the Variables (Dependent and Independent).

The conceptual diagram above shows the relationship between the variables of this study. It shows the relationship between the dependent variables (achievement & attitudes) and the independent variables (language, school location, & gender). Achievement in environmental education could be influenced by language (French & English), school location (urban, rural), and gender (male & female). There are also those factors which

are not considered in the study (extraneous variables), but which might have an effect on the results of the study. They are age, teaching methods, teacher characteristics (age, sex, gender, etc), peer influence, parental influence, and others. These variables which are not in the study will be controlled so that the results of the study are not affected.

Global issues on Environmental Education

The International Union for Conservation of Nature (IUCN), Conference held in Nevada, USA (1970) on the ñEnvironmental Education in the School Curriculumò was the first international conference which officially recognized environmental education as a subject in its own right, and it had a major influence in the development of EE. The first definition of EE was produced and it was defined as ñthe process of recognizing values and clarifying concepts in order to develop the skills and attitudes necessary to understand and appreciate the inter-relatedness between man, his culture and his biophysical surroundingsò (Living Earth Foundation, 1999).

In 1972, the United Nations conference on the ñHuman Environmentò was held in Stolkholm. It gave a renewed plan and emphasis on knowing the totality of the environment, keeping in view the environmental damage resulting from the activities of man. The conference drew the attention of societies to studying man vis-à-vis the physical, biological and social environments. It also viewed EE as a new emerging concept since the 1960s. The Stolkholm Declarationò to defend and improve the environment for present and future generationsò has become an important goal for mankind and it indicates the seriousness and sensitivity with which the environmental

issues should be viewed. The conference recommended the development of EE as the most powerful instrument in an all-out attack on the worldôs environmental crises. Since then, it has provided a lead to national and international agencies for developing and implementing programs for EE, (living Earth Foundation, 1998).

This conference which was attended by 113 nations, United nations Agencies and Non Governmental Organizations (NGOs), made several recommendations aimed at a new integrated plan of action for improving the overall relationship of man with the environment. As part of its action plan, the conference recommended:

- The establishment of the United Nations Environment Program (UNEP),
- The celebration of June 5 as World Environment Day every year,
- The establishment of a global program with the co-operative efforts of all UN bodies for promoting EE,
- The establishment of an international program in EE, interdisciplinary in approach, in-school and out-of-school, encompassing all levels of education and directed towards the general public, with a view to educating him as to the simple steps he might take, within his means, to manage and control his environment.
- Education in environmental matters for the younger generations as well as adults, giving due consideration to the under-privileged, is essential.

In accordance with recommendation 96 of the 1972 conference, the UNEP was established. The UNEP and UNESCO launched the International Environmental Education Program (IEEP) at an international conference on EE in Belgrade in 1975.

This conference produced the first intergovernmental statement on EE and a document was prepared listing the objectives of EE called ñThe Belgrade Charter- a global framework for EEò. The IEEP was designed to promote reflection and action, as well as international co-operation in this field. According to UNESCO 1985, its principal long-term objectives were:

- Facilitating the co-ordination, planning and programming of activities essential to the development of an international program in EE
- Promoting the international exchange of ideas and information pertaining to EE,
- Coordinating research to better understand the various phenomena involved in the teaching and learning of EE,
- Designing and evaluating new methods, curricula, materials and programs (both in-school and out-of-school; for youth and adult) in EE,
- Training and retraining personnel to adequately staff EE programs.

The actions of IEEP were conducted in 3 phases centering successively on; the development of a general awareness of the necessity of EE, the development of concepts and methodological approaches in this field, and lastly, efforts for incorporating an environmental dimension. These actions were realized in nine years, from 1975 to 1998 (UNESCO, 1985).

In 1977, the first intergovernmental conference on EE held in Georgia. Recommendations were prepared taking EE into the formal and informal education sectors. This conference culminated in the first phase of the IEEP, laying the basis for the

development of EE at the international level as well as strategies for the advancement of EE at the national level and the promotion of international co-operation. It endorsed the following as environmental objectives; to create awareness, knowledge, skills, and participation (action). The ñWorld Conference Strategyò was launched by IUCN in 1980, during which one of the most significant documents concerning conservation and EE was prepared. It set out guidelines intended for use at both national and international levels for the development of national conservation strategies. It also stressed on the importance of conservation through ñsustainable developmentò and the idea that conservation and development are mutually interdependent.

In November of the same year, the IEEP supported an international seminar on interdisciplinary EE at the primary and secondary levels, which held in Budapest, Hungary. This was to stress the interdisciplinary approach taken by EE so as to effectively contribute to the solution and prevention of environmental problems in their multiple aspects. Publications of the IEEP have helped a lot to disseminate widely these conceptual and methodological approaches and orientations. Ten years after the Tbilisi Conference, UNESCO and UNEP jointly organized a ñTbilisi plus Tenò Conference in Moscow (1987). This provided a forum for discussion on development in the field of EE and stressed the vital importance of Environmental Education.

Then, came the UNCED Earth Summit Conference that held in Rio de Janeiro, 1992. This was the largest ever Heads of States meeting, with delegates from over 170 countries. Several important documents were signed, one of the most significant being

ñAgenda 21ò which sets out what nations should do to achieve sustainable development in the 21st century. The Summitôs message was that nothing less than a transformation of attitudes and behavior would bring about necessary changes which reflected the complexity of the problems facing the environment. Mention has been made of the importance of Environmental Education throughout the text, although Chapter 25 ñchildren and youth in sustainable developmentò and Chapter 36 ñpromoting education, public awareness and trainingò address the issue in detail (Living Earth Foundation, 1999).

There have been a series of international conferences after the summit called ñGlobal Forum of EEò organized by the UN to discuss global environmental issues. EE is a large component of these talks. One of such is the ñWorld Summit on Sustainable Development (WSSD)ò that held in Johannesburg, South Africa in September 2002, organized by the UN in order to assess the progress made in this direction on a worldwide basis. This study is partly implementing these decisions as an attempt towards the attainment of sustainability in the Fako Division environs.

In 1990, the national EE Act was established with two broad goals;

- To improve understanding among the general public of the natural and built environment and the relationships between humans and their environs including global aspects of environmental problems.
- To encourage post-secondary students to pursue careers related to the environment (Cunningham & Saigo, 2001).

The NAAEEôs main goal for EE is to assist in the development of a citizenry conscious of the scope and complexity of current and emerging environmental problems and supportive of solutions and policies which are ecologically sound.

The Belgrade Charter Goal for EE, which has been generally accepted by professionals in the field, is to develop a world population that is aware of and concerned about the environment and its associated problems, and which has knowledge, skills, attitudes, motivation and commitment to work individually and collectively towards solutions of current problems and the prevention of new ones. The Tbilisi Report built upon the Belgrade Charter produced the following goals for the Environmental Education.

- To foster clear awareness of, and concern about economic, social, political and ecological interdependence in urban and rural areas.
- To provide every person with opportunities to acquire the knowledge, values, attitudes, commitment and skills needed to protect and improve the environment.

Environmental Education, like every educational endeavour, must be directed towards specific and relevant educational objectives. The objectives of the EE were defined by the Charter of Belgrade in 1975 at five levels; awareness, knowledge and understanding, skills, attitudes and behavior, and participation or action abbreviated AKUSABA. Tambo (2003) defines objectives as *"*Statements indicating the expected behavioural changes in pupils (learners) as they go through a lesson course.*"* This must be attained before the teacher can consider the lesson as being taught. The objectives therefore should be clearly stated so that they can guide the teaching process. Tambo also brings out the fact that

there are at least three approaches in stating; teacher centered, content centered and behaviour centered. The objectives of EE are behaviour centered because they emphasize the change expected in studentôs behaviour as they experience a teaching learning interaction. The objectives of EE as defined by the Tbilisi intergovernmental conference on EE in1977 are as follows:

Participation: to provide individuals, groups and societies with opportunities to be actively involved in exercising their skills of environmental citizenship and be actively involved at all levels in working towards sustainable development.

Knowledge: to help individuals, groups and societies gain a variety of experiences and basic understanding of the knowledge and action competences required for sustainable development.

Values: to help individuals, groups and societies acquire feelings of concern for issues of sustainability as well as a set of values upon which they can make judgments about appropriate ways of acting individually and with others to promote sustainable development

Skills: to help individuals, groups and societies acquire action competence or skills of environmental citizenship in order to be able to identify and anticipate environmental problems and with others to resolve, minimize and prevent them.

Awareness: to create an overall understanding of the impacts and effects of behaviours and lifestyles on both the local and global environments, and on the short and long term effects.

Living Earth Foundation (1998), in addition to the five objectives for EE above have two more:

- To develop mental and physical skills that will enable learners or students to investigate, interpret and evaluate issues of environment.
- To develop the opportunity to be actively involved in action for environmental protection, restoration or development.

Other objectives include the fostering of clear awareness and concerns about economic, social, political and ecological interdependence of urban and rural areas; providing every individual the opportunity to acquire the knowledge, values, attitudes, commitments and skills needed to protect and improve the environment and create new patterns of behavior of individual groups and society as a whole towards the environment (Dioh, 2000; Otiende *et al*., 1997).

Environmental Education as we have seen is very necessary in the spread of knowledge and skills for environmental protection and conservation, and hence sustainable resource management. It has a lot to offer from the content of EE that we have seen above. This can be acquired through learning. Learning according to Santrock (2004), is acquiring new knowledge, behaviours, skills, values, or preferences and may involve synthesizing different types of information. The ability to learn is possessed by humans, animals and

some machines. Human learning as suggested by Ormrod (1999) may occur as part of education, personal development, or training. It may be goal-oriented and may be aided by motivation.

Environmental Educationôs focus is on environmental ñliteracyò i.e. learning about and caring for the total environment, understanding how humans interact with and are dependent on natural ecosystems, and developing critical skills to resolve environmental issues. In addition, students gain analytical skills that are indispensable in almost any working environment. Effective environmental education provides the business community with a better-educated work force prepared to think creatively and critically, work in teams, forge consensus from diverging views and solve complex problems efficiently and effectively. EE can also create better citizens.

Environmental education not only introduces a critical value system, but also promotes greater financial assets for some countries. It was discovered that most Africans do not understand their environment and its constitution. We believe that education is the key and the best way to start is with our children and will primarily target those who will otherwise have no opportunity to see or touch most of the natural riches of their countries. (Cheetah outreach)

In 1994, the RDP Document stated, ñthere is a need to develop programs to rekindle our peopleôs love of the land and to increase environmental consciousness amongst youth, to co-ordinate environmental education policy at all levels, and to empower communities to

act on environmental issues, and to promote environmental ethicsò (Cunningham & Siago , 2001).

The 25th article of Agenda 21 talks about youth in sustainable development and 25.14 of this article is concerned with the steps governments should take to ensure that this is realized. It goes further to say that governments should promote primary environmental care activities that address the basic needs of the communities; expand educational opportunities for children and youth, including education for environmental and developmental responsibility ; and lastly mobilize communities through schools and local health centers so that children and their parents become effective focal points for sensitization of communities to environmental issues .These and others make it necessary for Environmental Education to be introduced in schools.

Evans *et al.* (1990), affirm that one major reason for EE is that it is critical in maintaining our quality of life .Whether we are talking about destruction of the tropical forest, global warming, toxic waste disposal, the ocean, crises or air quality, Environmental Education is essential if we are to participate fully in solving environmental problems facing the world today and on to the future. They go further to say that there are many positive educational outcomes from EE. A comprehensive approach to EE;

- Offers educators an effective way to integrate the curriculum
- Develops critical and creative thinking skills
- Not only teaches but allows students to develop problem solving skills

- Utilizes teaching strategies which are student-centered, actively involving students in the learning process
- Stresses investigative research skills to help understand the social and economic implications underlying environmental issues.
- Allow educators to easily integrate many of the principles of educational reform: real world application, cooperative learning teaching for understanding and emphasis on concepts, processes and products as opposed to content only. Most importantly according to these authors, this type of approach emphasizes life skills that students will continue to use in future work throughout their lives. Through encouraging community involvement and social responsibility, students learn how to create positive change in their community which is the main aim of EE.

Environmental Education is important because following the trend of degradation and unsustainable management of natural resources, and the high rates of population growth, young people need to develop and nurture positive, responsible behavior towards the environment. This, to a large extent can be acquired through Environmental Education.

The 1977 Tbilisi Conference, which followed soon after the launching of the United Nations Environmental Program (UNEP), is known to have spearheaded clarification on the nature of environmental education. This conference resulted in a declaration which listed seven directive principles for environmental education (EE) programs. These are summarized as follows:

- EE is a lifelong educational process that occurs at all levels of education.

- EE is about the interactions which occur in the natural, the built and social environment. It should lead to the understanding of how human interactions and political processes, together with the nature of socio-economic issues and the effect of these on environmental degradation or enhancement.
- EE is for developing attitudes and value systems which lead to socio-economic improvement through positive social interactions and the maintenance and improvement of the natural and built environments.
- EE aims to develop an individual's understanding, skills and the feelings of empowerment that are necessary for both positive behavior towards the biophysical and social environments in everyday living, and for active participation in group efforts to find the optimal solutions for environmental problems.
- EE requires a holistic and preferably interdisciplinary approach to teaching with opportunities for diverse learning experiences, but with particular emphasis on direct experiential learning in natural, built and social environments.

According to ñA Green print for Minnesotaò as cited in Cunningham and Saigo (2001), environmental education programs are expected to result in the following outcomes:

- Learners must understand their relation to other interlinking chains of natural systems and socio-ecological processes.

- An environmentally educated person should understand how human society influences the environment, as well as the economic, legal and political mechanisms that provide avenues for addressing issues and situations.
- Learners must be able to critique conditions and uncover hidden ideologies or assumptions underlying specific problems. That which is learned must drive the learner towards transformation. Knowledge of environmental issues must be built for the ultimate objective of action and practical change
- Environmentally educated persons are also expected to become involved in activities to improve, maintain or restore natural resources and environmental quality for all.

These are the expectations for the youth after a study of environmental education concepts and this investigation is out to check the effectiveness of the acquisition of the required skills.

Content of Environmental education.

Environmental Education is a complex process, convening not just events but a strong underlying approach to society building as a whole. In education, content is the sum total of a message depending on the different interpretations.

Ornstein and Hunkins (1988) state that, the design of a curriculum or syllabus is guided by two basic considerations. These are the horizontal and vertical considerations. EE related concepts should focus on the vertical considerations which stress on the presentation of related issues of sequence and continuity. Sequence indicates the order in

which the content of the syllabus will occur or be learnt. It is organized in terms of the following principles;

- concrete to abstract
- simple to complex
- near to far
- part to whole
- easy to difficult

Therefore, the EE syllabus should be organized in this manner so that it is easy for students to understand. Starting with difficult things or topics will de-motivate the students as they will not find it interesting. This will help the students or pupils to use the simple knowledge and create concrete things.

Tyler (1949) defines continuity as the vertical reiteration of crucial learning tasks. This view is supported by Brunner (1960) who says crucial elements are revisited repeatedly until the students or pupils grasps them fully. This indicates therefore that the process of education is to be continuous and lifelong both in and out of school (Moore, 2001). Syllabus should also be based on this idea of continuity.

Tambo (2003) points out that horizontal integration focuses on scope and integration. To him, scope means all the subjects that comprise the school curriculum. Integration is concerned with relating the elements of one subject to those of the other subjects .The content of EE should also be integrated by relating its topics with those of other subjects and those of subjects of the lower levels.

Cunningham and Cunningham (2004), adds that EE content should embody environmental ethics. Ethics is a branch of philosophy concerned with morals (distinction between right and wrong) and values, the ultimate worth of action or things. Therefore EE should address issues about moral relationships between humans and the natural worlds, as well as moral basis for environmental responsibility .These authors in this perspective, argued that the content of EE should be anthropocentric or human centered, biocentric or life centered ecocentric and eccentric, which maintains that the environment on its own deserves a direct moral consideration.

Furthermore, Cunningham and Saigo (2001) and Cunningham and Cunningham (2004) postulate that the content of EE should encompass broad areas such as environmental literacy and citizen science. Environmental literacy is the extent to which every citizen is familiar with the principles of ecology and has a working knowledge of basic grammar and the syntax of environmental wisdom. Environmental ethics can create a sense of duty to care for and manage wisely the endowments of the earthôs productive resources (land, water, air & forest).

Falconer & Foresman (2002) are of the opinion that the content of EE should not omit the concept of sustainable development as captured in the ñEarth Charterò (1987). This is because the ultimate aim of EE is to ensure sustainability. So its syllabus must contain principles of sustainable development and Cameroon is attempting to meet this goals.

The Concept of Language of Instruction.

Effective teaching has been accepted as a multidimensional construct since it measures a variety of different aspects of teaching such as; subject mastery, effective communication, lesson preparation and presentation (Onyeachu 1996). The influence of teachersô effective teaching on the learning outcome of students as measured by studentsô academic achievement has been the subject of several studies (Adediwura and Tayo 2007; Adu and Olatundun 2007; Schacter and Thum 2004; Starr 2002). The above studies suggest that effective teaching is a significant predictor of studentsô academic achievement. Therefore effective teachers should produce students of higher academic achievement by using their effective characteristics. The communication skill of the teacher involves language of instruction and is central when this skill is discussed.

Communication according to the Concise Oxford Dictionary means ôthe act of imparting, especially newsô, or ôthe science and practice of transmitting informationô. These definitions clearly show the link between ôteachingô and ôcommunicationô: teachers are constantly imparting new knowledge, or transmitting information. Hubley has shown us that communication is a complex process. At any stage of this process things may go wrong, making the communication less effective. For instance, the sender may not express what s/he wants to say clearly; or the room may be noisy; or the receiver may not understand the words the sender is using. To be effective, teachers have to try to minimise these barriers to communication. We do this in a number of ways ï for example, by making sure that the room is quiet and well lit; by speaking slowly and

clearly; by only using words which the students should be able to understand. However, the most important way to overcome the barriers is two-way communication. This means getting regular feedback from the receivers (the students in this case) on whether they are really understanding what you are trying to put across.

Communication skills can be defined as the transmission of a message that involves the shared understanding between the context in which the communication takes place (Saunders and Mills, 1999). Communication takes place through channels. Within the teaching profession, communication skills are applied in the teachersô classroom management, pedagogy and interaction with the class (Saunders and Mills, 1999). In addition, teaching speaking skills is important in teacher education (McCarthy and Carter, 2001). Effective communication skills are really important to teachers in their delivery of pedagogy, classroom management and interaction with the class. There are two types of communication skills; the verbal and the nonverbal. This study is focusing on the verbal aspect which directly involves language of instruction.

A study done by Lee (1997) reveals the importance of communication for effective teaching. She asserts that people are the centre of schools and communication is the foundation. Her study shows that all pre-service teachers bring to their teacher education program some knowledge of communication skills though they may not be able to describe this. Her study proves that communication skills should be taught explicitly and implicitly through the teacher trainerôs modeling of communication skills.

Another study done by Jones and Fong (1999) discovers that at the initial stage of teacher education, pre-service teachers perceive themselves as the center of communication and transmitter of knowledge. After they have completed their practical internship in the schools, they recognize the importance of the communication interaction between the teacher and the class. They have learned to integrate communication skills into their teaching practice (Jones and Fong, 1999).

Simkins, cited in Adeyemi (2008), argued that the education system is a productive system that has outputs. The outputs are generally defined in terms of studentsô test scores which denote academic achievement (Worthington, 2001). Simkins expressed that the components of an education system could be represented in an input ï process ï output model. According to Wobmann (2004), student achievement is produced by several inputs in the educational process. Such inputs include but are not limited to studentôs family background characteristics, class size, availability of teaching and learning materials, and teacher characteristics. The teacher as an input is the principal factor in education provision and thus affects the quality of education in a significant way. According to Ankomah, Koomson, Busn and Oduro (2005), teacher factors that have an effect on academic achievement include the number of teachers on post, teacher pupil ratio, teacher qualifications and the personal characteristics of the individual teacher. The personal characteristics include academic qualifications, pedagogical training, content training, aptitude, communication skills and years of service/experience. A teacher brings these characteristics to class to facilitate the learning process. Sigilai, (2013) reported that the effective curriculum implementation factors, such as adequate

teachers and physical facilities, aid in achieving better learning outcomes. He also highlighted the importance of understanding the influence of academic staffing, physical facilities and enrolment on studentsô academic achievement, so that improvement on these four factors can be addressed in schools to realize high academic achievement.

The extent to which other inputs can improve the quality of education is directly related to the extent to which teachers effectively use the inputs to improve the teaching and learning process. According to Sifuna and Sawamura (2011), the process quality is therefore the quality of the teacher-pupil interaction in the teaching learning process, and these include the language of instruction.

A medium of instruction, for the purpose of this study refers to the language used by a teacher to teach students. Simply put, it is a means of conveying information to students. Such a medium could be the official language in the country or it could be the mother tongue of the students. In an English speaking country like the United States, the medium or language used by teachers to teach students is American English. In some types of education, such as multilingual or bilingual education, the teachers may use more than one medium of instruction to teach the students. In Cameroon, which has two official languages, the media of instruction are English and French depending on the type of school.

The two official languages, English and French, came into the Cameroon linguistic scene in 1916 when Britain and France divided Cameroon into two unequal parts after defeating Germany in Cameroon during the First World War. The new colonial masters

then sought to impose their languages in the newly acquired territories, both in the areas of education and administration. This led to the solid implantation of the two languages between 1916 and 1960; a situation that was reinforced after Cameroon became independent. At reunification in 1961, English and French became the two official languages of Cameroon as the country opted for the policy of official language bilingualism. After a long history of existence as official languages, the status and attachment to English and French have witnessed various changes that are, to some degree, linked to the interaction of their respective speakers. This has led to a mixed educational system in Cameroon which made it to have the English system of education, with English as the language of instruction and the French system of education with French as the language of instruction. The two systems expose pupils and students to the French and English cultures which differ from each other in many ways including dressing, language, attitudes, habits and etiquette.

The Concept of Achievement.

Academic achievement is a product of many variables. Achievement of enhanced academic performance is a product of personal determination, cognitive development and motivation as well as several other positive correlates. Academic achievement is commonly measured by examinations or continuous assessment but there is no general agreement on how best to test it or which aspects are most important-procedural knowledge such as skills or declarative knowledge such as facts to be tested. Academic achievement is a measure of the degree of success in performing specific tasks in a

subject or area of study by students after a teaching/learning experience (Changeiywo, 2000; Shertzer & Linden, 1979). Simply put, achievement is all about completing goals that you have set for yourself, not necessarily making millions. It means that you have accomplished your dreams and have been liberated from the restrains of fear and disbelief. Weiner (1990) defines achievement as the tendency to strive for success and to participate in activities in which success is dependent on a personôs effort and ability. Anekwe (2006) describes it as something which has been accomplished successfully especially by means of exertion of skills, practice or perseverance. Omrod (2006) describes pupil achievement as the pupils potentials in school subjects.

It has been proven that teachers have an important influence on studentsô academic achievement. They play a crucial role in educational attainment because the teacher is ultimately responsible for translating policy into action and principles based on practice during interaction with the students (Moore, 2001). In their study, Wright, Horn and Sanders (1997) concluded that the most important factor influencing student learning is the teacher. Teachers stand in the interface of the transmission of knowledge, values and skills in the learning process. If the teacher is ineffective, students under the teacherôs tutelage will achieve inadequate progress academically. This is regardless of how similar or different the students are in terms of individual potential in academic achievement. According to Rivkin, Hanusheck & Kain (2005), there has never been consensus on the specific teacher factor that influence studentsô academic achievement. This study is focusing on one of the teacher characteristic which is language of instruction.

According to Adediwura and Tayo (2007), academic achievement is designated by test and examination scores or marks assigned by the subject teachers. It could also be said to be any expression used to represent studentsô scholastic standing. Levin, Wasanga and Somerset (2011) reported that the academic achievement of students at secondary school level is not only a pointer of the effectiveness of schools but also a major determinant of the well-being of youths in particular and the nation in general. Yusuf and Adigun (2010); Lydiah and Nasongo (2009) noted that the performance of students in any academic task has always been of special interest to the government, educators, parents and society at large, hence if pupilsô achievement in environmental education is good, it could go a long way to help the government of Cameroon to fight environmental problems and achieve sustainability.

Aremu (2001), while stressing the importance of academic performance in the educational system, is of the view that academic performance is a fundamental criterion by which all teaching learning activities are measured, using some standards of excellence and the acquisition of particular grades in examinations measures candidateôs ability, mastery of the content, skills in applying the knowledge acquired to a particular situation. This assertion is what is necessary for environmental education because the essential thing is for the pupils or students to be able to use the knowledge acquired in real life situations.

The Concept of Attitude.

Attitude is referred to as a learned predisposition or tendency of an individual to respond positively or negatively to some object, situation, concept or another person. This positive or negative feeling is of moderate intensity and reasonable stability; sometimes it is especially resistant to change. An individualôs knowledge and experience affect his/her attitudes towards a particular object; besides, the individualôs knowledge is also affected by attitudes (Freedman, Sears & Carlsmith, 1989). Santrock, (2000) defines attitudes as beliefs and opinions about people, objects and ideas. Attitudes have also been defined as learned predispositions to respond in a favourable or unfavourable manner to a particular person, behavior, belief or object (Crooks, and Stein 1991; Feldman, 1996). Attitude is a tendency to act towards or against something in the environment which reflects a positive or negative value (Osam, 1995). It is a pattern of thinking, responding or acting in a given set of circumstances. Allports (1983) attempts a comprehensive definition of attitude when he writes that; an attitude is a mental or neural state of readiness organized through direct experience exerting a directive or dynamic influence upon the individualôs response to all objects and situations with which it is related. The central feature of Allportôs definition is the idea of readiness for response. That is, an attitude is not behavior, not something that a person does; rather it is a preparation for behavior, a predisposition to respond in a particular way to the attitude object. In the same light, a positive attitude of pupils towards environmental education will prepare the pupils for responsible behaviors towards the environment in the future.

The present study adopts a rather simple definition of attitudes that includes, different kinds of feelings towards the environment and environmental education, such as love, hate, anxiety, interest, and a perception of the usefulness of environmental education in life, in order to facilitate young children to express their views. Thus, statements such as ñI like environmental educationò or ñenvironmental education is boringò are defined as attitudes. Attitude constitutes the feelings people have towards certain societal phenomena. In the case of this study, it is feelings towards environmental education as an attempt towards sustainability. Attitudes were characterised in terms being positively or negatively driven towards some feelings and beliefs about the environment. Those who perceived the environment as a necessary aspect of life (without doubt) become key actors in their environmental behavior with conscious, serious or positively driven attitudes, while those who seemed not to perceive it as such develop negative, nonchalant and indifferent attitudes towards it (Looh, 2010). Attitudes are acquired through learning and can be changed through persuasion using variety of techniques. Attitudes, once established, help to shape the experiences the individual has with object, subject or person. Although attitude changes gradually, people constantly form new attitudes and modify old ones when they are exposed to new information and new experiences (Adesina & Akinbobola, 2005).

Environmental attitude can be defined as the attitude "against the environment that are consistent and demonstrate a positive or negative attitude manifested in the form of learned tendencies" (Pelstring, 1997). In general, the attitudes of people towards the environment begin to evolve at very young ages. According to some researchers, to raise

the student's environment-related information is to develop a positive attitude towards the environment. While some researchers think that the participation of students in environmental courses will make an increase in their responsibility of environmental behavior and thinking about environmental problems; some people think that life experience is more effective (Bradley et al., 1999; Aydin, 2010). The most effective way of developing the responsibility of individuals towards the environment is to be taught as education (Çabuk and Karacao_lu, 2003). Environmental education is a life-long interdisciplinary approach with the aim of developing a world population which is conscious of the environment and related issues which will contribute to the solution of existing environmental problems and promote the formation of new knowledge, skills, attitudes, motivation, personal and social duties and responsibilities (Moseley, 2000). While environment education is education which includes every segment of the society; the young generation is the most important target audience. The younger generation, although not responsible for today's environmental problems, are the most affected by the environmental problems and, therefore, more knowledge, awareness and sensitivity on this subject is needed by them. It is this idea that necessitates the creation and sustenance of environmental awareness in them at very early stages so that they will develop positive attitudes towards the environment and grow up with these attitudes.

The Concept of School Location.

The main problem with rural schools is the fact that they differ from each other in so many ways. Some rural schools are thriving because of their small size, tightly knit community, and high quality instruction, while others are declining because of their dilapidated buildings, lack of up to date textbooks and resources, and inability to hold onto teachers. As a result of this, it is important for the government to implement a policy that gives funding to the failing urban schools in order to keep them on the same level as the flourishing rural schools, as well as other types of schools (Brown, 2003).

Schools in rural areas have tended to receive bad reputations based on stereotypical beliefs, resulting from the one-room school house pictured to exist in these areas. It is true that rural schools face many challenges that do not exist in urban or suburban areas, such as geographic isolation, and a lack of resources, teachers, and community involvement, however, they have made huge improvements in the past twenty years (Castle, 1995).

From the existing literature on the influence of location on academic achievement, it has been discovered that achievement varies with location. While some (Owoeye 2011, Obe 1984, Ajayi 1988,) maintain that urban students perform better than their rural counterparts, others (Axtel & Browers 1972) have found that rural students (in spite of all odds) perform better. Some (Macmillan 2012, Considine & Zappala 2002) have submitted in their findings and concluded that no particular set up (urban or rural) can claim superiority over the other because their performances are the same. In view of these

inconclusive findings, it is necessary to carry out further research to confirm or annul the otherwise protracted issue on the effect of location (urban/rural dichotomy) on academic achievement of primary schools pupils with particular reference to Fako Division, Cameroon.

The Concept of Gender

Gender is the range of physical, mental, and behavioral characteristics pertaining to, and differentiating between, masculinity and femininity. Depending on the context, the term may refer to biological sex (i.e. the state of being male, female or intersex), sex-based social structures or social roles (as in gender roles), or gender identity. The modern academic sense of the word, in the context of social roles of men and women, dates from the work of Money (1955), and was popularized and developed by the feminist movement from the 1970s onwards. The theory is that human nature is essentially epicene and social distinctions based on sex are arbitrarily constructed. Butler (1990), considers the concept of being a woman to have more challenges, owing not only to society's view of women as a social category but also as a felt sense of self, a culturally conditioned or constructed subjective identity. The World Health Organization (2002), defines gender as the result of socially constructed ideas about the behavior, actions, and roles a particular sex performs. The beliefs, values and attitude taken up and exhibited by them is as per the agreeable norms of the society and the personal opinions of the person is not taken into the primary consideration of assignment of gender and imposition of gender roles as per the assigned gender.

Over the last decade there has been evidence of a growing gender gap in educational achievement in a number of developed countries (Hillman & Rothman, 2003; Praat, 1999;Thiessen & Nickerson, 1999;Weaver-Hightower, 2003). Educational statistics have indicated that females are outperforming males at all levels of the school system, attaining more school and post-school qualifications, and attending university in higher numbers (Alton- Lee & Praat 2001; Mullis et al., 2003). Although males have traditionally outperformed females in the sciences, this advantage appears to be disappearing (Hyde & Linn, 2006; Spelke, 2005). These findings have caused widespread concern about male educational achievement and have led to considerable speculation and discussion about the origins of gender differences in education. The literature relating to gender differences in educational achievement is vast and complex, and a large number of explanations have been offered but, for the most part, these explanations tend to cluster around three themes: biological factors; gender theory; and school factors.

A number of explanations attribute gender differences in educational achievement to biological differences between males and females. These explanations propose that gender differences in behaviour, skills and cognitive abilities are determined by biological factors such as brain organisation, hormones and genetics, and that these biologically determined differences in behaviour and abilities are responsible for gender differences in educational achievement (Butler, 1990). According to gender theory, males and females enter the educational system with different sets of behaviours, attitudes and values. These gendered behaviours, attitudes and values are the result of childhood socialisation in line with the cultural norms of masculinity and femininity (Weaver-

Hightower, 2003).

Females across cultures have been found to have a stronger ñethic of careò and to be more interdependent, compassionate, nurturing, cooperative and helpful in care giving roles (Beutel & Marini, 1995; Gilligan, 1982). On the other hand males have been found to be more independent and competitive (Gilligan, 1982; Keller, 1985). These characteristics of males and females might affect the way they relate with the environment or environmental issues. In his study, Njoku (2001) confirmed that researches indicated that girls believe that Science is too difficult and not important for their future (environmental education is a science). He explained that the teaching methods used do not assist girls to understand Science. Njoku (2001) further reported that primary Science and Technology teachers agreed that they pay more attention to boys than girls. He also observed that there are more male Science teachers and professionals than female role models in Science and Technology. The conflicting views on the effect of gender on the achievement of pupils and students makes it necessary to find out what the situation in Fako Division will be in relation to this subject.

Environmental Education in Cameroon

There have been series of environmental protection and conservation measures introduced in Cameroon. Some of these include the abatement measures, environmental awareness campaigns, environmental legislations and policies, afforestation and land reclamation schemes. Environmental sanitation exercises are also put in place; and conferences organized by environmental organizations (Nnane,2008). However, there is

still the need to instil the knowledge of the use of the environment to children when they are still in school. The Cameroon Association for the Protection and Education of the Child (CAPEC), since 2006, runs Environmental Education (EE) programs which seek to reach out to children in Nursery and Primary schools in Cameroon especially in the Central and South West Regions of the Country. Their objectives are:

- To strengthen the knowledge base and create a strong sense of awareness on environmental issues amongst school children, and thus empower communities to reduce poverty through sustainable development.

- Change their attitudes and behaviours in relation to the environment and instil a sense of responsibility for protecting the environment by involving them in beautifying the school landscape and increasing their awareness of the ecological value of their surroundings.

- To also contribute to the implementation of the Millennium Development Goals number 7: to ensure environmental sustainability; as well as number 2: to achieve universal primary education by 2015, by ó integrating conservation and sustainable use into educational programmes (formal and non-formal) through the provision of educational opportunities that particularly target communities that are poor and overtly dependent on natural resources (CAPEC, 2006).

Furthermore, the expected results of CAPEC and others was to train pupils who are able to identify the major environmental problems within their school and communities and

the role they can play as key agents of change; pupils recognized as effective partners and key stakeholders in promoting sustainable development through effective Environmental Education within the South West Region of Cameroon and beyond. Despite all of these efforts, environmental degradation seems to continue to be alarming (Lambi, 2001). Even the basic environmentally friendly practices by students who go through formal education is lacking to a great extent. Since the fusion of Environmental Education into the primary school curriculum and its implementation, very little change seems to be seen in the behaviour of youths towards their immediate environments. It appears that a lot still has to be done in this direction as some other factors seem to influence their behaviours towards the environment.

The education system in Cameroon is undergoing significant changes following the recommendations of the 1995 National Education Policy (NEP), which formally acknowledged that EE has a home in our schools. This was not the beginning of EE since it had been practiced in ancient times though more attention was on the term ñNature studyò

Environmental Education gained ground in Cameroon in 1989 when the Cameroon EE program was established by the Ministry of National Education (MINEDUC) and Living Earth Foundation, UK, with headquarters in Buea. The aim was to promote increased environmental awareness and actions both in communities and in the formal education system. Living Earth Foundations has since then done a lot over the past 20 years to make EE a reality in the Cameroon Education System. This they have done through

published documents that carry a lot of information on environmental issues and EE. They also published guides to assist teachers and other educators in the teaching of EE in primary and secondary schools. They organized workshops and seminars for students, teachers, parents and other stakeholders in the community to increase the level of environmental awareness both at the formal and informal sectors (Living Earth Foundation, 1999).

According to the Ministry of National Education (2000), the content of EE in the Cameroon primary schools is in two broad areas: the natural and man-made environments. People need to be aware of their environment and its crisis before they can protect it. So the content of EE should address all the aspects that will help students to understand the functioning of the environment and the ways of protecting it. Environmental Education has been considered as an additional subject in the traditional curriculum. At the elementary school level, it can take the form of a science enrichment curriculum; natural field trips, community service projects and participation in out-door science activities. In secondary schools, EE curriculum can be focused on subjects within the sciences or as a part of student interest groups or clubs.

The new syllabuses for primary schools in Cameroon have EE as an independent subject but in secondary schools it is still a dependent subject. It is taught through interrelated topics in other subjects. In secondary schools there is no period on the timetable for EE. But the topics that concern EE are found in subjects like moral education, agriculture, mathematics, arts and craft, communication, literature, citizenship, geography, biology

and health education. The topics include ecosystems, soils, life cycles, photosynthesis, vegetation, economic activity, desertification, habitats, forestry, pollution, construction, atmosphere, water surfaces and recycling of paper and waste. Living Earth Foundation (2006) brings out the interrelatedness of EE topics and topics of other subjects, and also shows what the various subjects can contribute to Environmental Education in fig 3 below.

The diagram shows how interrelated the topics of other subjects are linked to those of EE and also indicates the difficulty of drawing a clear cut boundary between environmental education topics and those of other related subjects. It clearly shows how the ecosystem needs contributions from geography, ecology, arts, mathematics, science, Literature and technology.

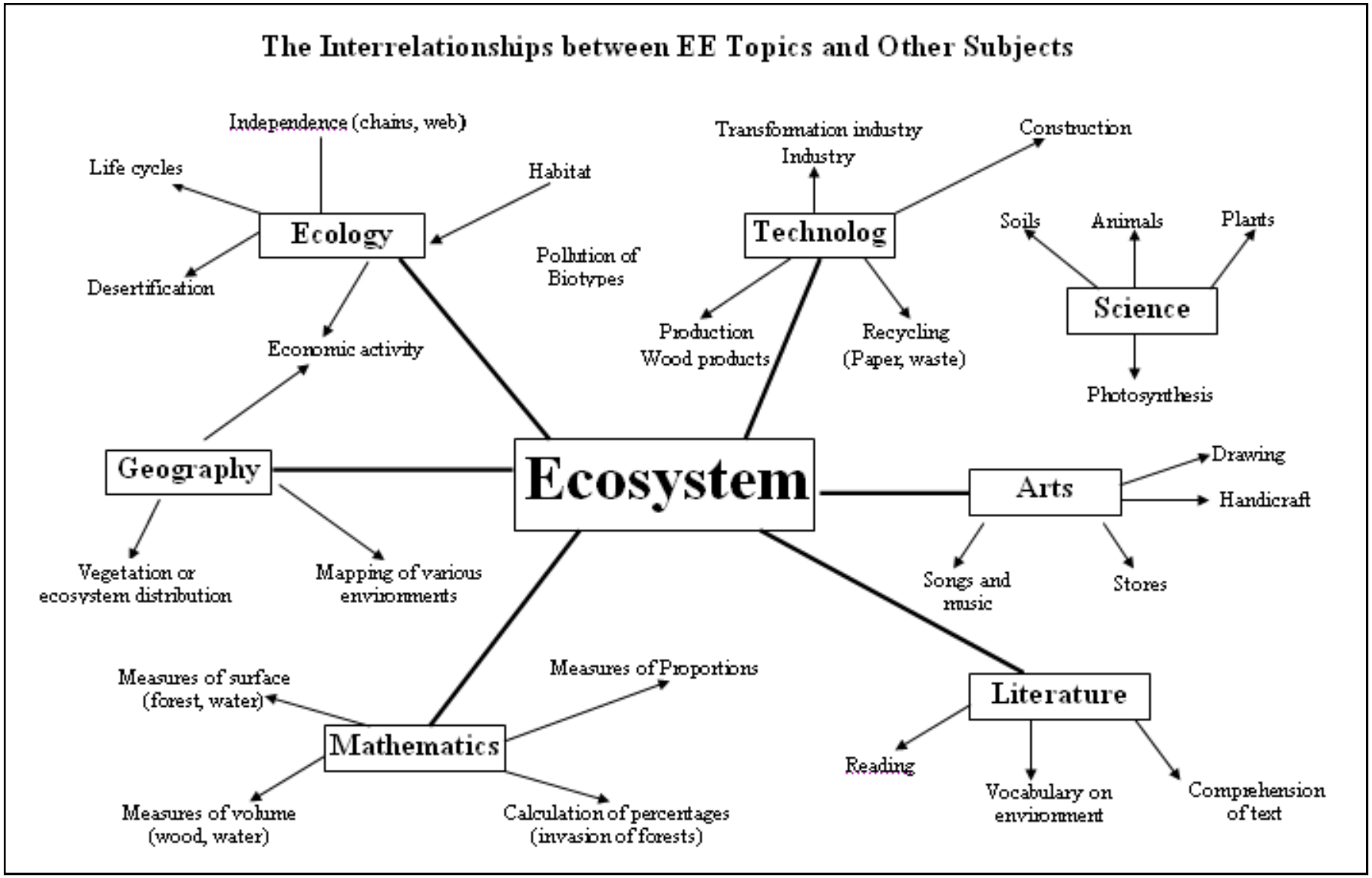

Fig. 3: The interrelationship between EE topics and other subjects (Source: Living Earth Foundation, 2006)

As a result of the contributions of Living Earth Foundation, most secondary schools have environmental clubs through which students carry out activities that can help them manage environmental problems. Some of the activities carried out by students in their environmental clubs are; panel discussions, conferences, debates, environmental information boards on topics like waste management, reforestation, capacity building and others. Other activities carried out by the clubs include; recycling through composting, tree nursery and planting, provision of trash cans on campuses, just to name a few.

In May 1991, a regional seminar was held in Sangmelima, organized by UNESCO, UNDP, MAB and the government of Cameroon. It was on the management of the reserves of the biosphere and Environmental Education. The main aim was to sensitize the population on sustainable ways of exploiting natural resources (especially forest resources that this part of the country is endowed with) and also to emphasize the importance of EE. The Ministry of Environment and Forestry was created by decree No 92/069 of 9th April 1992. This was proof that the Government saw the need to emphasize the importance of environmental conservation and the protection of the countyôs natural resources and put the ministry in place to take care of it (UNESCO, 1991).

In November 1996, through partnership with Ministry of National Education (MINEDUC) and the European Union (EU), Living Earth established the Cameroon EE support project to develop EE resources for use in primary and secondary schools. The project was to be carried out in the South West, North West and Centre provinces initially. The project was launched in 1997, with aims to stimulate the study and

understanding of environmental issues both within schools and in local communities, and therefore encourage local involvement in the sustainable management of natural resources. One of the key outputs of this project is the production of environmental education teaching materials for schools.

In 1997, the Cameroon Governmentôs goal on education reforms of the primary schools was based on the philosophy of ruralisation of education. This means that environmental issues were considered to an extent though indirectly. It is evident in the fact that Rural Science, Nature Study and Hygiene were part of the curriculum, and the content of these subjects is what we have in the EE curriculum today. The government organized a National Forum on education in May 1995. Following the recommendations of the forum, a bill to lay down the guidelines for education in Cameroon was passed by parliament and promulgated into law No 089/004 on the 4th of April 1988. As a result, a seminar was organized in Yaoundé in February 2000, to work on new Syllabuses for the primary school. One of the fruits of this work was the inclusion of EE as a separate subject in the syllabus. This was a major breakthrough in the fight against environmental degradation (Lambi, 2001).

In 2001, the EE syllabus came as a result of the governmentôs decision to revise the Anglophone primary school syllabus in general, and to make it suit the new six year Anglophone primary school course starting from the 2001/2002 academic year. In the course of this, the syllabus for EE was made. The syllabus covers the six years of the new course and the topics are almost the same as in the defunct syllabus. They are a part of

the six year primary science course which is divided into two: Science 1 ï Health Education and Science 2 ï Environmental Education. (MINEDUC, 2000)

Environmental Education requires that students build new knowledge upon the foundation of previous learning so that they will be able to apply it in their environment, through their activities and behaviors (Palmer, 2003). Meaningful learning (learning that will promote achievement and understanding in pupils) in environmental education can only occur when outside influences, behavior and cognition are considered. This study is based on the theories of constructivism, as propounded by Lev Vygotsky and Jean Piaget; the social cognitive learning theory by Albert Bandura; and the ecological theory by Bronfenbrenner.

Theoretical Framework

Constructivist Learning Theory

Learning is ñthe act, process or experience of gaining knowledge or skillsò. It has the following perspectives; behaviorism which focuses on the observable and measurable aspects of experience, and educationally is stimulus - response based, cognition, which stresses on processing rather than behavior, and sees learning as occurring within the learner (Gary, 2011). Cognitivism, which acknowledges outside influences and stimuli and stresses individual formation and interpretation of knowledge, and lastly social learning which considers learning as a mixture of behavior and cognition including the learnerôs contribution to the process (Oby, 2007). Constructivistôs theorists also think that learning is an internal process, influenced by the learner's personality, prior knowledge

and learning goals. They describe a learner-centered environment where knowledge and the making of knowledge is interactive, inductive, and collaborative, where multiple perspectives are represented, and where questions are valued (Brooks & Brooks, 1993).

According to Santrock (2000), constructivism can be classified into individual or cognitive constructivism (Piaget) and social constructivism (Vygotsky). Individual or cognitive constructivism initially evolved from Piagetôs work, specifically that on genetic epistemology. Cognitive constructivism developed as a reaction to behaviorist and information-processing theories of learning. It conceptualizes learning as the result of constructing meaning based on an individualôs experience and prior knowledge. Social constructivism, on the other hand grew from the work of individual constructivists as well as Vygotsky and others who took a social and cultural perspective of knowledge creation. Pure social constructivists believe that learning occurs via the construction of meaning in social interaction, within cultures, and through language (Santrock, 2004).

Piaget's Cognitive Constructivist Theory.

In his cognitive constructivist theory, Piaget (1970), proposed that children progress through a sequence of four stages, assumed to reflect qualitative differences in children's cognitive abilities. Limited by the logical structures in the different developmental stages, learners cannot be taught key cognitive tasks if they have not reached a particular stage of development. Piaget stressed the holistic approach to learning. To him, a child constructs understanding through many channels: reading, listening, exploring and experiencing his or her environment.

Later in (1985), he expanded this theory to explain how new information is shaped to fit with the learner's existing knowledge which is itself modified to accommodate the new information. The major concepts in this cognitive process include:

- Assimilation: it occurs when a learner perceives new objects or events in terms of existing schemes or operations. This information is compared with existing cognitive structures
- Accommodation: it occurs when existing schemes or operations have been modified to account for a new experience.
- Equilibration: it is the master developmental process, encompassing both assimilation and accommodation. Anomalies of experience create a state of disequilibrium which can only be resolved when a more adaptive, and sophisticated mode of thought is adopted.

Piagetian constructivists generally regard the purpose of education as educating the individual child in a fashion that supports the child's interests and needs; consequently, the child is the subject of study, and individual cognitive development is the emphasis. This is a child-centered approach that seeks to identify, through scientific study, the natural path of cognitive development (Devries et al. 2001). It also assumes that learners come to classrooms with ideas, beliefs, and opinions that need to be altered or modified by a teacher who facilitates this alteration by devising tasks and questions that create dilemmas for the learners. Considering the educational reflections of this theory, Piaget sees the child as ñcontinually interacting with the world around him/her by solving

problems that are presented by the environmentò and learning occurs through taking action to solve these problems (Biehler & Snowman, 1997).

Within his theory, the basis of learning is discovery: ôTo understand is to discover, or reconstruct by rediscovery and such conditions must be complied with if in the future individuals are to be formed who are capable of production and creativity and not simply repetitionô (Piaget, 1973). According to Piaget, children go through stages in which they accept ideas they may later discard as wrong. Understanding, therefore, is built up step by step through active participation and involvement.

He further states that children begin to think logically between the ages of 8 and 11 years, a stage he called the concrete operational stage of development (Wade & Tavis, 1990; Santrock, 2004). The average age for the primary six pupils (the target population for the study) is 9 and 10 years which imply that children at this age can give logical thought (creative thought) to Environmental Education concepts and be able to understand them better. Environmental education requires meaningful learning, i.e. learning that involves critical and creative thinking. Piagetôs ideology supports this with the idea of logical thinking. A child who thinks logically will be able to use the learnt concepts and apply them to new situations. The environment needs people who think and act in this way and this is the best age to inculcate such ideas in the children so that they grow up with them and develop positive attitudes towards the environment and environmental education. Achievement is one of the aspects through which thinking skills can be assessed. These

are the future generation and must be prepared in the best ways to face the future and sustainably act towards the environment and this study is out for such results.

Vygotsky's Social Constructivist Theory

Vygotsky is one of those who believed that children actively construct their knowledge. He viewed cognitive development as a result of a dialectical process, where the child learns through shared problem solving experiences with someone else, such as parents, teachers, siblings or peers. The social constructivist theory emphasizes the social contexts of learning and the fact that knowledge is mutually built and constructed. Devries, (2001), emphasizes the profits of collaboration in group work and noted that with a more skilled tutor; an individual will facilitate transition from his/her zone of proximal development to new levels of skills and competencies. Zone of proximal development (ZPD) is Vygotskyôs term for the range of tasks that are too difficult for children to master alone, but can be learned with guidance and assistance from adults or more skilled children working independently (Santrock, 2004). This implies that an environmental education teacher should act as a facilitator by gradually reducing explanations, hints and demonstrations until the student is able to perform the skill alone. This will encourage the pupil to learn from prior knowledge they had before coming to school or use the knowledge they already have to construct new knowledge.

Vygotsky(1962), emphasized the role of language and culture in cognitive development and in how we perceive the world and claimed that they provide frameworks through which we experience, communicate and understand reality. He demonstrated the

importance of language in learning by demonstrating that in infants, communication is a pre-requisite to the childôs acquisition of concepts and language. But, he suggests that people learn with meaning and personal significance in mind, not just through attention to the facts. To him, language and the conceptual schemes that are transmitted by means of language are essentially social phenomena. Knowledge is not simply constructed, it is co-constructed.

The sociocultural perspective suggests that learning is a process of appropriating 'tools for thinking', that are made available by social agents who initially act as interpreters and guides in the individual's cultural apprenticeship (Rogoff, 1990). It is not just that the child learns from others in social contexts and during social exchange, but rather that the actual means of social interaction (language, gesture) are appropriated by the individual (internalised & transformed) to form the instrumental tools for thinking, problem-solving, remembering and so on (Wertsch, 1985).

Vygotsky viewed cognitive developments as a result of a dialectical process, where the child learns through shared problem solving experiences with someone else, such as parents, teachers, siblings or peers. Originally, the person interacting with the child undertakes most of the responsibility for guiding the problem solving, but gradually this responsibility transfers to the child. Although these interactions can take many forms, Vygotsky stresses language dialogue. It is primarily through their speech that adults are assumed to transmit to children the rich body of knowledge that exists in their culture. As learning processes, the childôs own language comes to help as his or her primary tool

of intellectual transformation. Children can eventually use their own internal speech to direct their own behavior in much the same way that their parentsô speech once directed it. This transition reflects the Vygotsky´s theme of development as a process of internalization. Bodies of knowledge and tools of thought at first exist outside the child, within the culture of the environment. Development consists of gradual internalization, primarily through language, to form cultural adaptation (Rogoff, 1990).

Living Earth (2006) supports the fact that, in the teaching of Environmental Education using the co-curricular approach, the teacher acts as a facilitator. He is expected to sensitize learners to their environment, develop critical inferential thinking, encourage creative thinking, and exploration that will enhance self directed and cooperative learning amongst the learners. Vygotskyôs theory also encourages collaborative learning and recognizes that learning involves a community of learners. Peers, teachers and parents work together in a community of learners rather than the child learning as an isolated individual, (Rogoff *et al*., 2001).

This theory is an important function of education to guide students in learning the skills that are necessary in the culture in which they live. The teacher according Vygotskyôs view should also establish many opportunities for students to learn with the teacher and more skilled peers. In this respect, Environmental Clubs will play an important role. It is evident from this theory that EE should be taught in such a way that students will be able to construct their own knowledge from the environment and apply it practically out of the classroom. If a student does not understand the concepts of EE well, it will not be

possible for this student to make positive decisions that can promote sustainable environmental behaviour in the community (Brooks &Brooks, 1993).

Looking at the constructivist theories as postulated by Piaget and Vygotsky in the context of this study, we find that achievement in EE largely depends on the learner, the environment itself and the interactions that exist between the learner and the key actors in EE in schools and the society. These include the teachers, school authorities, peers, and parents. This is very important as language is also an innate and social construction. The innate framework for language construction holds that children have a natural language acquisition device (Santrock. 2004), which enables them to cognitively construct and produce language. The implication here is that teachers of EE must give learners the opportunities to construct, produce and use language that is meaningful to their understanding of the environment. When this is done then they can comfortably think, reason, perceive, talk and reflect about their environment, thereby constructing their own attitudes, meaning and knowledge towards and on their environment.

Away from the innate perspective, we also find the social and interactive perspective to language construction and use. This perspective within this study may require that learners are given the opportunities to interact with their social world in order to socially construct meaningful knowledge of and about the environment. Such construction will equally promote the formation of shared attitudes towards EE and subsequently towards better achievement in EE.

Bandura's Social Cognitive Theory

Social learning theory focuses on the learning that occurs within a social context. It considers that people learn from one another, including such concepts as observational learning, imitation and modeling. Dwyer (1991) asserts that this approach is child centered rather than curriculum centered, while Bagley and Hunter (1992) state that learning becomes a dynamic process. Bagley and Hunter (1992) went on to say that active learning leads to greater retention and higher level thinking. And as knowledge continues to double every two years, and since it also has a shelf life, students must learn to access information; there is now far too much information to memorize.

Bandura (1986) stated that when students learn, they can cognitively represent or transform their experiences. He developed a reciprocal determinism model that consists of three main factors: behaviour, person and the environment. All of these factors can interact to influence learning. The social learning theory of Bandura emphasizes the importance of observing and modeling the behaviours, attitudes and emotional reactions of others.

Bandura (1977) states that:

> *"Learning would be exceedingly laborious, not to mention hazardous, if people had to rely solely on the effects of their own actions to inform them what to do. Fortunately, most human behaviour is learned observationally through modeling: from observing others one forms an idea of how new*

behaviours are performed, and on later occasions this coded information serves as a guide for action" P, 134.

Social learning theory explains human behaviour in terms of continuous reciprocal interaction between cognitive, behavioural and environmental influences. The component processes underlying observational learning according to Bandura (1986) are:

- Attention, including modeled events and observer characteristics.
- Retention including symbolic coding.
- Motor reproduction, including physical capabilities of self observation of reproduction and accuracy of feedback.
- Motivation, including external, vicarious and self reinforcement.

Educational Implications of Bandura's social Learning Theory

The educational implications of Banduraôs social learning theory are strongly associated with his belief that one can master a situation and produce positive outcomes. This stresses on self-efficacy, which Bandura (1997, 2001) has emphasized in recent years. In applying Banduraôs social learning theory, Kearsley (1994) suggests keeping the following in mind:

- That attention is essential for students to learn what the model is doing or saying to be able to imitate the modelôs action.
- Retention is also important for students to be able to code the information and store in memory, so that they can reproduce it when need be. In this wise, teachers

of EE should use methods that will make the students participate because by doing so, they will learn and understand better.

- Reproduction of the knowledge and skills acquired through attention and retention is very vital. The ability to reproduce is necessary for EE students to be able to practice their skills at home.
- Students are more likely to perform a modeled behaviour if they are motivated by the use of reinforcement.

He further states that, observational learning is achieved by first organizing and rehearsing the modeled behaviour symbolically and then enacting it overtly. Individuals are more likely to adopt an observed behaviour if it results in outcomes that they value, and also if the model is similar to the observer and has admirable status. The child will observe and model those aspects of the culture that are interesting to him or her, and where these are environmentally friendly it will help the child in building new knowledge on it while in school.

When teaching students Environmental Education teachers should think about what type of model they will present to their students because children and students watch and listen (attend) to what parents and teachers say and do and they imitate. Just by being around parents and teachers, students will absorb a great deal of information through observation. Therefore parents and teachers should be careful because children will pick up their good or bad habits towards the environment, their expectations for their high or low achievement, their enthusiastic or bored attitude, their controlled or uncontrolled

manner of dealing with the environment, their attitudes and many other aspects of their behaviour.

This is a good model for environmental education skills because they are practical and so can be better learned through observation and modelling according to the social learning theory. The skills, values and attitudes for environmental education are to be applied in the immediate environment, so what the pupils see those around them do is what they will observe, imitate and model or copy. Pupilsô achievement will improve if good models are used in teaching environmental education, and high achievement will lead to positive attitudes towards the environment and a step towards sustainability.

Bronfenbrenner's Ecological Theory.

The ecological theory primarily focuses on the social contexts in which children live and the people who influence their development (Santrock, 2004). It also looks at environmental influences on the whole childôs development and finally how it relates to early education programs.

Bronfenbrenner developed the ecological systems theory to explain how everything in a child and the child's environment affects how a child grows and develops. He labelled different aspects or levels of the environment that influence children's development, including, microsystem, mesosystem, exosystem and macrosystem (Bronfenbrenner, 1979). The microsystem is the small, immediate environment the child lives. Children's microsystems will include any immediate relationships or organizations they interact with, such as their immediate family or caregivers and their school or daycare. How these

groups or organizations interact with the child will have an effect on how the child grows; the more encouraging and nurturing these relationships and places are, the better the child will be able to grow.

Bronfenbrenner's final level is the macrosystem, which is the largest and most remote set of people and things to a child, but which still have a great influence over the child. The macrosystem includes things such as the relative freedoms permitted by the national government, cultural values, the economy, wars, etc. These things can also affect a child either positively or negatively.

Learning is very much related to culture, and language is one of the major attributes of culture. Children acquire language skills in their immediate environments which include the home, peers, parents, neighbours, school and the church. According to this theory most of what the child learns is from the environment, so the childôs immediate surroundings are a source of information in areas like language, attitudes and habits. The behaviour of the child will depend on the behaviour of people and on the activities carried out around that child. The childôs first language will obviously be that of the society he /she come from, hence the selection of the language of instruction in the schools should take that into consideration.

The diagram below shows the different systems that surround the learner and through which they learn.

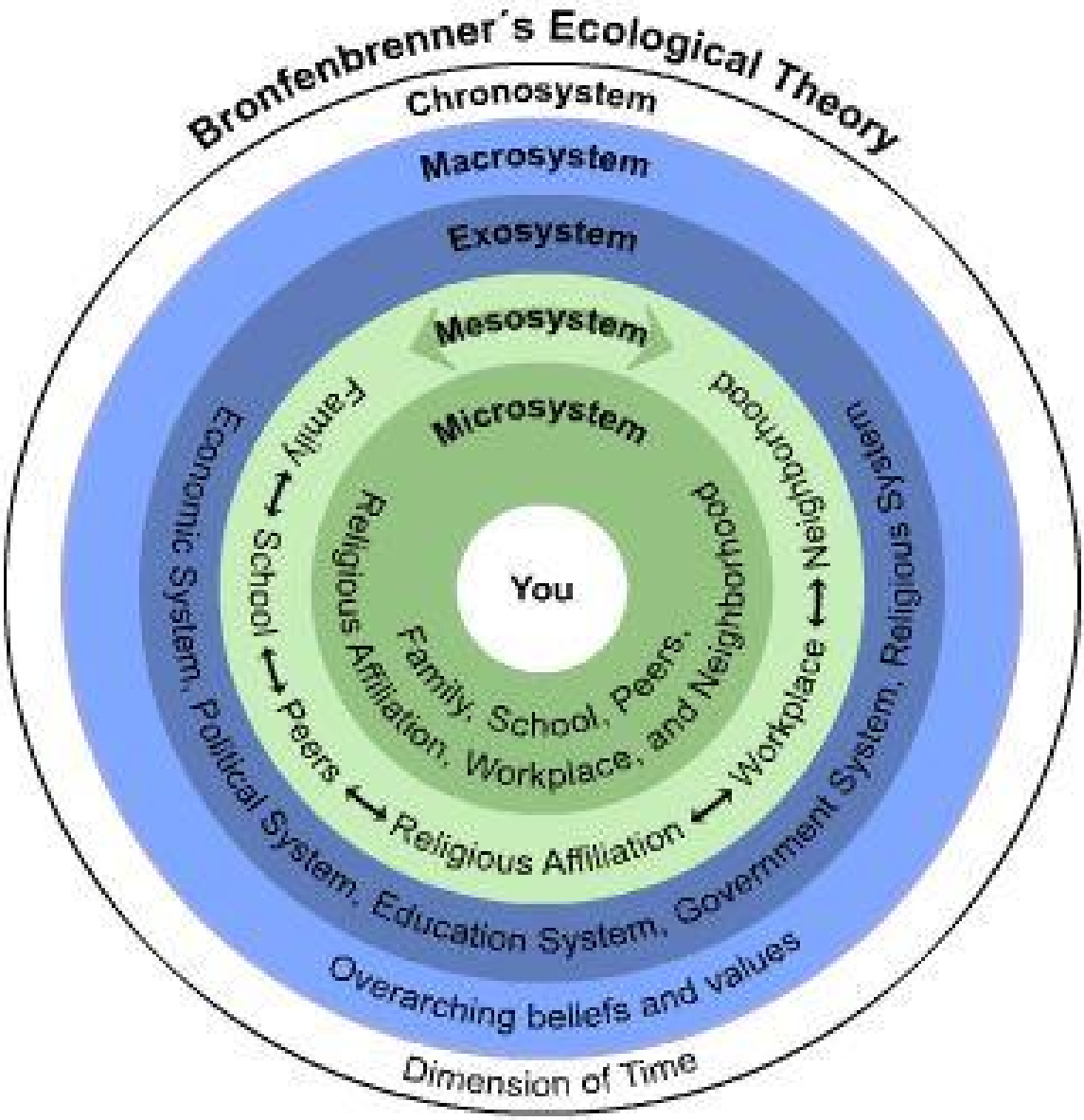

Fig 3: **Diagrammatic Representation of Bronfenbrenner's Ecological Theory of Development (Extracted from Swick, K., & Williams, R (2006).**

The ecological theory pre-supposes that the context of development is very primordial in forming positive attitudes towards the environment. Of interest to this study, we find that

Bronfenbrennerôs micro and mesosystems are important to the language used by children in their environment and the effects on their attitudes and achievement in EE. This may require that there is a relationship between language of instruction in the classroom and the language used at home, peer group, neighbourhood, school and even in church. It is likely that when the language used in the ecological context of the child is same with the language of instruction in the EE classroom, achievement may be improved in EE.

Review of Related Empirical Studies

Language of instruction and pupils' achievement.

Medium of instruction plays a key role in the teaching and learning process, and also on the achievement level of students (Ahmad, 2012). It is the language through which teachers and students communicate with each other during the teaching and learning process. Medium of instruction is an issue of vital importance in Education. During 1980s the private sector was encouraged by the educational sector and most of these institutions adopted English as the medium of instruction. No one can deny the importance of medium of instruction in the achievement level of students but it adversely influences the achievement level when the medium of instruction changes.

Zubair (1993) emphasized the significance of mother tongue as a medium of instruction at primary level. Ideally the medium of instruction of a child living in its own language environment should be the mother tongue .Children should be taught in their mother tongue and the second language i.e., English should be adopted as a subject.

Language is that tool which performs multidimensional function as a means of communication, expressions and conceptualization, means of domination and differences. Nowadaysô educators are facing the challenges to meet the need of the large number of students whose primary language is not English (Gibbons, 2003).

A research was conducted by Vizconde (2006) to study the attitudes of student teachers towards the use of English as language of instruction for science and mathematics in the Philpines. The study stated that concepts and topics taught are not comprehensive to students when they are taught in English. Miller et al. (1998) studied the teaching of Mathematics and English. It showed that language truly affects the learning of concepts. The communication of teachers play the key role in teaching which depends upon the language and so has effects on the learning of students (Baker, 1998). The basic language for school going students must be that language which they use at their home and wherever is possible. With the passage of time and with the urbanization of cities increasing and multilingual people living in the same society therefore making educationists to consider the multilingual medium of instruction means the same time teacher and students are communicating with each other through more than one language.

Ahmad, (2012), carried out a study on the impact of the medium of instruction on the achievement level of students at higher secondary stages in the Hyderabad region of Sindh. The objective of the study was to evaluate the impact of medium of instruction on the achievement level of students and to analyze the impact of change of the medium of instruction on studentsô performance.The specific purpose of the study was to analyze the

role of the medium of instruction and its impact on studentsô achievement. Further the study analyzed the attitude towards English as a medium of instruction in teaching science and mathematics. The strategy of the research was the survey .The target population was principals, teachers and students of government and private colleges. It was found that the medium of instruction plays the significant role in the learning outcome of students. A large majority of teachers were agreed that English should be taught as a functional subject from grade three on wards .It will certainly improve the language skills of students as they feel relax when the medium of instruction changes at higher secondary stages and ultimately it will enhance the learning.

Yip (2003) investigated the effects of the medium of instruction on science learning of Hong Kong secondary students. The research project was a longitudinal study that aimed at exploring the effects of this language policy on the science learning of the English-medium and Chinese-medium students in the first three years of secondary schooling. The learning outcomes of the two streams of students were assessed by science achievement tests and a questionnaire on students' self-concept in science. The results obtained show that the English-medium students were disadvantaged in science learning, as they had relatively lower achievement scores and lower self-concept in science than those who learned through Chinese. Based on the analysis of students' performance on the test items, their perception of classroom climate in science lessons and classroom observations, the negative effects of learning science through English can be related to the limited English proficiency of the immersion students and inadequate repertoire of instructional strategies used by the science teachers. These negative effects, however,

tended to become reduced with increase in time of immersion, probably because the English-medium students had become more proficient in English language skills and more confident in learning through English. Recommendation on the implementation of the language policy and teacher education programmes are proposed to resolve the problems faced by the English-medium students.

Kwok, (2006) carried out a study in which he investigated the relationship between physics achievement and language of instruction in a situation where instruction was in the second language of both students and teachers. One hundred and seventy-six grade ten physics students (first language was Chinese) were selected from four classes of two secondary schools in Hong Kong. For three months (with four lessons per week), two classes of students learned the content material (light & sound) in Chinese and two classes learned the material in English. Group differences were controlled by using individual aptitude scores as covariates in the analysis. There were no differences in achievement, students' motivation, and effort spent in physics in that controlled teaching period. This was probably because the Anglo-Chinese group was sufficiently proficient in English so they did not encounter additional difficulty in learning physics when compared with the Chinese group.

Birgit, (2007) put together results on study on the Language of instruction and student performance: new insights from research in Tanzania and South Africa. This article, drawing on a set of studies conducted in the framework of the Language of Instruction in Tanzania and South Africa (LOITASA) research project, shows how well African students express themselves if they are allowed to use a familiar African language, and

conversely the difficulties they have when forced to use a foreign language, a language they hardly hear and never use outside of school, as a language of instruction. A key finding of the research is that when the foreign language, English in this case, is used, there is a much larger spread in test performance between students. This means that a small group of students succeed while the vast majority sinks. The author therefore argues for working towards a goal whereby African children like children in industrialized countries may study in their own language. Pursuing this goal should be a centrepiece in poverty reduction strategies.

Neema, (2010), carried out a study on the Influence of the Language of Instruction on Studentsô Academic Performance in Secondary Schools: *A comparative study of urban and rural schools in Arusha-Tanzania.* The study highlights the impact of using English as the language of instruction on studentsԹ academic performance in secondary schools particularly contrasting urban and rural schools in Tanzania. Two subjects, that is, History and English were used to examine the differences and similarities in studentsԹ performances. The theoretical framework to guide this study included Vygotsky theory which examines the importance of language and learning in creating meaning and linking new ideas. The zone of proximal development is also featured by Vygotsky with the aim to promote effective learning. The self-worth theory assumes that success is valued while failure is not relates to the low ability of these as criteria of personal worth.

The study mainly used qualitative approaches in data collection, analysis and presentation. Quantitative approach was only used to present statistical data. Data was

obtained through the use of interviews, observation and documentary reviews. The study adopted a multiple-case study and content analysis was used for data analysis.

The findings indicated that students in urban secondary schools performed better than students at the rural schools. The findings also show that the use of similar coping strategies and lack of student participation in class discussions were observed in both schools. The scarcity of learning materials, regular uses of teacher-centered methods were observed in both schools except in a few lessons in the urban school. Findings also show that overcrowded classrooms and lack of physical facilities such as a library hamper effective learning and developing language skills.

Moreover, the findings reveal other influences that affect studentsô performance. School administrative issues such as giving students punishments and outdoor activities during class hours and the absence of lunch meals in school are issues that affect both urban and rural studentsҷ academic performance. The finding also showed that for students to perform well in examinations they need to be motivated by teachers and be willing to study conscientiously. Parental support and tuition/remedial classes were also highly recommended to enable students to perform much better. The absence of favorable living surroundings and adequate time to study at home were other factors that could contribute poor academic achievement.

This study considers the fact that English is still the language of instruction; therefore, measures need to be taken to solve the language problem. In order to work on this language problem the teaching of English as a subject should be enhanced to promote effective and efficient teaching and learning in classrooms. Reading programs and oral

exercises for students should be initiated in schools to develop students language skills. English training workshops and professional pedagogy workshops for all subject teachers should be organized to improve teachers language and pedagogy skills.

Chijng, (1996) investigated the effects of medium of instruction on the academic achievement of secondary one students in Hong Kong.The objective of the study was to compare the performance of Secondary 1 students studying in schools using different modes of medium of instruction (MOI); and to investigate the effect of the additional information for students provided by Medium of Instruction Grouping Assessment (MIGA) on their academic performance. The study attempted to look at how different medium of instruction (MOI) adopted by schools would affect the academic performance of Secondary1(S.1) students having different language abilities. The Education Department (ED) recommends the most suitable learning medium for students based on their results in the Medium of Instruction Grouping Assessment (MIGA), and also advises schools on the most appropriate MOI for adoption based on the MIGA profiles of schools' S.l intakes. Six achievement tests were administered to about 11000 S.l students from 56 schools that used a variety of MOI and had different MIGA patterns of S.l intakes. The results indicate that schools which conform to ED's MOI advice produce better student performance. Schools that adopt Chinese MOI help students of all ability levels achieve optimal performance in all subjects except English. Students, who are considered to be able to leam through English, perform well in English MOI on Chinese, English and Mathematics but poorly on Geography, History and Science.

School location and pupils' achievement.

Owoeye (2011), in a study that investigated the location of schools and its relation to the academic performance of students in Ekiti state of Nigeria between 1990 and 1997, came out with the following findings. The study examined results of the West African School Certificate Examinations (WASCE) conducted between 1990 and 1997 in 50 secondary schools in both rural and urban areas of the state. One validated instrument ñStudent Location Questionnaire (SLQ)ò was used for data collection. One hypothesis was formulated and answered. Data were analysed using mean and t - test. The results showed that there was a significant difference between the academic achievement of students in rural and urban secondary schools in senior school certificate examinations ($t=2.73$, $p<0.05$). The study has proven that students in urban areas had better academic achievement than their rural counterparts. It is recommended that Government should bridge the gap between the rural and urban locations by providing the rural dwellers the social amenities which will enhance better academic performance of students in their final examinations like the SSCE. The community should assist the government by providing taxis and buses to facilitate movement of teachers and students to their school. Adequate incentives should be provided to rural area teachers to encourage them to put in their best to remain in their duty stations.

Macmillan, (2012) carried out a study on the topic; School Location Versus Academic Achievement in Physics: Does Computer-Assisted Instruction (CAI) Have Any Effect? The research investigated the effect of Computer Assisted Instruction (CAI), a learner centred and activity based method of teaching/learning, on the achievement in Physics of

Nigerian rural and urban secondary school students. Gender issue was also examined. The research design used was the experimental design. Forty (40) SSS III students in Pankshin Local Government Area of Plateau State, Nigeria were tested on the concepts of space, time and motion using a developed 25 item Physics Achievement Test (PAT) whose reliability was 0.72. The formulated hypotheses were tested using the pooled variance formula of the student t-test statistics. The analyses revealed that there was no significant difference in the mean Physics achievement scores between urban and rural students taught Physics with CAI (69.00 for male and 67.50 for female). Furthermore, there was no significant difference in the mean Physics achievement scores of male (68.90) and female (67.60) students treated with CAI.

Obe (1984) also observed that there is a significant difference in the urban-rural performance of 480 primary six school finalists on the aptitude sub-tests of the (Nigeria) National Common Entrance Examination (NCEE) into secondary schools. In his study tagged scholastic aptitude test, he found out that children from urban schools were superior to their rural counterparts.

Ajayi (1988) found significant difference in academic performance of students in urban and rural areas of his study. He concluded that the achievement must have been borne out of many facilities which the urban students were used to and which were not available in the rural set up.

Axtel and Bowers (1972) found that students from the rural areas perform significantly better than their urban counterpart in verbal aptitude, English Language and total score using the National Common Entrance as a base. In another development, a research team

at the University of Aston recorded that it had received several well-founded reports that secondary schools have discovered that pupils from small rural schools are not only as well prepared academically as pupils from other schools, but they generally had a better attitude to whatever they are doing. Having been accustomed to working most of the time on their own, they could be given more responsibility for the organization of their work or learning tasks. Considine and Zappala (2002) studied students in Australia and found out that geographical locations do not significantly predict outcomes in school performance.

From the different studies reviewed above on the influence of location on academic achievement, the studies of Owoeye, Obe, and Ajayi, maintain that urban students perform better in examinations than their rural counterparts, Axtel and Bowers has found that rural students (in spite of all odds) perform better. Considine and Zappala have submitted in their findings and concluded that no particular set up (urban or rural) can claim superiority over the other because their performances are the same. In the literature search, no work was seen on school location and environmental education.

Gender and pupils' achievement.

Males and females learn differently from each other (Grebb, 1999; Ebel, 1999; Cavanaugh, 2002).Males tends to be more kinaesthetic, tactual and visual, and they need more mobility in a more informal environment than females. Males are more nonconforming and peer motivated than females. Males tend to learn less by listening. Females, more than males, tend to be auditory, authority-oriented, need significantly

more quiet while learning, they are more self- and authorities ï motivated, and are more conforming than males (Marcus, 1999; Pizzo, 2000).

In a study carried out by Njoki & Chandler (2002), on the African womenôs cultural knowledge of environmental education within a specific case study in rural Kenya, it was discovered that the participants had a deep understanding of the ecological situation and their level of cultural knowledge and environmental degradation stood out among all other participants. The results also indicated that rural women are connected to the land and the environment, and have a vast knowledge of the environment, which could be incorporated in teaching to contribute to environmental education. The study employed both qualitative and quantitative methods; Wane interviewed 77 Embu women whose ages ranged from 20 to 100 years. However, for the purpose of the study, Wane selected the narratives of six women, whose ages ranged from 70 to 100 years. It was found that some Embu women are in tune with their surroundings. The cosmology or belief system of the ancient people of Africa has a relevance to how many African communities, and especially Embu rural women, understand and conceptualize ecosystems, environmental change and conservation. He situated the arguments within an eco - feminism theoretical framework.

Abdu-Raheem B. O. (2012) investigated the influence of gender on secondary schools studentsô academic performance in South-West, Nigeria. The results of 2003/2004 to 2007/2008 West African School Certificate Examinations (WASCE) were collected on English Language, Mathematics, Biology, Chemistry, Physics, Economics, Geography,

Government, Yoruba, Christian Religious Studies and French from 10 Secondary Schools selected from 5 States in Nigeria. The samples consisted of 2,305 students. Stratified random sampling was used to select 2 schools from each state. Purposive sampling was used to collect the WASCE results of students sampled. Chi-Square was used to test the 5 hypotheses raised. The study revealed that male and female students performed equally in English language. Males performed better than females in Mathematics, Science and Social Science while females also did better than males in Arts except in Yoruba. It was, therefore, recommended that necessary materials/equipment should be provided to make Mathematics, Science and Social Science interesting to girls, French and Christian Religious Studies encouraging to boys.

Abiodun (2004), in an investigation on the influence of gender and classroom climate on secondary school studentsô achievement in mathematics and mathematics related subjects in Ekiti state, Nigeria. The data analyzed showed that there were differences in the academic performance of male and female students in mathematics related subjects. In addition, it was discovered that male students have more pleasant attitude towards mathematics than their female students and they study mathematics with intention to understand it. The results suggested that researchers and mathematics teachers should be sensitive to classroom climate. As a result of the findings from the study, it was recommended that mathematics teachers should encourage female students to participate fully during mathematics lessons. The design of the study was a descriptive design which elicits information through survey method. The population of the study was the Senior Secondary School Students in Ekiti State. The sample of the study

consisted of 198 students who were selected through random sampling technique. The instruments used for the study were questionnaires and achievement tests. These instruments were validated by experts in mathematics. The reliability of the instruments was established through tests and retest method and the data collected were subjected to Pearson Product Moment Correlation analysis and a coefficient of 0.92 and 0.89 were obtained respectively. The data collected during the main study was analyzed using frequency count and t-test analysis. The hypotheses were tested at 0.05 level of significance.

In a study carried out by Bosire,Mondoh, and Barmao (2000), on the effect of streaming by gender on studentsô achievement in mathematics in secondary schools, it was discovered that streaming based on gender improved overall student achievement in Mathematics and especially that of girls. The study focused on public schools categorised based on school type and class arrangement; mixed sex- aggregated, normal mixed sex and single sex schools. The ex- post factor design was used and the population for the study was 1489 candidates in four secondary schools. The achievement scores on national examinations of the candidates for the years 1999 and 2000 were analysed. They concluded that there were strong indications that streaming by gender may be useful in a class environment as an intervention towards improving the performance of girls in mathematics in co- educational schools.

Gender, school location and pupils' achievement.

Eraikhuemen (2003) examined the influence of Gender and school location on the mathematics achievement of senior secondary school II (SS II) students. The sample for the study consisted of four hundred and three (403) SS II students randomly selected from twelve (12) senior secondary schools in four (4) local government areas of Edo South Senatorial zone. The instrument of research is a sixty (60) multiple ï choice items mathematics achievement test. Three (3) hypotheses were formulated to direct the study. Data collected were analysed using a 2x2 Analysis of variance (ANOVA). The result indicated that: There is a significant difference in the academic achievement of male and female students. There is a significant difference in the academic achievement of urban and rural students. There is a significance interaction influence of gender and school location on the academic achievement of students. Based on the research findings, it is concluded that male students perform better than female students in senior secondary school mathematics. Also urban students perform better than rural students in senior secondary school mathematics. It is therefore recommended among others that facilitates and amenities, which make for ñgood lifeò should be provided in the rural areas to make rural life competitive and creative. Similar to the present study, this study concentrates on school location and gender and their effects on achievement. The same instrument was used for data collection and the findings were similar in both studies.

In another study by Akomolafe (2011), he examined the personal factors of individual students that could enhance environmental education in tertiary institutions. A total of 539 students of tertiary institutions were sampled, using multi-stage, simple random and

purposive sampling techniques. The research was a descriptive design. Data were gathered using self-constructed questionnaire. Six research hypotheses were generated, and t-test analysis was used to test hypotheses one and two, Analysis of variance (ANOVA) was used to test hypotheses three to five, while Pearson Product moment correlation method was use to test hypothesis six. The hypotheses were tested and the results were found to be significant at 0.05 level. The study revealed that the gender of students and parentsô level of education, were not important factors in studentsô environmental awareness knowledge. Gender of students and parentsô level of education were not important factors in their environmental attitude. The study further revealed that the type of institution has no influence on studentsô environmental awareness knowledge, and also on their environmental attitude. However a significant relationship was established between studentsô environmental awareness knowledge and environmental attitude. Based on these findings, it was recommended that environmental education should be intensified in tertiary institutions and that its content should reflect the immediate needs of the students.

Macmillan, (2012), investigated the effect of Computer Assisted Instruction (CAI), on the achievement in Physics of Nigerian rural and urban secondary school students. Gender issue was also examined. The research design used was the experimental design. Forty (40) SSS III students in Pankshin Local Government Area of Plateau State, Nigeria were tested on the concepts of space, time and motion using a developed 25 item Physics Achievement Test (PAT) whose reliability was 0.72. The formulated hypotheses were tested using the pooled variance formula of the student t-test statistics. The analyses

revealed that there was no significant difference in the mean Physics achievement scores between urban and rural students taught Physics with CAI (69.00 for male and 67.50 for female). Furthermore, there was no significant difference in the mean Physics achievement scores of male (68.90) and female (67.60) students treated with CAI.

Okereka(2011) looked at the influence of gender and school location on achievement in chemistry when the innovative teaching method of play-simulation was used. Eight intact classes of (SS 1)students were used, each class from each of the eight sampled schools. Four schools were randomly selected from each of the groups of Boys and Girls only schools from four Local Government Areas. The school types were further grouped into rural-urban dichotomies four each with two from each school type. A sample of 177 students participated in the study (99 males and 78 females with 92 of them from urban schools and 85 from rural schools). The sampled schools comprised of two boys only schools and two girls only schools. Each of the two school types was selected from among urban and rural schools. Each intact class received chemistry lesson on organic chemistry after pre-test, each also participated in a post-test. A teacher made tested formed the research instrument. ANCOVA statistical test was used to test the two hypotheses and means were used to answer the research questions. The result showed that male students achieved significantly better than female students and also that the students from urban schools achieved significantly better than students from rural schools when play-simulation is used to teach SS1 chemistry students organic chemistry. Based

on these findings, recommendations were made to the effect that school location and gender should not be a barrier in the application of innovative teaching strategies in science classes.

This study looks at the influence of gender and school location on achievement like the present study but is focused on the innovative teaching method of play-simulation while the present study focuses on language of instruction. It is similar to the present investigation in the same method of data analysis, the use of the same design and intact classes.

Akabogu (2002) carried out a research work on the effect of contextual clue exposure to English registers on secondary school studentsô achievement in reading comprehension. The study employed a non-equivalent control group quasi-experimental design. Stratified random sampling technique was used to select the eight schools used for the study. The eight schools were located in the urban and rural areas of Enugu Education Zone of the Enugu State. Two intact classes of SS 2 students were randomly selected and assigned to the experimental and control groups. The experimental group had one hundred and thirty three (133) students comprising male and female students. The control group had on hundred and twenty seven (127) students also made up of male and female students.

A Reading Comprehension Achievement Test (RCAT) was used to collect data on the studentsô performance. The data collected was analysed by use of means, standard deviation and Analysis of Covariance (ANCOVA). For gender and location, the results of the study revealed that; there is no significant effect of gender on studentsô achievement

in reading comprehension. Location of schools had a significant effect on studentsô achievement in reading comprehension, signifying that student achievement varied with a change in location from urban to rural.

This study and the present study share a number of things in common. The both have gender and school location as variables dependent on student achievement. The same design is used in the two studies and the data was collected through achievement test for the two studies. The data for both studies was analysed using means standard deviation and ANCOVA. The findings are similar though carried out in different study areas.

Attitudes towards the teaching and learning of Environmental Education.

Mbua (2007) carried out a study on teacherôs attitudes towards the teaching of EE in Government Primary schools in the South West Region of Cameroon. The study sought to find out what attitudes teachers have towards the teaching of EE, whether they have adequate teaching materials and also what teaching strategies they employ in the teaching of EE. The survey research design was used and the research instrument was the questionnaire and an interview guide. The simple random sampling technique was used to select the sample Administrative Divisions and the schools. A sample of 246 teachers was used. Frequency and percentage tables and graphs were used to present the results.

Etuk et al (2011), investigated constructivistsô instructional strategies and pupilsô achievement and attitude towards primary science. The population was 650 Basic-5 pupils in 21 public primary schools in Western Senatorial District of Rivers State, Nigeria. The sample of 180 pupils was drawn from four intact classes from four schools

in the area. Primary Science Achievement Test (PAST) and Primary Science Attitude Scale (PSAS) were the instruments used for the study. Test-retest reliability co efficient and Cronbach alpha 21 reliability was 0.82 for PSAT and 0.85 for PSAS, respectively. Four research questions and four corresponding null hypotheses guided the study. Analysis of covariance (ANCOVA) and multiple classification analysis (MCA) were used in analysing the data. Results revealed that the constructivist strategy was more effective than expository strategy in facilitating pupilsô achievement in and attitude towards primary science. Pupilsô from urban schools performed significantly better than pupils from rural schools under each of the two methods. The researchers advocated for the use of constructivist strategy by primary science teachers among their recommendations. The findings of the study revealed that a large number of teachers have negative attitudes towards the teaching of Environmental Education and that they use the separate subject approach, lecture, illustration and demonstration methods. Based on these findings some recommendations were made amongst which that for regular pedagogic seminars to be organized to enable teachers develop positive attitudes towards the teaching of Environmental Education.

Kuracina(2003), investigated Primary School Pupilsô Attitudes to Environmental Reality and Environmental Education. The main aim of the empiric research was diagnosis and analysis of the fifth to ninth grade primary school pupilsô attitudes towards environmental education and towards selected areas of environmental reality. A questionnaire was used as a research tool. The research sample can be characterized as follows: the questionnaire was completed by 677 pupils (327 boys, 350 girls) of the fifth

grade; 619 pupils (319 boys, 300 girls) of the sixth grade; 566 pupils (286 boys, 280 girls) of the seventh grade; 559 pupils (238 boys, 321 girls) of the eighth grade and 405 pupils (212 boys, 193 girls) of the ninth grade. Pupilsô attitudes towards environmental education, which is a part of Natural Science class curriculum, were analysed on a scale (Likert scales, Order scales). This part of the research was carried out among the ninth grade pupils. Attitudes towards environmental reality were surveyed among fifth to ninth grade pupils. A standard questionnaire consisting of nine items was used as a research tool. Response scales consisted of the statement and a five-point scale. While evaluating the answers, coefficients were assigned to constituent scale levels in the following order: 5 (I absolutely agree); 4 (I agree); 3 (I do not have a strong opinion); 2 (I do not agree); 1 (I do not agree at all). The scales of statements 2, 4, 8 & 9 were reversed to minimize automatic questionnaire completion by respondents. The scores for each question were calculated by using an appropriate scale. The score for the questionnaire was then reached by arithmetical means. The results gathered show a gap in environmental upbringing and education in elementary schools. Pupilsô attitudes towards environmental education scores were lower than expected. Environmental education needs integration and analysis of acquired knowledge by students.

An investigation by Muhammad and Hafiz (2012) on Studentsô Attitude towards Science: A Case of Pakistan yielded similar results. The main objective of the study was to examine studentsô attitude towards science. The sample of the study consisted of 3526 students of 10th grade (Boys = 1914, Girls = 1612) and were from urban (*n* = 2304) and

rural (*n* = 1222) localities of Pakistan. The instrument administered was ‘‘Test of Science Related Attitudes’’ (TOSRA) developed by Fraser (1981). Results of the study depicted a significant effect of gender and locale on students’ attitude towards science. Girls had significantly higher attitude towards science than boys on total scale and on all sub-scales of TOSRA with only one exception of Career Interest in Science subscale on which boys were slightly high than girls but it was not significant. Locality wise results showed rural students to score significantly higher on the total scale and on the subscales of Social Implication and Career Interest in Science than the urban respondents, while the urban respondents scored significantly higher on the subscale of Adoption of Scientific Attitudes than the rural respondents. There was no significant variation between the rural and urban respondents in their Attitude towards Scientific Inquiry, Enjoyment of Science Lessons and Leisure Interest in Science.

Azizollah (2012), investigated attitudes towards science and technology, school science and environmental issues among middle school students. The population included all 3rd grade students Isfahan and a total of 250 students (120 female and 130 male) were selected through stratified random sampling method. Research instrument was the Persian translation of the Relevance of Science Education (ROSE) Questionnaire. After pilot study, data were analyzed by SPSS. Cronbach's alpha coefficient for this scale was set to be 0.94. For data analysis, descriptive statistics and one sample t-test and independent t-test were used. Results indicated that there is a positive attitude towards science and technology, school science and environmental issues among students in three

components of study. However, there was not a positive attitude towards some items of these components. The results also showed that in three components of the study, there is a meaningful difference between males and females points of views in attitude towards environmental issues. According to this result, males have higher averages than the females. The results of this research provide important information about Iranian studentsô attitude towards science and could be used by science educators for the development of science curricula and science text books.

Bulent et al. (2009), carried out a study on Turkish Studentsô Views on Environmental Challenges with respect to Gender: An Analysis of ROSE Data; which examined high school studentsô attitudes toward the environment and their interest in learning about environmental protection with respect to gender. The questionnaire-based Relevance of Science Education (ROSE) Project data of 9th grade students were collected in Turkey from 1,260 students. Statistical analysis included tabulation of frequency distribution, descriptive statistics chi-square and multivariate analysis of variance. The findings of this study revealed that (i) Turkish students have favourable attitudes toward environmental issues, (ii) students are eager to studentsô interests in learning about environmental protection issues are moderate level, and (iv) statistically significant differences were found in environmental attitudes and interests in learning about environmental protection mean scores of students regarding gender. The authors offer suggestions, based on the results, for further research to identify reasons for differences between boys and girls so as to improve environmental education in Turkish schools.

Mahbub (2011), carried out a study on secondary studentsô environmental attitudes: the case of environmental education in Bangladesh. The study employed a standardized environmental attitude scale which consisted of 15 questions rated on a Likert-type scale ranging from 1 (strongly disagree) to 5 (strongly agree). The sample of the study was made up of 400 secondary school students, with an equal number of boys and girls from both the urban and rural schools. The study found that overall students from both the urban and rural areas expressed favourable environmental attitudes with girls having a significantly higher level of favourable environmental attitudes than boys; in particular, rural girls had the highest level of environmental attitudes comparing among others. This work is similar to the present study in that it is looking at learnersô attitude on environmental education and also employing the same instrument for the collection of data.

An investigation was undertaken by Shivakumar and Vamadevappa (2011), on the environmental attitude among the high school students, related to their Sex (Boys/Girls), Locality (Rural/Urban) and types of schools (Government/Private). The study was conducted in Davangere district of Karnataka. The sample of the study comprised of 1440 students of standard IX studying in urban and rural areas and in different types of schools selected by stratified random sampling. The proportion of the sample of urban and rural secondary school students is almost in the ratio of 1:1(770:680); boys and girls sample is also in the ratio of 1:1 (720:720). The tool used for the study is the Taj Environmental Attitude Scale prepared by Haseen Taj, 2001. The data were analysed using Mean, Standard Deviation, 't' test and Two Way ANOVA. The results of the study

revealed that, 1) the gender does not play any role on Environmental attitude, 2) The students belonging to urban background are comparatively better in terms of their environmental attitude as compared to the students belonging to rural background. 3) The students of private schools have more favourable environmental attitudes than the students of government schools. 4) Gender and locality have interaction effect on the Environmental Attitude of the secondary school students. 5) Gender and types of secondary schools does not have any interaction effect on Environmental Attitude of the secondary school students. 6) Locality and types of schools have interaction effect on Environmental Attitude of the secondary school students.

Extent of Implementation of Environmental Education in Cameroon.

Chongong (2002) also carried out a study on the evaluation of the extent of implementation of the 1996 Cameroon primary school Environmental Education Syllabus in Fako Division. The study was aimed at finding out the extent of coverage of the EE syllabus, the amount of contents taught by teachers and the skills and positive attitudes acquired by the pupils. It also sought to find out the relationship between the acquired EE knowledge and the environmental practices in the milieu within which the schools are situated.

The survey research design was used and a sample of 40 teachers selected from 165 schools in Fako Division was used to administer the questionnaire. From the responses and the results of the study, the researcher discovered that syllabus coverage ranged between

41 and 90% while pupilsô achievement in EE skills and positive environment attitudes were found to be low. Based on these findings he recommended that EE should be incorporated into all schoolsô curricula. The researcher also recommended that seminars and workshops be encouraged to enrich trainees or participants to meet the new challenges of the new syllabuses.

Summary of Literature Review

The literature reviewed shows that man has a lot to gain from the environment which on the other hand also benefits from manôs activities. The interaction of the components of the ecosystemis the basis for energy transfer in the ecosystem that ensures its smooth functioning. Manôs activities, geared towards development and better living standards, are a threat to all the components of the environment. The idea of sustainable development is the way out, so that man can continue to extract from the environment while ensuring that future generations will have their own share.

Sustainable management of the earthôs resources to ensure environmental conservation and protection can only succeed as revealed in the literature reviewed, if man is environmentally aware and acts responsibly towards the environment. Amongst the many ways to create environmental awareness in the human population, is Environmental Education. Literature also makes it clear that environmental education concepts will be better understood and applied to real life situations if taught to young children. That is why in Cameroon it has been introduced in the primary school syllabus and is part of the end of course examination for pupils.

How well these concepts are understood depends on so many factors which include; the nature of the curriculum, teacher preparation, teaching methods and strategies, language of instruction, attitudes of pupils towards environmental education and school location. Some learning theories reviewed support this notion and go further to explain the factors that influence learning in pupils and hence their achievement. The literature reviewed also revealed the fact that studies in the area of the effects of language of instruction, school location and gender on environmental education have not been explored in Fako Division.

It is evident from existing literature that a lot has been done in the area of research in environmental education, and what can be done to improve on it to enhance sustainability both in Cameroon and in the world at large. However, it is also clear that very little has been done in this area of study in the South West Region of Cameroon in general and in Fako Division in particular.

The extensive search of existing literature has not found any studies on the effect of language of instruction on pupilsô achievement in environmental education in Fako Division. This necessitates the carrying out of the present study which concentrates on the effect of language of instruction, school location and gender on the attitude and achievement of pupils in Environmental education in Cameroon.

CHAPTER THREE

RESEARCH METHOD

This chapter describes the research design, area of study, population of the study, sample and sampling procedures, experimental procedure, control of extraneous variables and instrument for data collection. Reliability and validity of the instruments are also discussed and the methods employed in analyzing the data are outlined.

Research Design

The quasi-experimental design was used for the study. Specifically, the study utilized the pre-test and post-test design with non- randomized groups involving three major groups of primary school pupils (2 experimental and 1 control groups). This design was considered to be appropriate for the study because there was no random assignment of subjects to groups; intact classes were used for the experiment. The three groups in the quasi-experiment consisted of pupils of English and French speaking backgrounds and pupils of a bilingual background. The pupils with English and French backgrounds constituted the experimental groups while those of a bilingual background served as the control group. This design was seen to be appropriate because the subjects were not randomly assigned to the groups, rather intact classes were used as the experimental and control groups. The major variable of the study, language of instruction, was manipulated. The quasi - experimental design can be symbolically represented as follow:

Table 1: *The Pre-test Post-test Design with Non-Randomized Experimental and Control Groups.*

Group	Pre-test	Experiment	Post-test
E1	Q1	X	Q2
E2	Q1	X	Q2
C	Q1	O	Q2

E1 = treatment group 1
E2 = treatment group 2
C = Control group
X = Treatment or Experiment
O = No treatment
Q1 = Pre ï test scores
Q2 = Post- test scores

The above symbolic representation indicates that E1 & E2 were experimental groups with the English and French speaking pupils respectively, and C was the control group comprising pupils of bilingual background. Q1 symbolizes the pre-test scores and Q2 symbolizes the post ï test scores. The experimental groups were subjected to treatment(X), which was the same lessons, but in different languages of instruction and the same achievement test in the respective languages. The control group was not subjected to any treatment (O) but the pupils in this group also took the achievement test.

Area of the Study

This study was conducted in Fako Division of the South West Region of Cameroon. This region has a population of 14,208,068 inhabitants (National Institute of Statistics, 2010), and it is divided into six administrative Divisions, notably: Fako, Koupé-Manengouba, Lebialem, Manyu, Meme, and Ndian. Fako Division (the area of study) covers an area of 2,093 km² and by 2010 had a total population of 634,854 (National Institute of Statistics, 2010). The capital of the Division is Limbe. Fako Division is located between latitude 4^{o} and 4^{o} 30 North of the Equator, and longitude 9^{o} 30 of the Greenwich Meridians. There are five Sub-Divisions in Fako Division namely; Buea, Tiko, Muyuka, Limbe and Idenau Sub Divisions. It is bounded in the South and South West by the Atlantic Ocean; to the East by the Littoral region and to the North by Meme Division. The Division is administratively divided into 5 local government council areas and in turn into villages. The study was carried out in English, French and Bilingual Government Primary Schools in the urban and rural areas of Fako Division (see Appendix XIII).

Population for the Study

The target population of the study is approximately 31,996 from all the 134 Government primary schools in Fako Division. The population has a gender distribution of 15,966 Boys & 16,030 Girls (South West Regional Delegation for Basic Education, 2012; appendix I).

Sample and Sampling Techniques

The sample for the study was 291 class six pupils (153 girls & 138 boys), from the nine (9) schools, (one of which was the control) that were used for the experiment, distributed thus; two urban English schools (G. S. Buea ï 60 pupils & G.S. Limbe - 26 pupils), two rural English schools (G.S. Mutengene ï 41pupils & G.S. Bokwango - 18 pupils), two urban French schools (EPF Limbe ï 31pupils & EPF Buea 28 pupils), and two rural French schools (EPF Bonadikombo ï 23pupils & EPF Muyuka - 21 pupils) respectively. The control group was another intact class (of class six pupils) in Government Bilingual primary school Muea with 43 pupils. This brought the total to 291pupils.

The study employed a multi-stage sampling procedure consisting of stratified, simple random, purposive, and cluster sampling techniques for the selection of the schools and classes to be used for the experiment. The nine sampled schools were drawn from all the 134 Government primary schools in Fako Division. The schools were stratified using two of the variables for the study, school location (urban & rural) and language of instruction (French & English). The selection of schools within the same location was done by simple random sampling, through the use of slips of paper or lucky dip. The names of all the English schools in each urban area were written on a slip of paper and the slips of paper were folded and put in a container and reshuffled thoroughly. The researcher dipped the hand into the container without looking inside and picked one slip, unfolded it and recorded the name of the school. This was repeated till the required number of urban

English schools was picked. The same procedure was used for French urban, English and French rural, as well as the bilingual school for the control.

In the next stage, purposive sampling was used to get the class or level to use for the experiment; the researcher did this based on her judgement in relation to the purpose of the study. Class six pupils were used for the experiment because they must have finished the syllabus on Environmental Education for primary schools and achievement can be evaluated summatively at this point.

In the last stage, cluster sampling was used to select the arm of the class to be used for the study. For schools that have more than one arm of class six, (i.e. A.,B & C arms), the researcher considered the arms as clusters and used simple random sampling by use of slips of paper, to draw the one to be used for the experiment.

Instruments for Data Collection

The instruments used for data collection in this study were (1) an Environmental Education Achievement Test, (EEAT, appendices X & XI), and (2) an attitude scale (ATS, appendices XII). The achievement test items were constructed based on the topics in the primary school Environmental Education syllabus, comprising: Living things, transpiration, the seed, seed germination, the plant, air pollution, man-made hazards, and waste disposal (appendices VI). The EEAT items were paper and pencil type, consisting of thirty two (32) multiple choice items with ñA, B, and C, response options. The multiple-choice questions were used mainly to assess the acquisition of the knowledge, skills and values from the content of the eight lessons taught by the researcher. The 32

multiple choice items of the EEAT were adapted from past First School Living Certificate (FSLC) examination question papers, (a public exam for final year primary school pupils in Cameroon, 2009, 2010 and 2011).

The FSLC examination has a section for environmental education in the general knowledge paper with five questions only. The researcher got the question papers and selected those questions that are on the topics to be used for the experiment, then developed the rest following the pattern of the ones from the past questions. Four questions were taken from each topic and the items classified under the two lower levels of Bloomôs taxonomy of educational objectives: the knowledge and the comprehension levels. A table of specifications (test blue print) was constructed and the knowledge items cover 81.24% while the comprehension items cover 18.76 % (see appendix V).

The attitude scale (ATS) was also used for data collection in this study, (see Appendix XII). It is a thirty (30) item 4 point Likert type rating scale with four category of responses; Strongly Agree (SA = 4), Agree (A = 3), Disagree (D = 2), Strongly Disagree(SD = 1) . It was based on pupilsô attitudes towards the environment and the teaching and learning of Environmental Education. It was constructed based on literature and the attitude of these pupils towards the environment and environmental education.

Validation of the Instrument

The types of validity established for the EEAT and the ATS were face and Content validity. The instruments were validated by six experts. The researcher sent out six copies of both instruments to six experts (one in Psychology, one in Educational Foundations

and one from the Department of Library and Information Sciences, (all from the University of Nigeria, Nsukka); one in measurement and Evaluation and one in curriculum studies and teaching, University of Buea; and a class six teacher, who has been a FSLC examiner for 12years. The validates were to ensure that the items on both the EEAT and ATS had content validity in cognizance with the Environmental Education Syllabus for primary schools in Cameroon, particularly the topics to be taught to the pupils in the experimental groups. The validates were also required to review the EEAT and ATS items in relation to: clarity of instructions to the subjects, language structure, suitability of items and the appropriateness of items in relation to the content. The translated EEAT test and the ATS scale were also given to a French education expert in the University of Buea, Cameroon.

A table of specifications (test Blue print) for environmental education achievement test was constructed to ensure content validity (see appendix V, pg 233). The construction was based on the first two levels of Bloomôs taxonomies of educational objectives (knowledge & comprehension). The EEAT test items were classified under these two levels and the results showed 81.24% of knowledge items and 18.76% of comprehension items. Knowledge items were more because the pupils are still at a developmental stage (concrete operational) as Piagetôs theory explains, that requires more of facts learning than comprehension. An equal number of test items were taken from all the topics to be taught in the experiment. The comments and recommendations of the various experts who validated the instrument, served as a guide for the acceptance; modification or removal of some items depending on their recommendations.

Reliability of the Instrument

Trial testing of both the attitude scale and EEAT was done on a group of 20 selected class six pupils in Government Bilingual Primary School in Tiko Town (Not one of the schools used in the experiment). The instruments were administered to the pupils in order to determine the reliability of the instruments from the data obtained. The same EEAT was re-administered to the 20 pupils after a week (Test-retest) with the numbering of the questions rearranged (see appendix X). This experimental time lag served to control the pre-test sensitization and also to minimize the effect of maturation and history. After marking the two sets of EEAT scripts, the Pearson Product Moment Correlation Coefficient was then used to determine the index of stability of EEAT which was 0.76. The internal consistency of ATS was determined with the use of Cronbachôs alpha to be 0.88. With the help of the Statistical Package for the Social Sciences (SPSS) Version 17.0 (SPSS Inc. 2008), the scores were coded ó0ô and ó1ô for pass and fail scores respectively.. The estimate of internal consistency of the attitude scale was determined using Cronbach Alpha. The internal consistency index stood at 0.83 which indicated a high reliability coefficient (appendix IX, pg 242).

Control of Extraneous Variables

In every experimental research, there is a need to take measures to control all the variables which are not directly related to the purpose of the study so that they do not interfere with the results of the experiment. To control some of the extraneous variables, the following steps were taken:

Avoiding Experimental bias;

When teachers are brought brought outside the experimental schools to be part of the experiment, the pupils may become aware that they are being used for an investigation. As a result, they may behave mechanically, thus faking most of their reactions. In order to avoid this bias, the study made use of the regular class six teachers in each of the schools used for the study. The class teachers were trained and used as research assistants. Also, the researcher, in the course of the research, constantly monitored the teachers, to ensure that they effectively adhered to the rules guiding the study.

Initial group differences:

Randomization is one of the procedures often applied by researchers in controlling initial group differences in experimental studies. But this was not the case in this study because the process would have disrupted the normal functioning of the schools. Consequently, intact classes were used in the study. Analysis of Covariance (ANCOVA) to partial out the initial differences between subjects.

Control of teacher variable:

The problem of teacher-variable will always arise in an experimental study because of the differences in standards among teachers particularly in relation to knowledge of the content and teaching methods. To control for this variable, the researcher prepared the lesson notes on the selected topics from the Environmental Education syllabus for

primary schools with the assistance of an experienced class six teacher (appendix 11). The teachers were prepared and given orientation before the experiment on how to effectively deliver the lessons in relation to the objectives of this study. The orientation was done in two meetings by the researcher. Presentation was the same for all the schools as the same materials, teaching methods and pupil activities were used in all the schools.

Variability of Instructional Situation:

The following measures were put in place to ensure the homogeneity of instruction across the different groups of pupils under study.

- The researcher trained the teachers on the instructional procedures involved.
- Teachers were directed to strictly adhere to the lesson notes provided for the study.
- The rural and urban pupils in all experimental schools were taught the same lessons in the different languages within the same regular time and the same class atmosphere.

Experimental Procedures and Data Collection

This study involves three groups of subjects. They are the classô six pupils in rural and urban English primary schools, those of rural and urban French primary schools and those of any urban or rural bilingual primary school. The pupils with English language backgrounds in rural and urban areas and pupils with French speaking backgrounds in the urban and rural areas were used as experimental groups, while pupils in a bilingual school were used as the control group for the study.

The letter of introduction that was obtained from the Head of Department for Arts Education, University of Nigeria, Nsukka was presented to the Divisional Inspector for Basic Education in Fako Division. She in turn signed a letter for the researcher to take to the schools for the study. On presentation of this letter to the head teachers of the schools, the researcher was given the go ahead. The first thing that was done in each of the schools was the administration of the pre-test (both the EEAT and the ATS) to the class six pupils, with the help of the class teachers. Marking was done with the help of the teachers and the scores obtained were recorded before the experimental teaching started.

On the first day of the experiment, the researcher introduced to the teachers the objectives of the study and the various ways through which they were to deliver the prepared lessons in Environmental Education to classô six pupils (appendices II & III, pgs 203 & 215). The eight classes were used as intact classes and in all the eight classes from the rural and urban areas, the teachers taught the same lessons using the same teaching methods and techniques but with different languages of instruction (French and English). Four out of the eight sample classes received the lessons in French while the other four received lessons in English. The class in the Bilingual school which was the control group did not receive the lessons for the experiment.

The experimental lessons were taught to the pupils for a period of eight (8) weeks to ensure effective teaching and understanding among teachers and pupils respectively. This was because environmental education comes up only once a week on the timetable. After the teaching exercise, the EEAT was administered to the pupils as post test. All the

classes involved in the study including the control group, took the test at the end of the teaching exercise, under the same examination conditions. The attitude scale (ATS) was also administered to the pupils alongside the Achievement test. The numbering for the EEAT questions and the ATS items were altered from the pre-test numbering. In the attitude scale, the pupils were required to tick a response to a statement on their feelings about the attitude statement. After marking the test with the assistance of the class six teachers, the scripts were collated based on the variables of language of instruction, school location, and gender, for analyses.

Method of Data Analyses

The data derived from the research was mainly quantitative; as such quantitative methods of data analyses were employed in analyzing them, after the experimental treatment. The data was analysed using means, Standard Deviations and Analysis of Covariance (ANCOVA). Means and standard deviation of scores were used to answer the research questions, and the null hypotheses were tested using the Analysis of Covariance (ANCOVA). This eliminated likely errors that might have arisen as a result of the non-equivalence of the experimental groups. The data were analysed using the Statistical Package for the Social Sciences (SPSS) Version 17.0 (SPSS Inc. 2008).

CHAPTER FOUR

PRESENTATION OF RESULTS

This chapter is concerned with the presentation of results from data analysis. The results are presented in tables according to the research questions and hypotheses that guided the study.

Research Question 1:

What is the effect of language of instruction on pupilsô mean achievement scores in environmental education?

Table 2: *Mean analysis of pre-test and post-test scores on the effect of language of instruction on pupils' mean achievement scores in environmental education*

Variable		**Pre test**		**Posttest**		**Mean gain**
Lang. of Instruction	**N**	**□**	**SD**	**□**	**SD**	
English Language	145	18.83	5.24	20.89	4.99	2.06
French	103	19.10	3.55	20.37	3.31	1.27
Bilingual	43	15.97	2.87	16.98	3.19	1.01

Table 2 reveals that the English group had a pretest achievement mean of 18.83 with a standard deviation of 5.24 and a posttest achievement mean of 20.89 with a standard deviation of 4.99. The difference between the pretest and posttest achievement mean for the English group is 2.06. The French group had a pretest achievement mean of 19.10 with a standard deviation of 3.55 and a posttest achievement mean of 20.37 with a standard deviation of 3.31. The difference between the pretest and posttest achievement means for the French group is 1.27. Table 2 also shows that the Bilingual group had a

pretest achievement mean of 15.97 with a standard deviation of 2.87 and a posttest achievement mean of 16.98 with a standard deviation of 3.19. The difference between the pretest and posttest achievement means for Bilingual group was 1.01. For each of the groups, the post-test achievement means are greater than the pretest achievement means with English group having the highest mean gain. This is indicative of the fact that language of instruction may have some effect on pupilsô achievement in environmental education.

Research Question 2:

What is the effect of school location on pupilsô mean achievement scores in environmental education?

Table 3: *Mean analysis of pre-test post-test scores of the effect of school location on pupils' achievement in environmental education*.

Variable		**Pre test**		**Posttest**		**Mean gain**
School Location	**N**	**□**	**SD**	**□**	**SD**	
Urban	145	20.32	3.87	22.11	3.75	1.79
Rural	146	16.74	4.62	20.13	4.41	3.39

Table 3 shows that the urban group had a pretest achievement mean of 20.32 with a standard deviation of 3.87 and a posttest achievement mean of 22.89 with a standard deviation of 3.75. The difference between the pretest and posttest achievement means for urban group is 1.79. The rural group on the other hand had a pretest achievement mean of 16.74 with a standard deviation of 4.62 and a posttest achievement mean of 20.13 with a standard deviation of 4.41. The difference between the pretest and posttest achievement

means for the rural group is 3.39. For each of the two groups, the posttest achievement means are greater than the pretest achievement means with rural group having the highest mean gain. This is indicative that school location appears to have an effect on pupilsô achievement in environmental education in favour of urban pupils.

Research Question 3:

What is the effect of gender on pupilsô mean achievement scores in environmental education?

Table 4: *Mean analysis of pretest and posttest scores on the effect of gender on pupils' achievement in environmental education.*

Variable		**Pre test**		**Posttest**		**Mean gain**
Gender	**N**	**□**	**SD**	**□**	**SD**	
Male	153	18.75	4.39	20.39	4.23	1.64
Female	138	18.28	4.86	19.84	4.61	1.56

Table 4 above shows that, the male group had a pretest achievement mean of 18.75 with a standard deviation of 4.39 and a posttest achievement mean of 20.39 with a standard deviation of 4.23. The difference between the pretest and posttest achievement means for the male group is 1.64. The female group had a pretest achievement mean of 18.28 with a standard deviation of 4.86 and a posttest achievement mean of 19.84 with a standard deviation of 4.61. The difference between the pretest and posttest achievement means for the female group is 1.56. For each of the two groups, the posttest achievement means is greater than the pretest achievement means with male group having a slightly higher

mean gain than the female group. This is indicative that gender appears to have some effect on pupilsô achievement in environmental education.

Research Question 4:

What is the effect of language of instruction on pupilsô attitudes toward environmental education?

Table 5: *Mean analysis of pretest and posttest scores on the effect of language of instruction on pupils' attitudes toward environmental education*

Variable		**Pre test**		**Posttest**		**Mean gain**
Lang. of Instruction	**N**	**□**	**SD**	**□**	**SD**	
English Language	145	78.26	5.83	81.01	6.64	2.75
French	103	79.15	6.77	81.02	7.03	1.87
Bilingual	43	76.93	8.63	79.37	9.60	2.44

Table 5 shows that the English Language group had a pretest attitude mean of 78.26 with a standard deviation of 5.43 and a posttest attitude mean 81.01 with a standard deviation of 6.64. The difference between the pretest and posttest attitude means for the English Language group is 2.75. The French group a pretest attitude mean of 79.15 with a standard deviation of 6.77 and a posttest attitude mean of 81.02 with a standard deviation of 7.03. The difference between the pretest and posttest attitude means for the French group is 1.87. It is also revealed in table 4 that the Bilingual group had a pretest attitude mean of 76.93 with a standard deviation of 8.63 and a posttest attitude mean of 79.37 with a standard deviation of 9.60. The difference between the pretest and posttest attitude means for the Bilingual group was 2.44. For each of the groups, the posttest attitude

means are greater than the pretest attitude means with the English Language group having the highest mean gain. This indicates that language of instruction seems have an effect on pupilsô attitudes toward environmental education.

Research Question 5:

What is the effect of school location on pupilsô attitudes towards environmental education?

Table 6: *Mean analysis of pretest and posttest scores on the effect of school location on pupils' attitudes towards environmental education.*

Variable		**Pre test**		**Posttest**		**Mean gain**
School Location	**N**	**□**	**SD**	**□**	**SD**	
Urban	145	78.32	6.30	81.06	6.73	2.74
Rural	146	78.38	7.04	80.48	7.79	2.10

Table 6 reveals that the urban group had a pretest attitude mean of 78.32 with a standard deviation of 6.30 and a posttest attitude mean of 81.06 with a standard deviation of 6.73. The difference between the pretest and posttest attitude means for the urban group was 2.74. The rural group had a pretest attitude mean of 78.38 with a standard deviation of 7.04 and a posttest attitude mean of 80.48 with a standard deviation of 7.79. The difference between the pretest and posttest attitude mean for the rural group is 2.10. For each of the two groups, the posttest attitude means are greater than the pretest attitude means with urban group having slightly higher mean gain than the rural group. This is indicative that school location appears to have some effect on pupilsô attitude towards environmental education.

Research Question 6: What is the effect of gender on pupilsô attitudes towards environmental education?

Table 7: *Mean analysis of pretest and posttest scores on the effect of gender on pupils' attitudes towards environmental education*

Variable		**Pre test**		**Posttest**		**Mean gain**
Gender	**N**	**□**	**SD**	**□**	**SD**	
Male	153	78.46	6.92	80.81	7.72	2.35
Female	138	78.22	6.38	80.72	6.78	2.50

Table 7 shows that the male group had a pretest attitude mean of 78.46 with a standard deviation of 6.92 and a posttest attitude mean of 80.81 with a standard deviation of 7.72. The difference between the pretest and posttest attitude means for the male group is 2.35. The female group had a pretest attitude mean of 78.22 with a standard deviation of 6.38 and a posttest attitude mean of 80.72 with a standard deviation of 6.78. The difference between the pretest and posttest attitude mean for the female group was 2.50. For each of the two groups, the posttest attitude means is greater than the pretest attitude means. The mean gain for the female group is slightly higher than that for the male group. This is indicative that gender appears to have some effect on pupilsô attitude towards environmental education.

Research Question 7: What is the interaction effect of language of instruction and school location on pupilsô achievement in environmental education?

Table 8: *Mean analysis of pretest and posttest scores on the interaction effect of language of instruction and school location on pupils' achievement in environmental education*

Variable			**Pre test**		**Posttest**		**Mean gain**
Lang. of Instruction	**School Location**	**N**	**□**	**SD**	**□**	**SD**	
English Language	Urban	86	20.55	4.33	22.69	4.09	2.14
	Rural	59	16.44	5.52	18.27	5.05	1.83
French	Urban	59	20.00	3.09	21.27	3.04	1.27
	Rural	44	17.89	3.79	19.18	3.32	1.29
Bilingual	Rural	43	15.98	3.87	16.98	3.19	1.00

Table 8 indicates that the English urban group had a pretest achievement mean of 20.55 with a standard deviation of 4.33, and a posttest achievement mean of 22.69 with a standard deviation of 4.09. Whereas the English Language rural group had a pretest achievement mean of 16.44 with a standard deviation of 5.52 and a posttest achievement mean of 18.27 with a standard deviation of 5.05.The difference between the pretest and posttest achievement means for the English urban and rural groups were 2.14 and 1.83 respectively. The French urban group had a pretest achievement mean of 20.00 with a standard deviation of 3.09 and a posttest achievement mean of 21.27 with a standard deviation of 3.04, whereas the French rural group had a pretest achievement mean of 17.89 with a standard deviation of 3.79 and a posttest achievement mean of 19.18 with a standard deviation of 3.32.The difference between the pretest and posttest achievement

means for the French urban and rural groups were 1.27 and 1.29 respectively. Table 8 also shows that the Bilingual rural group had a pretest achievement mean of 15.98 with a standard deviation of 3.90 and a posttest achievement mean of 16.98 with a standard deviation of 3.19. The difference between the pretest and posttest achievement means for the Bilingual rural group was 1.00. For each of the groups, the posttest achievement means is greater than the pretest achievement means. This is indicative of the fact that language of instruction and school location appear to have an interaction effect on pupilsô achievement in environmental education.

Research Question 8: What is the interaction effect of Language of Instruction and gender on pupilsô achievement in environmental education?

Table 9: *Mean analysis of pretest and posttest score on the interaction effect of Language of Instruction and gender on pupils' achievement in environmental education*

Variable			**Pre test**		**Posttest**		**Mean gain**
Lang. of Instruction	**Gender**	**N**	**□**	**SD**	**□**	**SD**	
English Language	Male	86	19.43	4.60	21.27	4.53	1.84
	Female	59	18.07	5.99	20.32	5.58	2.25
French	Male	48	18.73	3.69	20.10	3.25	1.37
	Female	55	19.42	3.42	20.62	3.31	1.20
Bilingual	Male	19	15.68	3.90	17.11	3.28	1.43
	Female	24	16.21	3.87	16.88	3.18	0.67

Table 9 shows that for the English male group, the pretest achievement mean was 19.43 with a standard deviation of 4.60 and the posttest achievement mean was 21.27 with a standard deviation of 4.53, while the English female group had a pretest achievement

mean of 18.07 with a standard deviation of 5.99 and a posttest achievement mean of 20.10 with a standard deviation of 5.58. The difference between the pretest and posttest achievement means for the English male and female groups were 1.84 and 2.25 respectively. The French male group had a pretest achievement mean of 18.73 with a standard deviation of 3.69 and a posttest achievement mean of 20.10 with a standard deviation of 3.25, while the French female group had a pretest achievement mean of 19.42 with a standard deviation of 3.42 and a posttest achievement mean of 20.62 with a standard deviation of 3.31.The difference between the pretest and posttest achievement means for the French male and female groups were 1.37 and 1.20 respectively. The results in table 9 also reveal that the Bilingual male group had a pretest achievement mean of 15.68 with a standard deviation of 3.90 and a posttest achievement mean of 17.11 with a standard deviation of 3.28, whereas the Bilingual female group had a pretest achievement mean of 16.21 with a standard deviation of 3.87 and a posttest achievement mean of 16.88 with a standard deviation of 3.18.The difference between the pretest and posttest achievement means for Bilingual male and female groups were 1.43 and 0.67 respectively. For each of the groups, the posttest achievement means are greater than the pretest achievement means. This is indicative that language of instruction and gender appears to have some interaction effect on pupilsô achievement in environmental education.

Research Question 9: What is the interaction effect of school location and gender on pupilsô achievement in environmental education?

Table 10: *Mean analysis of pretest and posttest score on the interaction effect of school location and gender on pupils' achievement in environmental education.*

Variable			**Pre test**		**Posttest**		**Mean gain**
School location	**Gender**	**N**	**□**	**SD**	**□**	**SD**	
Urban	Male	79	20.34	3.18	22.19	3.38	1.85
	Female	66	20.30	4.59	22.02	3.75	1.72
Rural	Male	74	17.04	4.87	18.47	4.21	1.43
	Female	72	16.43	4.37	17.85	4.08	1.42

Table 10 shows that the urban male group had a pretest achievement mean of 20.34 with a standard deviation of 3.18 and a posttest achievement mean of 22.19 with a standard deviation of 3.38. Whereas the urban female group had a pretest achievement mean of 20.30 with a standard deviation of 4.59 and a posttest achievement mean of 22.02 with a standard deviation of 3.75.The difference between the pretest and posttest achievement means for urban male and female groups were 1.85 and 1.72 respectively. The rural male group had a pretest achievement mean of 17.04 with a standard deviation of 4.87 and a posttest achievement mean of 18.47 with a standard deviation of 4.21.while the rural female group had a pretest achievement mean of 16.43 with a standard deviation of 4.37 and a posttest achievement mean 17.85 with a standard deviation of 4.08.The difference between the pretest and posttest achievement means for rural male and female groups were 1.43 and 1.42 respectively. For each of the groups, the posttest achievement means are higher than the corresponding pretest achievement means. This then indicates that

school location and gender appears to have some interaction effect on pupilsô achievement in environmental education.

Research Question 10: What is the interaction effect of language of instruction and school location on pupilsô attitude towards environmental education?

Table 11: *Mean analysis of pretest and posttest score on is the interaction effect of language of instruction and school location on pupils' attitude towards environmental education*

Variable			**Pre test**		**Posttest**		**Mean gain**
Lang. of Instruction	**School Location**	**N**	**□**	**SD**	**□**	**SD**	
English Language	Urban	86	78.16	6.23	81.68	7.09	3.52
	Rural	59	78.27	5.23	80.01	5.81	1.74
French	Urban	59	78.54	6.38	80.15	6.10	1.61
	Rural	44	79.95	7.25	82.18	8.02	2.23
Bilingual	Rural	43	76.93	8.62	79.37	9.59	2.44

Table 11 above shows that the English group from the urban and rural schools had a pretest attitude mean of 78.16 with a standard deviation of 6.23 and 78.27 with standard deviation of 5.23 respectively. The corresponding posttest attitude mean of the English group from urban and rural schools were 81.68 with a standard deviation of 7.09 and 80.01 with a standard deviation 5.81 respectively. It is also revealed from table 11 that the French group from urban and rural schools had a pretest attitude mean of 78.54 with a standard deviation of 6.38 and 79.95 with standard deviation of 7.25 respectively. The corresponding posttest attitude mean of the French group from urban and rural schools were 80.15 with a standard deviation of 6.10 and 82.18 with a standard deviation of 8.02 respectively. Furthermore, the results show that the bilingual rural group had a pretest

attitude mean of 76.93with a standard deviation of 8.62 and a posttest attitude mean of 79.37with standard deviation of 9.59.

The difference between the pretest and posttest attitude means for the English group with regards to school location are 3.52 for English urban and 1.74 for English rural groups. Also the difference between the pretest and posttest attitude mean for the French group with regards to school location are 1.61 for urban French and 2.23 for rural French groups respectively. The difference between the pretest and posttest attitude mean for the bilingual group with regards to school location is 2.44 for the rural group. For each of the groups, the posttest attitude means are higher than the corresponding pretest attitude means but that for the urban English group is higher than the others. This indicates that language of instruction and school location has an interaction effect on pupilsô attitude towards environmental education.

Research Question 11: What is the interaction effect of gender and language of instruction on pupilsô attitude towards environmental education?

Table 12: *Mean analysis of pretest and posttest score on interaction effect of gender and language of instruction on pupils' attitude towards environmental education.*

Variable			**Pre test**		**Posttest**		**Mean gain**
Gender	**Lang. of Instruction**	**N**	**□**	**SD**	**□**	**SD**	
Male	Eng. Lang.	86	77.91	6.05	80.67	6.86	2.76
	French	48	79.44	6.82	81.06	7.60	1.62
	Bilingual	19	78.53	10.30	81.05	11.31	2.52
Female	Eng. Lang.	59	78.64	5.51	81.58	6.31	2.94
	French	55	78.89	6.78	80.98	6.56	2.09
	Bilingual	24	75.67	7.01	78.04	7.93	2.37

Table 12 presents results on the interaction effect of gender and language of instruction on pupilsô attitude towards environmental education, and it shows that the male group taught environmental education in English, French and Bilingual had pretest attitude means of 77.91 with a standard deviation of 6.05, 79.44 with standard deviation of 6.82 and 78.53 with standard deviation of 5.51 respectively. The posttest attitude mean of the male groups were 80.67 with a standard deviation of 6.86 for English, 81.06 with a standard deviation of 7.60, for French and 81.05 with a standard deviation 11.31 for the bilingual group. Table 12 also reveals that the female group had a pretest attitude mean of 78.64 with a standard deviation of 5.51 for English, 78.89 with standard deviation of 6.78 for French and 75.67 with standard deviation of 7.01 for the bilingual group. The posttest attitude mean for the English, French and Bilingual groups were 81.58 with a standard deviation of 6.31, 80.98 with a standard deviation of 6.56 and 78.04 with a standard deviation 7.93 respectively. The difference between the pretest and posttest attitude means for the male group with regards to language of instruction were 2.76, 1.62 and 2.52 for English, French and Bilingual groups respectively. Also the difference between the pretest and posttest attitude means for the female group with regards to language of instruction are 2.94, 2.06 and 2.39 for English, French and Bilingual groups respectively. For each of the groups, the posttest attitude means are higher than the corresponding pretest attitude means. This indicates that gender and language of instruction appears to have some interaction effect on pupilsô attitude towards environmental education.

Research Question 12: What is the interaction effect of gender and school location on pupilsô attitude towards environmental education?

Table 13: *Mean analysis of pretest and posttest scores on the interaction effect of gender and school location on pupils' attitude towards environmental education.*

Variable			**Pre test**		**Posttest**		**Mean gain**
Gender	**Sch. Location**	**N**	**□**	**SD**	**□**	**SD**	
Male	Urban	79	78.23	6.44	80.86	6.97	2.63
	Rural	74	78.72	7.43	80.76	8.49	2.04
Female	Urban	66	78.42	6.12	81.30	6.48	2.88
	Rural	72	78.04	6.64	80.19	7.04	2.15

Table 13 shows that the male group from urban and rural schools had a pretest attitude mean of 78.23 with a standard deviation of 6.44 and 78.72 with standard deviation of 7.43 respectively. The corresponding posttest attitude mean of the male group from urban and rural schools were 80.68 with a standard deviation of 6.97 and 80.76 with a standard deviation 8.49 respectively. Table 12 also reveals that the female group from urban and rural schools had a pretest mean of 78.42 with a standard deviation of 6.12 and 78.04 with standard deviation of 6.64 respectively, and the corresponding posttest attitude mean of the female group from urban and rural schools were 81.30 with a standard deviation of 6.48 and 80.19 with a standard deviation 7.04 respectively. The difference between the pretest and posttest attitude means for the male group with regards to school location are 2.63 for urban male and 2.04 for rural male. Also the difference between the pretest and posttest attitude means for the female group with regards to school location are 2.88 for urban female and 2.15 for rural female. For each of the groups, the posttest means are

higher than the corresponding pretest means. The mean gain for the rural female group is slightly higher than that of their urban counterparts and even that of the male urban and rural groups. This then indicate that gender and school location appears to have some interaction effect on pupilsô attitude towards environmental education.

Research Question 13: What is the interaction effect of gender, language of instruction and school location on pupilsô achievement in environmental education?

Table 14: *Mean analysis of pretest and posttest scores on the interaction effect of language of instruction, school location and gender on pupils' achievement in environmental education*

Variable				**Pre test**		**Posttest**		**Mean gain**
Gender	**Lang. of Instruction**	**Sch. Location**	**N**	**□**	**SD**	**□**	**SD**	
Male	Eng. Lang.	Urban	54	20.56	3.58	22.48	3.81	1.92
		Rural	32	17.53	5.56	19.25	4.98	1.72
	French	Urban	25	19.88	2.26	21.56	2.12	1.68
		Rural	23	17.48	4.52	19.90	2.97	2.42
	Bilingual	Rural	19	15.68	3.90	17.11	3.28	1.43
Female	Eng. Lang.	Urban	32	20.53	5.89	23.03	4.56	2.50
		Rural	27	15.15	5.27	17.11	4.99	1.96
	French	Urban	34	20.09	3.61	21.06	3.58	0.97
		Rural	21	18.33	2.83	19.90	2.96	1.57
	Bilingual	Rural	24	16.21	3.91	16.87	3.18	0.66

Table 14 shows that the male group taught with English from urban schools had a pretest achievement mean of 20.56 with a standard deviation of 3.58 and the male group taught with English from rural schools had a pretest achievement mean of 17.53 with a standard deviation of 5.56. The male group taught with French from urban schools had a pretest

achievement mean of 19.88 with a standard deviation of 2.26 and the male group taught with French from rural schools had a pretest achievement mean of 17.48 with a standard deviation of 4.52. The male group taught with English and French from rural schools had a pretest achievement mean of 19.88 with a standard deviation of 3.90.

The corresponding posttest achievement mean of the male group taught with English from urban schools was 22.48 with a standard deviation of 3.81 and the male group taught with English from rural schools had a posttest achievement mean of 19.25 with a standard deviation of 4.98. The male group taught with French from urban schools had a posttest achievement mean of 21.56 with a standard deviation of 2.12 and the male group taught with French from rural schools had a posttest achievement mean of 19.90 with a standard deviation of 2.97. The male group taught with both English and French from rural schools had a posttest achievement mean of 17.11 with a standard deviation of 3.28.

Table 14 also reveals that the female group taught with English Language from urban schools had a pretest achievement mean of 20.53 with a standard deviation of 5.89 whereas the female group taught with English Language from rural schools had a pretest achievement mean of 15.15 with a standard deviation of 5.27. The female group taught with French from urban schools had a pretest achievement mean of 20.09 with a standard deviation of 3.61 while the female group taught with French from rural schools had a pretest achievement mean of 18.33 with a standard deviation of 2.83. The female group taught with English and French from rural schools had a pretest achievement mean of 16.21 with a standard deviation of 3.91. The corresponding posttest achievement means

of the female group taught with English Language from urban schools was 23.03 with a standard deviation of 4.56 and the female group taught with English Language from rural schools had a posttest achievement mean of 17.11 with a standard deviation of 4.99. The female group taught with French from urban schools had a posttest achievement mean of 21.06 with a standard deviation of 3.58 and the female group taught with French from rural schools had a posttest achievement mean of 19.90 with a standard deviation of 2.96. The female Bilingual group from rural schools had a posttest achievement mean of 16.87 with a standard deviation of 3.18. For each of the groups, the posttest achievement means are higher than the corresponding pretest achievement means. This then indicates that gender, language of instruction and school location had some interaction effect on pupilsô achievement in environmental education.

Hypotheses 1

There is no significant difference between the achievement mean scores of pupils in English and French schools in environmental education.

Table 15: *Summary Analysis of Covariance (ANCOVA) for the difference between language of instruction, school location and gender on the achievement of pupils in environmental education.*

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	4502.742[a]	10	450.274	109.795	.000
Intercept	435.662	1	435.662	106.232	.000
Pretestachievementscore	3094.826	1	3094.826	754.641	.086
Languageofinstruction	41.626	2	20.813	5.075	.007
Location	40.059	1	40.059	9.768	.002
Gender	.973	1	.973	.237	.627
Languageofinstruction * Location	9.491	1	9.491	2.314	.129
Languageofinstruction * Gender	5.833	2	2.916	.711	.492
Location * Gender	1.021	1	1.021	.249	.618
Languageofinstruction * Location * Gender	17.632	1	17.632	4.299	.039
Error	1148.296	280	4.101		
Total	123576.000	291			
Corrected Total	5651.038	290			

a. R Squared = .797 (Adjusted R Squared = .790)

The results in table 15 shows that with respect to the achievement mean scores of pupils in English and French schools in environmental education; an F-ratio of 5.075 was obtained with associated probability value of 0.007. Since the associated probability (0.007) was less than 0.05, the null hypothesis (H_{01}) was rejected. Thus, there was a significant difference between the achievement mean scores of pupils in English and French schools in environmental education. This implies that English and French as languages of instruction have an effect on the achievement of pupils in environmental education in Fako Division.

Hypotheses 2

There is no significant difference between the achievement mean scores of pupils taught environmental education in rural and urban areas. The results for this hypothesis are presented in Table 15.

Results in table 15 show that with respect to the achievement mean scores of pupils in environmental education in rural and urban areas; an F-ratio of 9.768 was obtained with associated probability value of 0.002. Since the associated probability (0.002) was less than 0.05, the null hypothesis (H_{02}) was rejected. Hence, there was a significant difference between the achievement mean scores of pupils in environmental education in rural and urban areas. The implication here is that school location has an effect on the achievement of pupils in environmental education.

Hypotheses 3

There is no significant differences between the achievement mean scores of male and female pupils in environmental education. The results for this hypothesis are presented in Table 15.

Results show that with respect to the achievement mean scores of male and female pupils in environmental education, an F-ratio of 0.237 was obtained with associated probability value of 0.627. Since the associated probability (0.627) was greater than 0.05 which is the stipulated level of significance, the null hypothesis (H_{03}) was accepted. Consequently, there is no significant difference between the achievement mean scores of male and female pupils in environmental education. Therefore we can say that gender has no effect on the achievement of pupils in environmental education.

Hypotheses 4

There is no significant difference between the attitude mean scores of pupils taught environmental education in English and those taught in French. The result for this hypothesis is presented in table 16.

Table 16: *Summary Analysis of Covariance (ANCOVA) difference between language of instruction, school location and gender on the attitude of pupils towards environmental education.*

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	12646.790[a]	10	1264.679	131.114	.000
Intercept	23.598	1	23.598	2.447	.119
Pretestattitudescore	12202.372	1	12202.372	1265.064	.000
Languageofinstruction	37.669	2	18.835	1.953	.144
Location	18.760	1	18.760	1.945	.164
Gender	5.966	1	5.966	.619	.432
Languageofinstruction * Location	92.641	1	92.641	9.604	.002
Languageofinstruction * Gender	1.163	2	.582	.060	.941
Location * Gender	3.593	1	3.593	.373	.542
Languageofinstruction * Location * Gender	.059	1	.059	.006	.938
Error	2700.784	280	9.646		
Total	1913760.000	291			
Corrected Total	15347.574	290			

a. R Squared = .824 (Adjusted R Squared = .818)

Table 16 shows that for the attitude mean scores of pupils taught environmental education in English and in French, an F-ratio of 1.953 was obtained with associated probability value of 0.144. Since the associated probability (0.144) was greater than 0.05, the null hypothesis (H_{04}) was not accepted. Thus, there is no significant difference

between the attitude mean scores of pupils taught environmental education in English and in French. However language of instruction has an effect on the attitude of pupils towards environmental education though it is not significant.

Hypothesis 5

There is no significant difference between the attitude mean scores of rural and urban pupils in environmental education.

The result for this hypothesis is presented in Table 16.

Table 16 shows that for the attitude mean scores of rural and urban pupils in environmental education; an F-ratio of 1.945 was obtained with associated probability value of 0.164. Since the associated probability (0.164) was greater than 0.05, the null hypothesis (H_{05}) was accepted, hence, there is no significant difference between the attitude mean scores of rural and urban pupils in environmental education.

Hypothesis 6

There is no significant difference between the attitude mean scores of male and female pupils taught environmental education. The result for this hypothesis is presented in Table 16.

The results show that for the attitude mean scores of male and female pupils taught environmental education, an F-ratio of 0.619 was obtained with associated probability value of 0.432. Since the associated probability (0.432) was greater than 0.05 which is the stipulated level of significance, the null hypothesis (H_{06}) was accepted. Consequently,

there was no significant difference between the attitude mean scores of male and female pupils taught environmental education.

Hypothesis 7

There is no significant interaction effect between the achievement mean scores of school location and language of instruction of pupils in environmental education. The result for this hypothesis is presented in table 15.

Table 15 reveals that the interaction effect between school location and language of instruction on pupilsô achievement in environmental education was not significant. An F-ratio of 2.314 was obtained with associated probability value of 0.129. Since the associated probability (0.129) was greater than 0.05 which is the stipulated level of significance, the null hypothesis (H_{07}) was accepted. Consequently, the interaction effect between school location and language of instruction on pupilsô achievement in environmental education was not significant.

Hypothesis 8

There is no significant interaction effect between the achievement mean scores of gender and language of instruction of pupils in environmental education. The result for this hypothesis is presented in able 15.

Table 15 reveals that the interaction effect between gender and language of instruction on pupilsô achievement in environmental education was not significant. An F-ratio of 0.711 was obtained with associated probability value of 0.492. Since the associated probability (0.492) was greater than 0.05 which is the stipulated level of significance, the null hypothesis (H_{08}) was accepted. Consequently, the interaction effect between gender and

language of instruction on pupilsô achievement in environmental education was not significant.

Hypothesis 9

There is no significant interaction effect between the achievement mean scores of gender and school location of pupils in environmental education. The result for this hypothesis is presented in table 15.

Table 15 shows that the interaction effect between gender and school location on pupils achievement in environmental education was not significant. An F-ratio of 0.249 was obtained with associated probability value of 0.618. Since the associated probability (0.618) was greater than 0.05 which is the stipulated level of significance, the null hypothesis (H_{09}) was not rejected. Consequently, the interaction effect between gender and school location on pupils achievement in environmental education was not significant.

Hypothesis 10

There is no significant interaction effect between the attitude mean scores of school location and language of instruction of pupils in environmental education. The result for this hypothesis is presented in table 16.

Table 16 reveals that the interaction effect between school location and language of instruction on pupilsô achievement in environmental education was significant. An F-ratio of 9.604 was obtained with associated probability value of 0.002. Since the

associated probability (0.002) was less than 0.05 which is the stipulated level of significance, the null hypothesis (H_{010}) was rejected. Consequently, the interaction effect between school location and language of instruction on pupilsô attitude towards environmental education was significant. This implies that as school location and language of instruction varies, the attitudes of pupils towards environmental education also changes depending on the location (urban or rural).

Hypothesis 11

ñThere is no significant interaction effect between the attitude mean scores of gender and language of instruction of pupils in environmental educationò.

Table 16 reveals that the interaction effect between gender and language of instruction on pupilsô achievement in environmental education was not significant. An F-ratio of 0.060 was obtained with associated probability value of 0.941. Since the associated probability (0.941) was greater than 0.05 which is the stipulated level of significance, the null hypothesis (H_{011}) was accepted. In other words, the interaction effect between gender and language of instruction on pupilsô attitude towards environmental education was not significant.

Hypothesis 12

There is no significant interaction effect between the attitude mean scores of gender and school location of pupils in environmental education. The result for this hypothesis is presented in table 16

Table 16 reveals that the interaction effect between gender and school location on pupils attitude towards environmental education was not significant. An F-ratio of 0.373 was obtained with associated probability value of 0.542. Since the associated probability (0.542) was greater than 0.05 which is the stipulated level of significance, the null hypothesis (H_{012}) was not rejected. In other words, the interaction effect between gender and school location on pupilsô attitude towards environmental education was not significant.

Hypothesis 13

There is no significant interaction effect between the achievement mean scores of language of instruction, school location and gender of pupils in environmental education. The result for this hypothesis is presented in table 15

Table 15 reveals that the interaction effect between language of instruction, school location and gender on pupilsô achievement in environmental education was significant. An F-ratio of 4.299 was obtained with associated probability value of 0.039. Since the associated probability (0.039) was less than 0.05 which is the stipulated level of significance, the null hypothesis (H_{013}) was rejected. In other words, the interaction effect between language of instruction, school location and gender on pupilsô achievement in environmental education was significant. Consequently, the combined effect of language of instruction, school location and gender created some positive effect on pupilsô achievement in environmental education.

Summary of Findings

The summary of the findings is presented below:

1. There was a significant difference between the achievement mean scores of pupils in English and French schools in environmental education. This indicates that Language of instruction had some effect on pupilsô achievement in environmental education. The English pupils achieved better than the French and Bilingual pupils.

2. There was a significant difference between the mean achievement scores of pupilsô in environmental education in rural and urban areas. Signifying that School location had some effect on pupilsô achievement in environmental education with the rural pupils achieving more that the urban pupils.

3. There is no significant difference between the mean achievement scores of male and female pupils in environmental education. However there appears to be some effect of gender on pupilsô achievement in environmental education with the male pupils having a slightly higher achievement than the female pupils.

4. There is no significant difference between the attitude mean scores of pupils taught environmental education in English and in French. However language of instruction seems to have some effect on pupilsô attitudes toward environmental education. The English pupils showed a more positive attitude towards environmental education than their French counterparts.

5. There is no significant difference between the attitude mean scores of rural and urban pupils in environmental education. School location appears to have some effect on pupilsô attitude towards environmental education, however this is not significant.. Urban pupils had a more positive attitude towards environmental education than the rural pupils.

6. There was no significant difference between the attitude mean scores of male and female pupils in environmental education. Gender appears to have some effect on pupilsô attitude towards environmental education. The female pupils had more positive attitudes towards environmental education than their male counterparts.

7. The interaction effect between language of instruction and school location on pupilsô achievement in environmental education was not significant. Language of instruction and school location appears to have some interaction effect on pupilsô achievement in environmental education. The English urban pupils achieved more that the English rural, French urban and the French rural pupils.

8. The interaction effect between language of instruction and gender on pupilsô achievement in environmental education was not significant. Language of instruction and gender appears to have some interaction effect on pupilsô achievement in environmental education with the English males achieving better than the English females, French males and French females.

9. The interaction effect between gender and school location on pupils achievement in environmental education was not significant. School location and gender appears to have some interaction effect on pupilsô achievement in environmental education. The urban males achieved better than the urban females, rural males and rural females.

10. The interaction effect between language of instruction and school location on pupilsô attitude towards environmental education was significant. Language of instruction and school location appears to have some interaction effect on pupilsô attitude towards environmental education. The English urban pupils had more positive attitudes towards environmental education than the others.

11. The interaction effect between language of instruction and gender on pupilsô attitude towards environmental education was not significant. Gender and language of instruction appears to have some interaction effect on pupilsô attitude towards environmental education. The English females showed more positive attitudes towards environmental education.

12. The interaction effect between gender and school location on pupilsô attitude towards environmental education was not significant. Gender and school location appears to have some interaction effect on pupilsô attitude towards environmental education. Urban females had more positive attitudes than the rest of the groups.

13. The interaction effect between language of instruction, school location and gender, on pupilsô achievement in environmental education was significant. Language of instruction, school location and Gender had some interaction effect on pupilsô achievement in environmental education. English urban females achieved better than all the other groups of pupils.

CHAPTER FIVE

DISCUSSION OF RESULTS, CONCLUSION, IMPLICATIONS, RECOMMENNDATION AND SUMMARY OF THE STUDY.

This chapter presents the discussions, conclusions, educational implications, recommendations, limitations and suggestions for further studies based on the results of the study. The discussions will be done according to the hypothesis that guided the study, summarising how the findings are similar or different from those in existing literature.

Discussion

The effect of Language of Instruction on Pupils' achievement in Environmental Education.

This study sought to investigate the effect of language of instruction on pupilsô achievement in environmental education. The results revealed that there was a significant difference between the mean achievement scores of pupils in English and French schools in environmental education. This implies that English and French as languages of instruction have an effect on pupilsô achievement in environmental education in Fako Division. It signifies that as the language of instruction varies, pupilsô achievement in environmental education also varies.

Evidence from the results show that the mean gain for the English group was higher than that for the French, and the bilingual groups signifying that the pupils taught environmental education in English performed better than their French and bilingual counterparts. It is interesting to note that the bilingual group which was the control for the

experiment also had a positive mean gain from the difference between the posttest and pretest means. The findings of this study are similar to that of Ahmad Saeed (2012), who found out in a study on the impact of medium of instruction on achievement level of students at higher secondary stage in Hyderabad region of Sindh that medium of instruction plays a significant role in the learning outcome of students.

This can be attributed to the communication skill of the teacher; it could be that the teacher did not communicate the information well for pupils to understand the intended meaning out of the lessons. The pupils might also have a problem understanding the language being used in teaching and it will affect their understanding and hence achievement. It is evident that other factors other than language of instruction can lead to some changes in the achievement of pupils but the effect of language cannot be ignored.

The effect of school location on pupils' achievement in environmental education.

The second objective of the study was to find out the effect of school location on pupilsô achievement in environmental education. The findings show that the mean difference for the rural group (3.39) is higher than that for the urban group (1.79), which indicates that the rural pupils achieved better than the pupils from the urban group. From the pretest means it is observed that the urban pupils performed better than the rural pupils but after the experimental lessons, the rural pupils did better than the urban pupils.

The findings of this study were contrary to that of Owoeye, (2011) who investigated the effects of School Location on the Academic Achievement of Secondary School students

in Ekiti State, Nigeria between 1990 and 1997. The findings of Neema (2010), in a comparative study of rural and urban schools in Arusha-Tanzania also indicated that students in urban secondary schools performed better than students in rural secondary schools. The discovery of Considine and Zappala (2002), was different from above studies, they studied students in Australia and found out that geographical locations did not significantly predict outcomes in school performance.

Pupilsô achievement in rural schools may vary depending on what type of rural school they attend, but for the most part these pupils are not too far behind the national average. Many rural pupils' test scores are equal to or greater than urban pupils' scores. Rural schools have made a vast improvement in pupil achievement recently, and this trend is expected to continue as researchers continue to find new ways of improving the education of rural pupils. The small class sizes in rural schools may also explain their higher achievement. There is more interaction between the teacher and pupils when the class size is small than when it is large. Also the few pupils of rural school will have more access to the available teaching and learning aids than those in urban schools. This can account for the high achievement in rural schools, The different views above are an indication that pupil achievement by location varies from one location to another.

The effect of gender on pupils' achievement in environmental education.

The study also sought to find out the effect of gender on pupilsô achievement in environmental education. The results reveal that gender generally appears to have a slight effect on pupilsô achievement in environmental education since the mean gain for both male (1.67) and female (1.56) groups was positive. The figures show that the male pupilsô achieved slightly better than the female pupils.

In a similar study on the Influences of Gender on Academic Achievement, Linver, Davis-Kean, & Eccles, (2002, April) found out that contrary to the results of the present study, female pupils achieve better than male pupils. Abiodun (2004), on the other hand carried out an investigation on the influence of gender and classroom climate on secondary school studentsô achievement in mathematics and mathematics related subjects in Ekiti state, Nigeria and had similar results with males achieving better than females. Bosire,Mondoh, and Barmao(2000), also discovered that there is a significant difference in the achievement of male and female students in mathematics with the males having and advantage over the females. Anizoba (2004, on the contrary found out in her study that there is no significant difference in the achievement of male and female students. The findings of the present study are also in line with the results from the studies carried out by Abiodun (2004), and Bosire,Mondoh, and Barmao(2000), while that of Linver, Davis-Kean, & Eccles, (2002), are contrary. On the other hand Anizoba (2004) had results showing no difference between the achievement of male and female students.

It is evident from this that pupilsô achievement varies because of some other factors other than gender. This implies that as language of instruction changes or is manipulated, the achievement of pupils changes but that of male pupils changes more significantly than that of female pupils in environmental education in Fako Division. This can be attributed to the stereotype belief that females are weaker in their achievement in science subjects in particular. It is also said that males have a better mental ability than females which might affect their achievement. Some people think that females are not as interested in the modern technologies and facilities like the males so it gives the males an advantage over the females since they are more exposed and a lot of learning takes place from such facilities.

The effect of language of instruction on pupils' attitude towards environmental education.

This objective was to find out the effect of language of instruction on pupilsô attitude towards environmental education. The results indicated that language of instruction seems to have an effect on pupilsô attitudes toward environmental education because there was a positive difference in the pretest and posttest means of the two experimental groups and the control group. The mean gain from the difference between the pretest and posttest attitude means for the English, French and Bilingual groups was 2.75, 1.87, and 2.44 respectively. It implies that the English pupils had a more positive attitude towards environmental education than the French and bilingual pupils after the experiment. The French pupils had a negative attitude towards environmental education since the mean

difference is less than 2.5, but for the bilingual pupils who did not undergo any treatment their attitude were negative but better than that of the French pupils. The positive mean gain also reveals that after the teaching of the experimental lessons all the pupils attitude changed to the positive direction, and this is a good sign.

Despite the fact that the attitude of those taught in French was negative, their pretest score was higher than that for the English and the bilingual groups. It is indicative of the fact that these pupils had better attitudes towards environmental education even before the experiment than their English and bilingual counterparts.

The implication here is that the attitude of pupils in Fako Division towards environmental education is dependent on the language of instruction to an extent. The bilingual pupilsô had a more positive change in attitude towards environmental education than the French pupils even though they did not undergo treatment.

The effect of school location on pupils' attitude towards environmental education.

The results indicate that school location seems to have an effect on pupilsô attitudes toward environmental education because there was a positive difference in the pretest and posttest means of the urban and rural groups. The mean gains for the pretest and posttest attitude means for both the urban and rural groups was not significantly different; it is only after the experimental lessons were taught that the difference in attitude was noticed.

The urban pupils (2.74) had a more positive attitude towards environmental education than the rural pupils (2.10). This could be attributed to the fact that the urban pupils are

more exposed to some facilities like televisions, radios and computers. Pupils can gain a lot of knowledge on environmental education from the programs on television radio and the internet that might influence their attitudes towards it. The rural pupils on the other hand do not have access to these facilities and so might not have the advantages that come with them. This could explain why their attitude towards environmental education is slightly negative than that of the urban pupils. Another explanation for the negative attitude towards environmental education in rural pupils might be the fact that most of the environmental problems that are prevalent in urban areas are absent in rural areas.

Mahbub S. (2011), in a study on secondary studentsô environmental attitudes: the case of environmental education in Bangladesh found out that there is no significant difference in the attitude of both rural and urban students towards environmental education. The study found that overall students from both the urban and rural areas expressed favourable environmental attitudes with girls having a significantly higher level of favourable environmental attitudes than boys; in particular, rural girls had the highest level of environmental attitudes comparing among others.

Muhammad and Hafiz (2012) had similar results to those of this study from an investigation on Studentsô Attitude towards Science: A Case of Pakistan. The main objective of the study was to examine studentsô attitude towards science. Results of the study depicted a significant effect of gender and location on studentsô attitude towards science. This study had similar results to those of the present study showing that there is a significant difference in the attitude of urban and rural pupilsô attitude towards

environmental education. It is an indication that the location of the school does have a positive effect on pupilsô achievement in environmental education.

The Effects of gender on pupils' attitude towards environmental education.

The findings of this study indicate that, female pupils have a more positive attitude towards environmental education than their male counterparts. The differences between the pretest and posttest means of the male and female pupils was 2.35 and 2.50 respectively. This signifies that there is a significant effect on pupilsô attitudes in environmental education when gender is considered in Fako Division.

The results of this study are in line with the findings of, Mahbub S. (2011), who found out that there is significant difference in the attitude of both male and female students towards environmental education. The study found that girls had a significantly higher level of favourable environmental attitudes than boys; and in particular, rural girls had the highest level of environmental attitudes compared with others. Similar to the results of this study are those of Muhamma & Hafiz (2012) in their investigation on Studentsô Attitude towards Science: A Case of Pakistan came out with similar findings in relation to the attitude of boys and girls towards science. The results of the study depicted a significant effect of gender on studentsô attitude towards science. In another investigation by Azizollah, (2012), on attitudes towards science and technology, school science and environmental issues among middle school studentsô similar results were obtained. The results showed that in three components of the study, there is a significant difference

between males and females attitude towards environmental issues. According to this result, males have higher averages than the females.

Contrary results from those above were obtained by Njoki and Chandler (2002), in a study on African womenôs cultural knowledge of environmental education within a specific case study in rural Kenya. In the study it was discovered that the participants had a deep understanding of the ecological situation and their level of cultural knowledge and environmental degradation stood out among all other participants. The results also indicated that rural women are connected to the land and the environment, and have a vast knowledge of the environment, which could be incorporated in teaching to contribute to environmental education.

Bulent, Pinar, Ceren, Jale, Teoman, (2009), carried out a study on Turkish Studentsô Views on Environmental Challenges with respect to Gender: An Analysis of ROSE Data; which examined high school studentsô attitudes toward the environment and their interest in learning about environmental protection with respect to gender. The findings of this study revealed that Turkish students have favourable attitudes toward environmental issues, and also, statistically significant differences were found in environmental attitudes and interests in learning about environmental protection mean scores of students regarding gender.

The interaction effect of language of instruction and school location on pupils' achievement in environmental education.

Another objective of this study was to find out the interaction effect of language of instruction and school location on pupilsô achievement in environmental education. The results reveal that the interaction effect of language of instruction and school location on pupilsô achievement in environmental education is not significant. The indication here is that when language of instruction and school location are considered together it does not affect the achievement of pupils. The achievement of pupils in environmental education in Fako Division is not influenced by the combined effect of language of instruction and school location.

Despite that, the results showed that the English urban group of pupils achieved better in environmental education as compared to their English rural, French urban, French rural and bilingual rural counterparts. Findings indicate that the urban pupils taught in English, achieved better than those taught in French. It can be concluded that school location in combination with the language used in teaching pupils, does not influence pupilsô achievement in environmental education in Fako Division significantly.

The interaction effect of language of instruction and gender on pupils' achievement in environmental education.

The findings of this study have also revealed that there is no significant interaction effect of language of instruction and gender on pupils ó achievement in environmental education.

The achievement of pupils in environmental education in Fako Division is not influenced by the interraction effect of language of instruction and gender. The female English pupils had the highest mean gain, followed by the male English pupils. The French males pupils, achieved slightly higher than the females. Looking at the mean gain differences, it can be concluded that language of instruction and gender seems to have an interaction effect on pupilsô achievement but it is not significant.

The interaction effect of school location and gender on pupils' achievement in environmental education.

The results of the study indicate that there is no significant interaction effect of school location and gender on pupilsô achievement in environmental education. This is seen in the fact that the associated probability value is greater than 0.05, the stipulated significance level.

Eraikhuemen, (2003), had a contrary discovery to the results of this study, in an investigation on the influence of gender and school location on the mathematics achievement of senior secondary school II (SS II) students. The findings revealed that; there is a significant difference in the academic achievement of male and female students, as well as urban and rural students and that there is a significance interaction influence of gender and school location on the academic achievement of students.

Similar results to those of this study were revealed by Akabogu (2002) in a study on the effect of contextual clue exposure to English registers on secondary school studentsô achievement in reading comprehension and his focus was on location and gender. The

results of the study which were similar to those of the present study revealed that; there is no significant effect of gender on studentsô achievement in reading comprehension. Location of schools had a significant effect on studentsô achievement in reading comprehension, signifying that student achievement varied with a change in location from urban to rural.

The interaction effect of language of instruction and school location on pupils' attitude towards environmental education.

The study also set out to investigate the interaction effect of language of instruction and school location on pupilsô attitude towards environmental education. The findings of the study show that there appears to be some interaction effect of language of instruction and school location on pupilsô attitude towards environmental education. When the combined effect of language of instruction and school location is considered, it significantly influences pupilsô attitude towards environmental education. So it is not only where a school is located that determines the attitude of pupils but also the language of instruction used in teaching them.

From the results, the English urban group of pupils have a more positive attitude towards environmental education with a mean gain of 3.52 as compared to their English rural (1.74), French urban (1.61), French rural (2.23) and bilingual rural (2.44) counterparts. This means that the urban pupils taught in English had a better improvement in their attitude towards environmental education than those taught in French, and those taught in French and English, after the experiment.

The interaction effect of language of instruction and gender on pupils' attitude towards environmental education.

From the results of this study, it is evident that there is no significant interaction effect of language of instruction and gender on the pupilsô attitude towards environmental education. Despite this, all the pupils male and female generally have a more positive attitude towards environmental education because all the mean gains are positive. This implies that the attitude of pupils towards environmental education does not depend on the interaction effect of gender and the language of instruction.

The results of this study agrees with that of Akomolafe (2011). The study revealed that gender of students and parentsôlevel of education, were not important factors in studentsô environmental awareness knowledge, and environmental attitude. The study further revealed that type of institution has no influence on studentsô environmental awareness knowledge, and also on their environmental attitude.

The interaction effect of school location and gender on pupils' attitude towards environmental education.

The results showed, that there is no significant interaction effect of school location and gender on the pupilsôattitude towards environmental education. It is indicative of the fact that whether school location and gender varies or not, the attitude of pupils towards environmental education remains the same. These findings are contrary to the findings of Shivakumar & Vamadevappa (2011), in an investigation undertaken on the environmental attitude among the high school students, related to their Sex (Boys/Girls),

Locality (Rural/Urban) and types of schools (Government/Private). The results of the study revealed that, gender and locality have an interaction effect on the Environmental Attitude of the secondary school students, gender does not play any role on Environmental attitude, and lastly that the students from the urban background are comparatively better in terms of their environmental attitude as compared to the students from the rural background.

The attitude of pupils towards the environmental education in Fako Division is dependent on the combined effect of gender and the location of the school.

The interaction effect of language of instruction, school location and gender on pupils' achievement in environmental education.

This objective was to find out the interaction effect of language of instruction; school location and gender on pupils achievement in environmental education. The findings of the study revealed that the interaction effect of language of instruction; school location and gender is significant. This signifies that when language of instruction, school location and gender is considered together, the effect is significant for pupilsô achievement in environmental education in fako Division.

Conclusions.

The study set out to investigate the effect of language of instruction, school location and gender on pupils' attitude and achievement in environmental education in Fako Division, Cameroon. Based on the findings of this study, the following conclusions have been made;

English as a medium of instruction is the best for the teaching of environmental education concepts in primary schools in Fako Division. This is because the pupils who were taught environmental education in the experiment using English achieved better than those taught using French language, they also showed more positive attitude towards environmental education. If the pupils of Fako Division must understand their EE concepts well enough to have good results and have positive attitudes towards environmental education, the English language should be used for instruction.

The results of this study are an indication that pupils from rural schools in Fako Division achieved relatively better in environmental education than those from urban schools. It was seen from literature in the background of this study that urban pupils in Fako are exposed to modern technologies which help and influence learning, while the rural environs do not have these amenities. The results have proven the contrary; otherwise it could be that other factors account for the better performance of rural pupils.

Findings of the study further revealed that gender does not influence the achievement of pupils in environmental education although male pupils in Fako Division achieved slightly higher in environmental education than female pupils.

Rural pupils in Fako Division have a more positive attitude towards environmental education than their urban counterparts, and lastly, male pupils in Fako Division have a more positive attitude towards environmental education than their female pupils.

Language of instruction, school location and gender, also have a combined effect on pupilsô achievement in environmental education in Fako Division. The urban females taught in English had the highest mean gain which indicated that they achieved better than the rest of the pupils.

Lastly, findings revealed that language of instruction and school location have a combined effect on pupilsô attitude towards environmental education. The urban English pupils achieved higher than all the other pupils.

Educational Implications

The results of this study have some implications for the education industry in Cameroon, specifically, for the policy makers, curriculum designers, pupils, parents and the society as a whole.

With the knowledge that English Language is the best medium of instruction that can improve pupilsô achievement in Environmental Education in Fako Division, policy - makers will make appropriate decisions that will make the teaching and learning of EE

better than it was. If this is done, it will not only increase achievement of pupils but will help them understand environmental education concepts better and then be able to apply the knowledge to their environment and help in giving them more positive attitudes towards environmental education.

For curriculum designers, these results will guide them in the development and designing of the primary school curriculum for environmental education. It might influence them to plan curriculum documents in relation to zones and locations, so that implementation will also be according to the needs of particular areas. They will realise that a general syllabus for the whole country is not the best as the needs of pupils differ with respect to their different locations.

The results will help pupils have a better understanding of their subject matter in environmental education since they will be taught in the language they have a mastery of in order to improve their achievement in environmental education. The language used will be one that they know best and examples used in class will be those around them, motivating them to improve their achievement in environmental education.

The community will also benefit from this study because the pupils will act positively in the environment after understanding environmental education.A change in attitude will changetheir behaviour towards the environment and the community as a whole will benefit from the changes.

The researcher believes that if all stakeholders consider the findings of this study and use them accordingly, there will be a lot of improvement in the achievement of pupils in environmental education and it will influence their behaviour towards environmental issues. Improvement in the achievement will lead to positive attitudes towards the environment, hence some remedy to environmental problems.

Limitations.

The generalizations drawn from this study are subject to the following limitations;

The teachers were all trained for the teaching of the research lessons, and the researcher ensured that the same teaching materials, teaching methods and pupil activities were used, but other intervening variables like mastery of content, teaching experience, communication skills, and classroom environment skills of the teachers might have affected the results of the study.

Recommendations.

Based on the findings, it is recommended that more emphasis should be placed on teachersô communication skills in the planning and designing of teacher training programs and that curriculum planners should consider locations when developing syllabuses.

One of the recommendations is for teachers and educational authorities to encourage the female pupils to take their lessons in environmental education seriously so as to improve

their achievement. In addition, parents should help encourage children at home so they can develop more positive attitudes towards environmental education.

Workshops should be organised regularly for the teachers in Fako Division to acquaint them with the necessary skills for the effective teaching of environmental education concepts.

Environmental education should be given the importance it deserves so that people will see the need and accept the responsibility to undertake activities that will preserve the environment. It should also be made clear to young people that environmental education is not just an element of the learning process, but an element of an individual's entire life style.

The communities should assist the government by providing the basic facilities for teachers and pupils in rural and urban schools. Adequate incentives should be provided for teachers in rural areas to encourage them to put in their best, remain in their duty stations so that pupils in these rural areas will improve their achievement in environmental education.

Suggestions for Further Research

- This study is limited to Fako Division, similar studies could be carried out in other Divisions of Cameroon and the results compared to this results.
- Since this study is limite to primary schools, it could be extended to secondary schools in Fako Division.

- Another investigation could be carried out on the attitude displayed by pupils who are taught EE topics with teaching aids and those who are taught without teaching aids.

Summary.

This study focused on the investigation of the effect of language of instruction, school location, and gender on pupilsô attitude and achievement in environmental education in Cameroon. The main purpose was to find out the effect of French and English as languages of instruction, rural and urban location of schools and gender (male or female) on pupils achievement in environmental education. Literature related to the study was reviewed and from the existing literature it was discovered that investigations of this nature have not been carried out in Fako Division. This created the gap that this study seeks to fill. The study adopted the quasi experimental design. Thirteen research questions and their corresponding hypotheses were formulated to guide the study. The population for the study was 31,996 pupils from 134 primary schools, with a gender distribution of 15,966 Boys and 16,030 Girls. The sample for the study was 291 class six pupils (153 girls and 138 boys), from the nine (9) schools, drawn randomly by stratified sampling, from the 134 primary schools in Fako Division. An Environmental Education Achievement Test, (EEAT) and an attitude scale (ATS) were used for data collection.

The data derived from the research was mainly quantitative; as such quantitative methods of data analyses were employed in analyzing data collected, after the experimental

treatment. Means and standard deviation of scores were used to answer the research questions, and the null hypotheses were tested using the Analysis of Covariance (ANCOVA). The data were analysed using the Statistical Package for the Social Sciences (SPSS) Version 17.0 (SPSS Inc. 2008). All statistics for achievement scores were discussed at 0.05 level of significant (Ŭ=0.05).

Chapter five presented the discussions according to the thirteen hypotheses that guided the study; six major conclusions were drawn from the results of the investigation. It was concluded that English as a medium of instruction is the best for the teaching of environmental education concepts in primary schools in Fako Division, that pupils from rural schools in Fako Division achieve relatively better in environmental education than those from urban schools. It was also concluded that rural pupils in Fako Division have a more positive attitude towards environmental education than their urban counterparts, and lastly, that male pupils in Fako Division have a more positive attitude towards environmental education than the female pupils.

Some recommendations were made to the Government, education authorities and teachers, the educational implications that stem from this study were also outlined by the researcher, and lastly the limitations and suggestions for further studies based on the results of the study were proposed.

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APPENDICES

GOVERNMENT PRACTISING SCHOOLS IN BUEA SUB-DIVISION ANNEXED TO G.T.T.C. BUEA .

		NUMBER OF PUPILS			NUMBER OF TEACHERS			NUMBER OF CLASSROOMS			
TYPE OF SCHOOL	NO. OF SCHOOLS	BOYS	GIRLS	TOTAL	MALES	FEMALES	TOTAL	P	SP	TEMP	T
GOVERNMENT PRIMARY	04	757	713	1470	04	33	37	33	-	-	33
GOVERNMENT NURSERY	01	102	111	213	-	43	47	44	-	-	44
TOTAL	**05**	**859**	**824**	**1683**	**04**	**43**	**47**	**44**	**-**	**-**	**44**

GOVERNMENT PRACTISING SCHOOLS IN LIMBE I SUB DIVISION ANNEXED TO G.T.T.C. LIMBE.

		NUMBER OF PUPILS			NUMBER OF TEACHERS			NUMBER OF CLASSROOMS			
TYPE OF SCHOOL	NO. OF SCHOOLS	BOYS	GIRLS	TOTAL	MALES	FEMALES	TOTAL	P	SP	TEMP	T
GOVERNMENT PRIMARY	03	429	430	859	01	31	32	25	-	-	25
GOVERNMENT NURSERY	01	24	30	54	-	06	06	02	-	-	02
TOTAL	**04**	**453**	**460**	**913**	**01**	**37**	**38**	**27**	**-**	**-**	**27**

SUMMARY OF SCHOOLS TEACHERS, PUPILS AND CLASSROOMS IN WEST COAST DISTRICT

		NUMBER OF PUPILS			NUMBER OF TEACHERS			NUMBER OF CLASSROOMS			
TYPE OF SCHOOLS	NO. OF SCHOOLS	BOYS	GIRLS	TOTAL	MALES	FEMALES	TOTAL	P	SP	TEMP	T
GOVERNMENT PRIMARY	09	938	963	1901	20	38	58	33	06	05	44
GOVERNMENT NURSERY	05	79	63	142	-	13	13	02	-	04	06
DENOMINATIONAL PRIMARY	03	245	270	515	07	11	18	07	-	10	17
DENOMINATIONAL NURSERY	02	02	44	47	91	-	04	04	-	01	02
LAY- PRIVATE PRIMARY	01	35	31	66	-	05	05	04	-	-	04
LAY – PRIVATE NURSERY	01	37	45	82	-	02	02	01	-	-	01
TOTAL	**21**	**1378**	**1419**	**2797**	**27**	**73**	**100**	**48**	**06**	**20**	**74**

SUMMARY OF SCHOOLS TEACHERS, PUPILS, AND CLASSROOMS IN TIKO SUB-DIVISION.

		NUMBER OF PUPILS			NUMBER OF TEACHERS			NUMBER OF CLASSROOMS			
TYPE OF SCHOOLS	NO. OF SCHOOLS	BOYS	GIRLS	TOTAL	MALES	FEMALES	TOTAL	P	SP	TEMP	T
GOVERNMENT PRIMARY	30	4190	4477	8667	40	153	193	109	20	34	163
GOVERNMENT NURSERY	12	261	264	525	-	42	42	05	-	18	23
DENOMINATIONAL PRIMARY	18	2738	2703	5441	63	117	180	126	14	09	149
DENOMINATIONAL NURSERY	08	339	294	633	-	27	27	15	05	-	20
LAY- PRIVATE PRIMARY	14	1531	1649	3180	33	79	112	63	23	07	93
LAY – PRIVATE NURSERY	14	592	626	1218	-	46	46	20	11	02	33
TOTAL	**96**	**9651**	**10013**	**19664**	**136**	**464**	**600**	**338**	**73**	**70**	**481**

SUMMARY OF SCHOOLS TEACHERS, PUPILS AND CLASSROOMS IN MUYUKA SUB-DIVISION.

		NUMBER OF PUPILS			NUMBER OF TEACHERS			NUMBER OF CLASSROOMS			
TYPE OF SCHOOLS	NO. OF SCHOOLS	BOYS	GIRLS	TOTAL	MALES	FEMALES	TOTAL	P	SP	TEMP	T
GOVERNMENT PRIMARY	22	2890	2640	5530	36	105	141	99	29	-	128
GOVERNMENT NURSERY	16	492	529	1021	01	54	55	15	12	-	27
DENOMINATIONAL PRIMARY	20	2318	2349	4667	55	80	135	101	37	-	138
DENOMINATIONAL NURSERY	05	145	140	285	-	10	10	08	02	-	10
LA-Y- PRIVATE PRIMARY	16	1006	962	1968	42	65	107	61	36	-	97
LAY – PRIVATE NURSERY	15	393	428	821	-	35	35	19	13	-	32
TOTAL	**94**	**7244**	**7048**	**14292**	**134**	**349**	**483**	**303**	**129**	**-**	**432**

SUMMARY OF SCHOOLS TEACHERS, PUPILS AND CLASSROOMS IN LIMBE III SUB-DIVISION.

		NUMBER OF PUPILS			NUMBER OF TEACHERS			NUMBER OF CLASSROOMS			
TYPE OF SCHOOLS	NO. OF SCHOOLS	BOYS	GIRLS	TOTAL	MALES	FEMALES	TOTAL	P	SP	TEMP	T
GOVERNMENT PRIMARY	07	744	889	1633	16	24	40	19	06	04	29
GOVERNMENT NURSERY	01	24	22	46	-	03	03	02	-	-	02
DENOMINATIONAL PRIMARY	-	-	-	-	-	-	-	-	-	-	-
DENOMINATONAL NURSERY	-	-	-	-	-	-	-	-	-	-	-
LA-Y- PRIVATE PRIMARY	-	-	-	-	-	-	-	-	-	-	-
LAY – PRIVATE NURSERY	-	-	-	-	-	-	-	-	-	-	-
TOTAL	**08**	**768**	**911**	**1679**	**16**	**27**	**43**	**21**	**06**	**04**	**31**

SUMMARY OF SCHOOLS, TEACHERS, PUPILS AND CLASSROOMS IN LIMBE II SUB-DIVISION

		NUMBER OF PUPILS			NUMBER OF TEACHERS			NUMBER OF CLASSROOMS			
TYPE OF SCHOOLS	NO. OF SCHOOLS	BOYS	GIRLS	TOTAL	MALES	FEMALES	TOTAL	P	SP	TEMP	T
GOVERNMENT PRIMARY	05	648	682	1330	05	24	29	30	02	-	32
GOVERNMENT NURSERY	05	98	85	183	-	10	10	04	-	-	04
DENOMINATIONAL PRIMARY	02	157	151	308	04	07	11	02	10	-	12
LAY- PRIVATE PRIMARY	06	394	437	831	09	27	36	17	28	-	45
LAY – PRIVATE NURSERY	06	147	156	303	-	13	13	12	2	-	14
TOTAL	**24**	**1444**	**1511**	**2955**	**18**	**81**	**99**	**65**	**42**	**-**	**107**

STATISTICS

SUMMARY OF SCHOOLS, TEACHERS AND PUPILS IN BUEA SUB-DIVISION

		NUMBER OF PUPILS			NUMBER OF TEACHERS			NUMBER OF CLASSROOMS			
TYPE OF SCHOOLS	NO. OF SCHOOLS	BOYS	GIRLS	TOTAL	MALES	FEMALES	TOTAL	P	SP	TEMP	T
GOVERNMENT PRIMARY	34	3226	3068	6294	32	230	262	132	23	27	182
GOVERNMENT NURSERY	16	680	719	1399	-	78	78	40	03	10	53
GPS	04	757	713	1470	04	33	37	33	-	-	33
GPNS	01	102	111	213	-	10	10	11	-	-	11
DENOMINATIONAL PRIMARY	22	2218	2337	4555	36	104	140	115	06	07	128
GTTC	01	48	303	351	18	72	90	04	-	05	09
PTTC	02										
DENOMINATIONAL NURSERY	05	152	161	313	-	09	09	07	-	03	10
LAY- PRIVATE PRIMARY	48	4407	4100	8507	102	243	345	255	66	15	336
LAY – PRIVATE NURSERY	47	866	901	1767	02	87	89	14	95	-	109
TOTAL	**180**	**12491**	**12563**	**25054**	**210**	**881**	**1091**	**618**	**193**	**67**	**878**

DIVISIONAL SUMMARY OF PRIMARY/NURSERY SCHOOLS, TEACHERS, PUPILS AND CLASSROOMS.

		NUMBER OF PUPILS			NUMBER OF TEACHERS			NUMBER OF CLASSROOMS			
TYPE OF SCHOOLS	NO. OF SCHOOLS	BOYS	GIRLS	TOTAL	MALES	FEMALES	TOTAL	P	SP	TEMP	T
GOVERNMENT PRIMARY	127	14780	14887	29667	180	706	886	491	100	108	699
GOVERNMENT NURSERY	67	1960	2060	4020	01	251	252	82	40	38	160
GOVERNMENT PRACT. PRIMARY	07	1186	1143	2329	05	64	69	58	-	-	58
GOVERNMENT PRACT. NURSERY	02	126	141	267	-	16	16	13	-	-	13
DENOMINATIONAL PRIMARY	80	9350	9504	18854	198	405	603	479	67	26	572
DENOMINATIONAL NURSERY	31	1208	1159	2367	02	84	86	59	07	06	72
LAY- PRIVATE PRIMARY	105	9581	9603	19184	273	566	839	514	159	46	719
LAY – PRIVATE NURSERY	104	3069	3308	6377	19	259	278	122	127	09	258
TOTAL	**523**	**41260**	**41805**	**83065**	**678**	**2351**	**3029**	**1818**	**500**	**233**	**2551**

APPENDIX II

DAILY LESSON PLAN ON ENVIRONMENTAL EDUCATION

Topic: Living things
Lesson 0ne: Differences between plants and animals
Objective: After presentation, illustration and explanation and comparative study by both teachers and pupils, by the end of the lesson at least 95% of the class should be able to state 3 out of 4 differences between plants and animals in 8minutes.
Previous knowledge: pupils have been seeing plants and animals. They have know the characteristics of living things
Instruct. Material: Ant, herbs
Time: 12:35pm-1:00 pm
Duration: 35minutes

<table>
<tr><th>STAGES</th><th>TEACHER'S ACTIVITIES</th><th>PUPILS' ACTIVITIES</th><th>DURATION</th></tr>
<tr><td>Revision and observation</td><td>The teacher presents an ant and a rooted plant. Taking each living thing at a time the asks, ñwhat and where does each live</td><td>Pupil watch keenly and name; individually and orally as appointed</td><td>5mins</td></tr>
<tr><td>Fundamental questions</td><td>Name and state any differences between plants and animals</td><td>Pupil struggle to individually state the differences</td><td>5mins</td></tr>
<tr><td>Research situation and verification of hypothesis</td><td>The teacher lists all the general characteristics of living things and asks the pupil to differentiate between an animal and a plant. The teacher moves round to check jotted down points</td><td>The pupil attempt to state the differences in a tabular form</td><td>3mins</td></tr>
<tr><td>Synthesis and stating of results</td><td>Teacher present the lesson in point form, asking questions to glean these differences</td><td>They listen keenly and try to put the facts together</td><td>4mins</td></tr>
<tr><td>Chalkboard summary</td><td>The teacher state some differences between plants and animals

<table><tr><th>Animals</th><th>Plants</th></tr><tr><td>Move from place to place.</td><td>Do not move from place to place</td></tr><tr><td>Feed on plants and animals.</td><td>Synthesize their own food from the sun</td></tr><tr><td>Response to stimulus faster.</td><td>Respond to stimulus very slowly</td></tr></table></td><td>The pupil within the stated time with the teacher put up the summary; they copy in their note books</td><td>10mins</td></tr>
</table>

	Breath in oxygen through special sensory organs / Have no special sensory organs through which can also respire		
Evaluation	The teacher asks the pupil the following questions: in a tabular form (presented in your note book) state 4 differences between plants and animals. The teacher moves round to mark the work	They tabulate their work stating the differences between plants and animals	**8mins**

DAILY LESSON PLAN ON ENVIRONMENTAL EDUCATION

Topic: Transpiration
Lesson Two: Factors that affect transpiration and how the process is checked in plants
Objective: After presentation, explanation, discussion and asking and answering of questions by both the teachers and pupils at least 95% of the class should be able to state 3 out of 6 reasons/factors that affect transpiration and at least 2 out of 4 ways by which transpiration is checked in plants, with 5 minutes by the end of the lesson.
Previous knowledge: The pupils have witnessed evaporation of water from their environment and have observed transplanted crops wither
Instruct. Material: A well-water plant and a just transplanted plant
Time: 12:35pm-1:00 pm
Duration: 35minutes

STAGES	TEACHER'S ACTIVITIES	PUPILS' ACTIVITIES	DURATION
Revision and observation	1 (A) What is transpiration? (B) In which part of the plant does this takes place? 2 why do you think plant transpire? Observe the two plants presented to you; which plant has lost more water than absorbed?	Orally, appointed pupils provide answers like losing of water from plant to surroundings; to cool the plant, leaves, etc	**5mins**
Fundamental questions	The teacher writes this question on the board. What factors affect transpiration and how do plants control this process?	Pupils ponder over the question and show anxiety to obtain the answer.	**3mins**
Research situation and verification of	The teacher poses these thought-provoking questions: 1) which plant will transpire more, the large leaf plant or the small leaf plant? 2) The higher the temperature the (higher, lower) the transpiration rate. 3) How	Pupils orally provide answers. They observe guidelines provided by the teacher and take clues to give	**7mins**

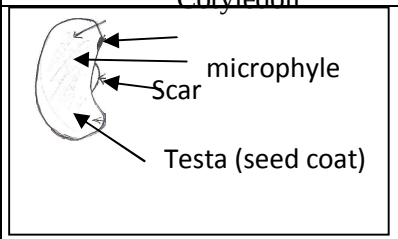
hypothesis	do you think humidity, windiness, availability of stomata and soil water affects transpiration? 4) Leaf shedding and dropping helps to curb transpiration. What other ways do plants control transpiration	reasonable responses	
Chalkboard summary	Factors affecting transpiration Leave size. Temperature of the environment Windiness Number of stomata present Amount of water present in the soil The humidity of the atmosphere How plant check transpiration Leaf shedding: leaves are lost in dry weather to reduce transpiration Leaf dropping helps to reduce water loss in hot weather Leave folding reduce lost of water Water may be stored in stems and leaves to control transpiration when water is short	Pupils copy this summary in their exercise books. They intermittently pause to ask question for better understanding	**10mins**
Evaluation	There are 6 factors that affect transpiration and one of them is the size of the leaves. Name the other 5 factors that affect transpiration In hot weather plants shed their leaves to reduce the rate of transpiration. In what other 3 ways is transpiration checked. The teacher moves round to correct work done	The pupils provide answers to the questions in their rough work books. They allow the teacher to correct their answers.	**5mins**

DAILY LESSON PLAN ON ENVIRONMENTAL EDUCATION

Topic: The seed
Lesson Three: Part of a seed
Objective: After presentation, explanation, discussion, posing and answering of questions by the end of the lesson at least 80% of the class should be able to name parts of a seed and state 3 functions of some of the stated parts in 5 minutes
Previous knowledge: Pupils have handled plants seeds and have watching them germinate
Instruct. Material: Beans seed (non germinated and germinating)
Time: 12:35pm-1:00 pm
Duration: 35minutes

CLASS: Six **AVERAGE AGE:** 10

STAGES	TEACHER'S ACTIVITIES	PUPILS' ACTIVITIES	DURATION
Revision	The teacher asks Plants with one seed leave are called what? Two seed leaves are referred to as what? State 2differences between monocots and dicots?	The pupils answer orally and individually as appointed answers may be: monocots and dicots, etc	**5mins**

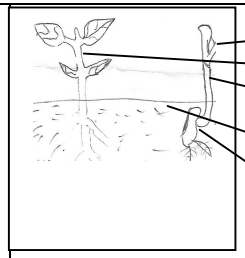
Fundamental questions	The teacher poses these questions: What are the names of the parts of a seed? What are their function	The pupils attempt answers orally as they observe the seeds	**3mins**
Research	The teacher presents two seed types ï the non- germinated and the germinated one. he then touches certain parts of each seed and ask the pupils to observe and name the parts What do you think is the function of the part you have just named?	The pupils observe keenly and attempt answering the questions pose by the teacher	**5mins**
synthesis	The teacher gives a sound explanation of the named parts. He clearly states the parts stating their individual functions. he asks and receives questions intermittently to ensure thorough follow up by pupils	The pupils listen attentively and they answer the questions posed by the teacher and they also ask their own question for clarity.	**5mins**
Chalkboard summary	Cotyledon  **Function of the Seed Part** **Seed coat:** it protects the seed from injury **Cotyledon:** it contains food which nourishes the young plant before leaves and roots operate **Scar:** it is the mark left where the seed was attached to the parent plant	The pupils copy the summary in their exercise books	**12mins**
Re-investment	The teacher asks: Name the parts of the seed you have studied Select any 3 of these parts named and state their function The teacher listens to the oral answers, give and make corrections where necessary.	Pupils answer questions individually and orally.	**5mins**

DAILY LESSON PLAN ON ENVIRONMENTAL EDUCATION

Topic: seed germination
Lesson Four: kinds of germination
Objective: After presentation, explanation, discussion, posing and answering of questions by both the teachers and pupils at least 95% of the class should be able to answer orally at least 4 out of 5 questions related to kinds of germination in 5 minutes at the end of the lesson
Previous knowledge: pupils have witnessed different types of seed germination and grow.
Instruct. Material: tins with seeds under germination, chalkboard
Time: 12:35pm-1:00 pm
Duration: 35minutes

CLASS: Six **AVERAGE AGE:** 10

STAGES	TEACHER'S ACTIVITIES	PUPILS' ACTIVITIES	DURATION
Revision and observation	The teacher present germinating seed in tins. he then ask: What do you see? Which seed is monocot or dicot? Where are these monocot and dicots located- in air or soil? The teacher listens and corrects where necessary.	The pupils curiously observe them. They attempt answers orally.	**5mins**
Fundamental questions	The teacher asks: What are the main differences between the germination types observed?	Pupils attempt oral answers.	**3mins**
Research situation and verification of hypothesis	The teacher presents germinating seeds and asks the pupils to observe them keenly. the teacher then asks: Monocots generally exhibit what kind of germination; dicots show what kind of germination?	The pupils orally attempt answers.	**5mins**
Synthesis and stating of results	The teacher states that during germination the cotyledons or seed leaves of dicots are brought out of the soil while the monocotyledon or seed leaves of monocots remain in the soil. the dicot type of germination is known as epigeal germination whereas that of the monocot is termed hypogeal germination	The pupils listen to how their contributions have led to these deductions. they feel happy	**5mins**

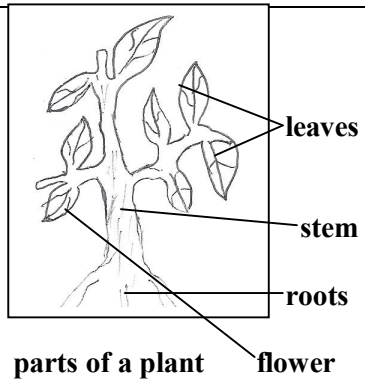
Chalkboard summary	 First foliage leaves cotyledon Epigeal germinatio Hypogeal germination Ground (soil) Cotyledon **Types of germination** There are two types of germinations namely **Epigeal germination:** the seed leaves are brought out of the soil. This is seen in dicote like beans and groundnuts leaf remains in the soil e.g maize and rice	The pupils copy this ummary in their xercise books	**12mins**
Evaluation	The teacher writes 1) Monocots and dicots exhibit two types of germination, name them? 2) Young life springs from a process of seed growth is calledé é é .. 3) Carriage of cotyledons above the soil in germination is calledé é é 4) Monocot show hypogeal germination, that of dicot is termedé é é . 5) Monocots have one seed leaf while dicots have é é é seed leaves. The teacher corrects answers where necessary	The pupils answer the questions orally.	**5mins**

DAILY LESSON PLAN ON ENVIRONMENTAL EDUCATION

Topic: The plant
Lesson Five: Parts of a plant and their functions
Objective: After presentation, explanation, discussion, posing and answering of questions by both the teachers and pupils at least 90% of the class should be able to name parts of a plant and their functions orally in 10 minutes
Previous knowledge: pupils have been seeing plants grow
Instruct. Material: an off rooted plant, chalkboard
Time: 12:35pm-1:00 pm
Duration: 35minutes

CLASS: Six **AVERAGE AGE:** 10

STAGES	TEACHER'S ACTIVITIES	PUPILS' ACTIVITIES	DURATION
Revision and observation	From our previous lesson on plant germination, we saw that plants will have 3 fundamental parts called what? Name one function of each part. the teacher corrects pupils where necessary	The pupils as appointed try to provide oral answers like roots, stems,	**5mins**

<table>
<tr><td></td><td></td><td>leaves and flowers.</td><td></td></tr>
<tr><td>Fundamental questions</td><td>The teacher presents a live off rooted flowering plant. he ask: what main part do you see what are their respective functions</td><td>The pupils observe quietly and rag their brains for answers</td><td>3mins</td></tr>
<tr><td>Research situation and verification of hypothesis</td><td>The teacher poses the following guiding questions: 1) what is that part of the plant that grows into the soil? 2) What is that part of the plant that is found in between the roots and the leaves? 3) Most plants look green; the structures that are green are known as what ? 4) For plants that produce fruits have structures that bring forth these fruits. What are the structures that bring forth these fruits?
The teacher listens to the answers and corrects those that are wrong.</td><td>Appointed pupils orally give the parts seen</td><td>5mins</td></tr>
<tr><td>Chalkboard summary</td><td> 

parts of a plant
A plant consist of 4 main parts namely: leaves, stems, roots and flowers
<table>
<tr><th>leaves</th><th>Stem</th><th>Roots</th><th>flower</th></tr>
<tr><td>Make plant food</td><td>Protection</td><td>Absorb water and mineral salt</td><td>Produce fruits and seeds for reproduction</td></tr>
<tr><td>Send out excess water from plant through transpiration</td><td>Support plants</td><td>Anchor plant</td><td></td></tr>
<tr><td>Help in breathing</td><td>Store food and water</td><td>May store plant food</td><td></td></tr>
<tr><td>May store food</td><td>Send out water</td><td>Some are medicinal</td><td></td></tr>
</table></td><td>The pupils copy these points on their note books</td><td>12mins</td></tr>
<tr><td>Evaluation</td><td>The human body is made up of parts like head, hands, and legs. Each of these parts does one or two things. In the same way name 4 parts of a plant. State the function of each part named.</td><td>Appointed pupils give oral answers. others listen to them and pick a clue on what to say should they be called</td><td>5mins</td></tr>
</table>

DAILY LESSON PLAN ON ENVIRONMENTAL EDUCATION

Topic: Pollution
Lesson Six: Air Pollution
Objective: After presentation, explanation, discussion, between the teacher and pupils, by the end of the lesson, pupils should be able to state at least 4 out of 5 air pollutants in 5 minutes
Previous knowledge: pupils have observed the air polluted with exhaust fumes, dust, odours etc.
Instruct. Material: A chart showing air pollution.
Time: 1:05pm-1:35 pm
Duration: 30minutes
ENROLMENT: **AVERAGE AGE:**

STAGES	TEACHER'S ACTIVITIES	PUPILS' ACTIVITIES	DURATION
Revision	The teacher asks the following questions: What comes out of an exhaust of a heavy ï duty truck (vehicle) particularly when it is climbing a steep hill? 2) When a bush lamp it lit, what do you observe emitted from its chimney? 3) What kind of smell do you scent from a decaying rubbish site? The teacher listens to responses	Pupils excitingly give answers as called upon to do so orally. some answers may be:	**3mins**
Observation	The teacher presents the (intentionally) unlabeled chart for observation	The pupils curiously and silently observe the respective items on the chart.	**2mins**
Fundamental Question	The teacher asks ñSay what you have seen on the chart presented to you What do you think is emitted in air?	Orally, pupils provide answers like, I can see a vehicle, a bush lamp, etc. some black gas is emitted, etc.	**3 mins**

Verification of Hypothesis	The teacher poses other thought ï provoking questions like: (1) What burns in the vehicle to enable it move? (2) What waste results from the combustion? (3) What makes the wick of a bush lamp to burn? What does one observe emitted at the chimney? When an eruption occurs what is discharged into the atmosphere? etc the teacher receive the advanced answers.	Appoint pupils orally educe answers like: petrol, smoke, kerosene, etc.	**7mins**
Chalkboard summary	The teacher writes the following summary on the chalkboard for pupils to copy. **Introduction**: Air pollution occurs when the composition of compounds in the atmosphere is altered due to poisonous gases from industries, hydrocarbon combustion, eruption and organic waste decay. **Major Air Pollutants:** 1. Motor vehicle exhaust: The burning of fuels (eg. Petrol, diesel) in cars release gases (poisonous gases) e.g. carbon monoxide which can pollutes the atmosphere. 2. Burning of organic substances: The burning of coal, gas, oils may release gases such as sulphur dioxide which are very poisonous. 3. Solid waste Disposal: Accumulation of solid waste leads to the production of strong odour, which pollutes the atmosphere. 4. Volcanic eruption: Harmful and poisonous gases such as sulphur dioxide, nitrogen dioxide are emitted into the atmosphere. Heat released thus results to rise in atmospheric temperature. 5. Poor Sanitation: Improper sanitation results in the accumulation of faeces and urine. This cause strong odour and smell thus contaminating the area.	Pupils copy the notes into their notebooks.	**10mins**
Re-investment	The teacher writes on the chalkboard: Dangerous gases may be discharged into the atmosphere from natural sources and human activities. List 5 major air pollutants in your rough work book. The teacher collects and marks the books	Pupils attempt answering the question. They pass their books for marking.	**5 mins**

DAILY LESSON PLAN ON ENVIRONMENTAL EDUCATION

Topic: Environmental Hazards
Lesson Seven: Man-made Hazards
Objective: After presentation, explanation, discussion, between the teacher and pupils, by the end of the lesson, pupils should be able to state and explain how mankind is responsible for at least 4 out of 5 man-made hazards in 7 minutes
Previous knowledge: pupils have seen dirty streams, floods, wild fires, heard of wars, etc.
Instruct. Material: A chart showing some man-made hazards e.g. pollution, floods, fire, etc
Time: 1:05pm-1:35 pm
Duration: 30minutes
ENROLMENT: **AVERAGE AGE:**

STAGES	TEACHER'S ACTIVITIES	PUPILS' ACTIVITIES	DURATION
Revision (3mins)	The teacher asks: 1. What makes some natural water sources unfit for drinking? 2. When torrential rain falls in a flat terrain, what is likely to occur? 3. What are some of the causes of fire accident at home and in the wild?	Appointed pupils endeavor to provide oral answers.	
Observation	The teacher presents a chart depicting some man-made hazards scenarios and asks the pupils to observe.	The pupils curiously and silently observe the respective items on the chart.	**2mins**
Fundamental Question	The teacher asks: Are the scenarios observed on this chart dangerous or conducive to man.	Orally, pupils provide the answers: The situations are rather dangerous to man.	**3 mins**
Verification of Hypothesis	The teacher asks: Civilization has sometimes brought with some man-made hazards like landslides, floods and fire. (1) Do you think the location of a building on a given landscape may be hazardous? How and why? (2) What caused by man results to a fire accident? (3) What are some of the causes of war?		**7mins**

Chalkboard summary	**Man-made Hazards:** Introduction Man-made hazards are environmental hazards that occur due to manôs activities. Some man-made hazards include: pollution, floods, fire, landslides, wars, etc. 1. Pollution: This occurs when man deposite or releases waste into the environment which is harmful or toxic to man himself and to other living things. These include air, soil and water pollutants. 2. Floods: these can be caused by: (i) poor construction of drainage (ii) creation of dams that may break or overflow their banks. (iii) Eroding sea or river banks. 3. Fire: Carelessness and improper management or control of fire sources may lead to loss of buildings, farmlands and even deaths of humans and animals alike. 4. Landslides: These can be caused by: (i) poor road construction with steep sides. (ii) Building on delicate slopes. (iii) Deforestation of the forest uphill. (iv) Digging of the hill for minerals such as gold, coal, etc. 5. Wars: Greed for wealth and fame, the desire to avenge evil, intolerance, etc. result to wars which in turn destroy buildings, vegetation, fauna and people.	Pupils copy the notes into their notebooks.	**10mins**
Re-investment	Mankind is behind some of his plight and great sufferings. Outline 5 man-made hazards (do this work in your rough books)	The pupils do the given exercise. They then allow the teacher to correct the work.	**5 mins**

DAILY LESSON PLAN ON ENVIRONMENTAL EDUCATION

Topic: Waste disposal
Lesson eight: Organic Waste disposal
Objective: After presentation, explaination and demonstration by the teacher, by the end of the lesson, pupils should be able to state 3ways of disposing refuse within 5 minutes.
Previous knowledge: pupils have taken part in disposing waste and witnessed waste being disposed by others.
Instruct. Material: Chart and dustbin.
Time: 12:35pm-1:00 pm
Duration: 35minutes
Enrolment: 30
Average Age:

STAGES	TEACHER'S ACTIVITIES	PUPILS' ACTIVITIES
Revision (3mins)	The teacher asks: cocoyam, plantain peelings and leafy excess destined to be thrown away is generally referred to as what? Dry grass and leaves may be gotten rid of in which way? Decaying vegetation and bodies of dead animals is converted into what?	Appointed pupils provide answers orally like: kitchen refuse, we burn them, manure
Observation(2 mins)	The teacher presents a chart showing ways of disposing refuse. He also presents a real dust bin. He asks the pupils to observe them.	Pupils observe keenly
Fundamental questioning(3 mins)	The teacher poses the question: the items presented are used for what purpose? The teacher comments as answers are educed from pupils	Orally, an appointed pupil may answer thus: to dispose waste.
Verification of hypothesis(5 mins)	More intriguing questions are asked by the teacher: Why do we ensure that a rubbish pit and a dust bin has a lid? Why do you think an incinerator is designed with a chimney component? Where appropriate is dust bin emptied?	Pupils try to give oral questions like: to prevent the spread of diseases and odour, to send toxic fumes far off, etc.

Chalkboard Summary(12 mins)	The teacher put this summary on the chalkboard. Introduction: the act of pupil throwing rubbish(waste papers, old rags, fruit peelings,etc) anywhere is not good because it leads to health hazards. To prevent this proper waste disposal as discussed below is advised: 1) Refuse dumps or pits may be dug or considerable distance away from the house. The council may provide deep pits where garbage is transported in trucks and thrown in to them.. this is just what HYSACAM is doing in the Buea Municipality. 2) Compositing may be done. Here, refuse of vegetable matter is allowed to decay to form humus which is spread on the soil as fertilizers. 3) Incinerating or burning: Here, refuse is collected into an incinerator and burnt far away from homes because the gases produced may cause air pollution. The teacher moves round to ensure that notes are well copied.	The pupils copy notes into their notebooks.
Re-investment(5 mins)	Proper waste disposal enhances good health. 1) State 3 ways by which organic wastes can be properly disposed. (do this in your rough work book). 2) Explain how each of the stated ways is carried out.teacher marks the books after work has been done.	Pupils try to do this exercise in their roughwork books. They then, pass the books for marking.

APPENDIX III

PLAN DE LEÇON QUOTIDIENNE SUR L'ÉDUCATION ENVIRONNEMENTALE

Sujet : Les êtres vivants
Leçon une : différences entre les plantes et les animaux
Objectif : Après la présentation, l'illustration, explication et lôétude comparative par les enseignants et les élèves, à la fin de la leçon au moins 95 % de la classe devraient être capable de faire 3 sur 4 différences entre les plantes et les animaux en 8minutes.
Connaissance Précédente : les élèves ont vu les plantes et les animaux. Ils connaissent déjà les caractéristiques des êtres vivants
Matériel pédagogique: fourmi, herbes
Heure : 12:35-13:00
Durée : 35minutes

Classe: 6 Age moyenne: 10

ETAPES	ACTIVITÉS DE L'ENSEIGNANT	ACTIVITÉS DES ÉLÈVES
Révision et observation (5mins)	L'enseignant présente une fourmi et une plante arrachée. Prenant les deux un après lôautre, il demande : « ou se trouve les deux êtres vivants»	Les élèves regardent avec attention et répondre oralement lôun après lôautre.
Questions fondamentales (5mins)	Nommez et établissez les différences entre les plantes et les animaux	Les élèves se démènent pour répondre à la question individuellement
Situation de la recherche et la vérification de l'hypothèse (3mins)	Le professeur fait la liste de toutes les caractéristiques générales des êtres vivants et demande aux élèves d'établir la distinction entre un animal et une plante. Le professeur fait un tour de la classe pour vérifier les points notés par les élèves.	Les élèves tentent à établir les différences sous forme de tableau

<table>
<tr><td></td><td></td><td></td></tr>
<tr><td>Synthèse et les réponses (4mins)</td><td>Le professeur présente la leçon en donnant les points, puis il poser des questions afin de glaner les différences</td><td>Ils écoutent avec attention et essaient de réunir les faits</td></tr>
<tr><td>Tableau récapitulatif (10mins)</td><td>L'enseignant établit des différences entre les plantes et les animaux
<table>
<tr><th>Animals</th><th>Plants</th></tr>
<tr><td>Se déplacer d'un endroit à l'autre.</td><td>Ne peuvent pas se déplacer d'un endroit à l'autre</td></tr>
<tr><td>Se nourrissent de plantes et d'animaux.</td><td>Synthétisent leur propre nourriture du soleil</td></tr>
<tr><td>Réponse au stimulus plus rapide.</td><td>Réponse au stimulus très lente</td></tr>
<tr><td>Respirent de l'oxygène par l'intermédiaire des organes sensoriels</td><td>Pas dôorganes sensoriels spéciaux par la quôelles</td></tr>
</table></td><td>dans le délai précisé, les élèves et l'enseignant font la résumé, puis les élèves copient dans leurs cahiers</td></tr>
</table>

	spéciaux peuvent aussi respirent	
Évaluation (8mins)	L'enseignant pose aux élèves les questions (qui sont dans leurs cahiers) suivantes, sous forme de tableau ; Établissez 4 différences entre les plantes et les animaux. L'enseignant fait un tour de la classe pour corriger leurs réponses.	Ils répondent a la question sous forme de tableau et indiquent les différences entre les plantes et les animaux.

PLAN DE LEÇON QUOTIDIENNE SUR L'ÉDUCATION ENVIRONNEMENTALE

Sujet : Transpiration
Leçon deux: Les facteurs qui influencent la transpiration et la méthode pour vérifier le processus dans les plantes
Objectif : Après la présentation, lœxplication, la discussion et les réponses aux questions par les enseignants et les élèves, au moins 95 % de la classe doit être incapable de expliquer 3 sur 6 raisons et les facteurs qui influencent la transpiration et au moins 2 sur 4 moyens par lesquelles la transpiration est vérifiée dans les plantes, en 5 minutes vers la fin de la leçon.
Connaissances précédente : les élèves ont témoigné à l'évaporation dœau dans leur environnement et ont observé des cultures transplantés qui se fanent
Matériel pédagogique: Une plante bien arrosée et une plante transplantée
Heure : 12:35-13:00

Durée : 35minutes

Classe : 6 Age moyenne : 10

<table>
<tr><th>ETAPES</th><th>ACTIVITÉS DE L'ENSEIGNANT</th><th>ACTIVITÉS DES ÉLÈVES</th></tr>
<tr><td>Révision et observation (5mins)</td><td>1 (A) qu'est-ce qui est la transpiration ? (B) dans quelle partie de la plante elle se fait ?
2 pourquoi vous pensez quûne plante transpire ?
Observer les deux plantes présentés à vous ; quelle plante a perdu plus d'eau qu'absorbé ?</td><td>Par voie orale, élèves nommés, fournissent des réponses.</td></tr>
<tr><td>Questions fondamentales (5mins)</td><td>L'enseignant écrit cette question au tableau ;
Quels facteurs influencent la transpiration et comment les plantes contrôler ce processus ?</td><td>Les élèves s'interrogent sur la question et puis, ils veulent obtenir la réponse avec impatient.</td></tr>
<tr><td>Situation de la recherché et la verification de l’hypothèse (3mins)</td><td>L'enseignant pose ces questions de réflexion: 1) quelle plante transpire la plus, la plante à grandes feuilles ou la plante à petites feuilles ? 2) plus la température élevée, la plus (élevée ou baissée) le taux de transpiration. 3) Comment vous pensez que l'humidité, le venteux, la disponibilité des stomates et l'eau du sol affectent la transpiration ? 4) Feuille mort et de larguer contribue à freiner la transpiration. Quelles autres façons les plantes contrôlent la transpiration</td><td>Les élèves fournissent des réponses oralement. Ils observent les lignes directrices fournies par l'enseignant et prennent des indices pour donner des réponses raisonnables</td></tr>
<tr><td>Resume au tableau noir</td><td><table><tr><th>Les facteurs de la transpiration</th><th>Comment les plantes réduisent la transpiration</th></tr><tr><td>la taille de feuille.
Température de l'environnement
Venteux
Nombre de stomates présents
Quantité d'eau présente dans le sol
Le taux d'humidité de l'atmosphère</td><td>Chute des feuilles : les feuilles sont perdues suite a la saison sèche afin de réduire la transpiration
Chute de feuilles permet de réduire la perte d'eau quant il fait chaud
Pliage de feuille réduit la perte d'eau
L'eau peut être réservée dans les tiges et les feuilles pour contrôler la transpiration quand l'eau est courte</td></tr></table></td><td>Les élèves copient ce résumé dans leurs cahiers d'exercices. Une petite pause se poursuit pour poser des questions afin de mieux comprendre</td></tr>
</table>

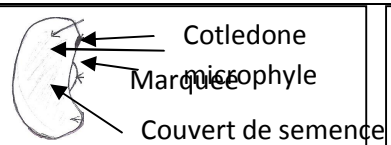
Evaluation (8min)	Il y a 6 facteurs qui influencent la transpiration et l'un d'entre eux est la taille des feuilles. Nommez les 5 autres facteurs qui influencent la transpiration ? En saison sèche, les plantes perdent leurs feuilles afin de réduire le taux de transpiration. Dans quelles autres 3 façons transpiration est vérifiée ? L'enseignant fait un tour de la classe pour corriger les travaux		Les élèves fournissent des réponses aux questions dans leurs cahiers de brouillon. Ils permettent à l'enseignant de corriger leurs réponses.

PLAN DE LEÇON QUOTIDIENNE SUR L'ÉDUCATION ENVIRONNEMENTALE

Sujet : Les semences
Leçon trois : Partie d'une semence
Objectif : après la présentation, lœxplication, la discussion, les questions et les réponses, à la fin de la leçon au moins 80 % de la classe devrait être capable de nommer les parties d'une semence et 3 fonctions de certaines parties énoncées en 5 minutes
Connaissances Précédentes : les élèves sont venus au contact avec des semences et les ont vus germer.
Matériel pédagogique: semences dœHaricots (non germées et en germination)
Heure : 12:35-13:00
Durée : 35minutes

Classe: 6 Age moyenne: 10

ETAPES	**ACTIVITÉS DE L'ENSEIGNANT**	**ACTIVITÉS DES ÉLÈVES**
Révision et observation (5mins)	l'enseignant demande : Les plantes a une seule semence sont appelées quoi ? Les plante a deux semences sont désignés comme quoi ? 2Differences entre monocotylédones et dicotylédones?	Les élèves répondent oralement et individuellement selon lœordre ; les réponses peuvent être ; monocotylédones ou dicotylédones, etc.

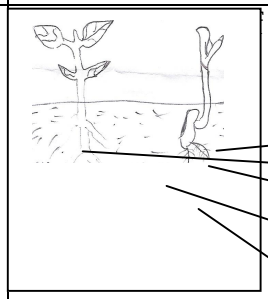
Questions fondamentales (5mins)	L'enseignant pose ces questions : Quels sont les parties d'une semence? Quelles sont leurs fonctions ?	Les élèves tentent à donner les réponses oralement qu'ils observent dans les semences.
Research (5mins)	L'enseignant présente deux types de semences ; semence non - germée et semence en germination. Il touche certaines parties de chaque semence et demandez aux élèves d'observer et nommer les parties. Vous, quelle est la fonction de la partie, que vous avez venez de nommé ?	Les élèves observent parfaitement et essaient de répondre aux questions posées par l'enseignant
synthesis (5mins)	L'enseignant donne une bonne explication des parties nommées. Il énonce clairement les parties en indiquant pour chacune leurs fonctions spécifiques. Il demande et reçoit les questions par intermittence pour assurer une compréhension approfondie chez les élèves	Les élèves écoutent attentivement et ils répondent aux questions posées par l'enseignant et ils demandent également leurs propres questions pour plus de clarté.
Tableau récapitulatif (12mins)	 Fonction de la couverte de semence : il protège la semence des blessures Cotylédon : il contient des aliments qui nourrissent la jeune plante avant la sortie des feuilles et des racines. Marque : c'est la gauche marque où la semence a été attachée à la plante-mère	Les élèves copient le résumé dans leurs cahiers d'exercices
Revision (5mins)	L'enseignant demande les étudiants de : Nommer les parties de la semence que vous avez étudiée Sélectionner les 3 de ces parties et donner leur fonction L'enseignant écoute aux réponses orales, donnée et fait les corrections si nécessaire.	Les élèves répondent aux questions individuellement et oralement.

PLAN DE LEÇON QUOTIDIENNE SUR L'ÉDUCATION ENVIRONNEMENTALE

Sujet : germination des semences
Leçon quatre: types de germinations
Objectif : Après la présentation, lœxplication, la discussion et les réponses aux questions posées par lœnseignant et les élèves au moins 95 % de la classe devrait être capable de répondre oralement au moins à 4 sur 5 questions relatives aux types de germinations en 5 minutes vers la fin de la leçon
Connaissances Précédentes : les élèves connaissent déjà les différents types de germinations par rapport aux semences et leur germination.
Matériel pédagogique: une boîte de semences en germination et le tableau noir
Heure : 12:35-13:00
Durée : 35minutes

Classe: 6 Age moyenne : 10

ETAPES	ACTIVITÉS DE L'ENSEIGNANT	ACTIVITÉS DES ÉLÈVES
Révision et observation (5mins)	L'enseignant présente les semences en germinations qui sont dans la boîte. Alors il demande aux élèves : Que voyez-vous ? Les semences sont-elles monocotylédones ou dicotylédones ? Où sont ces monocotylédones et dicotylédones situés - dans l'air ou le sol ? L'enseignant écoute et fait des corrections dans le cas échéant.	Les élèves les observent curieusement. Ils tentent de répondre par voie orale.
Questions fondamentales (5mins)	L'enseignant demande : Quelles sont les différences spécifiques entre les types de germinations observées?	Les élèves essaient de donner les réponses oralement.
Research situation and verification of hypothesis (5mins)	L'enseignant présente les semences en germinations et demande aux élèves de les observer avec attention. l'enseignant demande alors : Monocotylédones présentent généralement quel genre de germination ? dicotylédones montrent quel genre de germination ?	Les élèves tentent de répondre par voie orale.

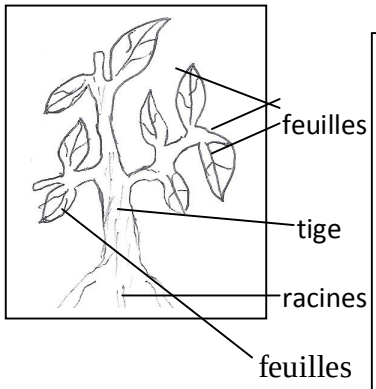
Situation de la recherché et la verification de l'hypothèse (3mins)	L'enseignant déclare que durant la germination des cotylédons, les semences de dicotylédones se repoussent du sol alors que les monocotylédones restent dans le sol. la germination de dicotylédone est connue comme la germination épigée tandis que celle des monocotylédones est connue comme la germination hypogée	Les élèves écoutent et donnent leurs contributions.ils se sentent heureuses
Resume au tableau noir (12mins)	feuilles cotylédonaires.  Premier feuillage feuilles cotylédr Epigeal germination Hypogeal germination Ground (soil) Cotyledon Types de germinations Il existe deux types de germinations à savoir Épigés germination : les feuilles de semence sont portées sur le sol. Cela se voit chez les dicotes comme les haricots et feuille d'arachides demeure dans le sol par exemple maïs et du riz.	Les élèves copient le résumé dans leurs cahiers d'exercices
Evaluation (5mins)	L'enseignant écrit 1) Monocotylédones et dicotyledones, presentent deux types de germinations. Nommez-les ? 2) la Jeune vie qui ressorts d'un processus de croissance des semences est appelée..... ?. 3) Transport de cotylédons au-dessus du sol de la germination est appelée..... 4) Monocotylédones montrent la germination hypogée, et celle des dicotylédones est appelée..... 5) Monocotylédones ont une feuille de semences, dicotylédones ont..... feuilles semence. ? L'enseignant corrige les réponses dans le cas echeant.	Les élèves répondent aux questions oralement.

PLAN DE LEÇON QUOTIDIENNE SUR L'ÉDUCATION ENVIRONNEMENTALE

Sujet : La plante
Leçon cinq: Parties d'une plante et leurs fonctions
Objectif : Après que la présentation, lœxplication, la discussion et les réponses aux questions par les enseignants et les élèves, au moins 90 % de la classe peuvent distinguer les parties d'une plante et leurs fonctions oralement en 10 minutes
Connaissances précédentes : les élèves ont déjà vu les plantes en germinations
Matériel pédagogique: une large plante avec sa racine et le tableau noir
Heure : 12:35-13:00
Durée : 35minutes

Classe: 6 Age moyenne: 10

ETAPES	ACTIVITÉS DE L'ENSEIGNANT	ACTIVITÉS DES ÉLÈVES
Révision et observation (5mins)	De notre leçon précédente sur la germination des plantes, nous avons vu que les plantes ont 3 parties fondamentales appelées quoi ? Dites la fonction de chaque partie. l'enseignant corrige les élèves si nécessaire.	Les élèves nommés essaient de fournir des réponses orales ; comme des racines, des tiges, des feuilles et des fleurs.
Questions fondamentales (5mins)	L'enseignant présente des plantes avec leurs racines. Il demande : quelle partie principale vous voyez ? quels sont leurs fonctions respectives ?	Les élèves observent tranquillement et poussent leurs cerveaux pour trouver des réponses
Situation de la recherché et la verification de l'hypothèse (3mins)	L'enseignant pose les questions suivantes comme guide: 1) quelle est la partie de la plante qui pousse dans le sol ? 2) Quelle est la partie de la plante qui se trouve entre les racines et les feuilles ? 3) La plupart des plantes sont verts ; les structures qui sont vertes sont connues comme quoi ? 4) les plantes qui produisent des fruits ont des structures qui apportent ces fruits. Quelles sont les structures qui présenter ces fruits ? L'enseignant écoute aux réponses et corrige ceux qui sont mauvais.	Les élèves nommés donnent les réponses oralement.

<table>
<tr><td></td><td></td><td></td></tr>
<tr><td>Resume au tableau noir</td><td>


parties d'une fleur de la plan

Une plante se compose de 4 pièces principales à savoir : feuilles, tiges, racines et fleurs
<table>
<tr><th>leaves</th><th>Stem</th><th>Roots</th><th>flower</th></tr>
<tr><td>fournissent alimentaires pour la plante</td><td>Protection</td><td>Absorbent l'eau et des sels minéraux</td><td>Produire des fruits et des semence pour la reproduction</td></tr>
<tr><td>disparaissent des excès d'eau de la plante par transpiration</td><td>Soutenir des plantes</td><td>Souteneurs principaux</td><td></td></tr>
<tr><td>Aident à respirer</td><td>Conservent le nourritue</td><td>Conservent le nourriture</td><td></td></tr>
</table>
</td><td>Les élèves copient ces points dans leurs cahiers</td></tr>
<tr><td>Evaluation (5mins)</td><td>Le corps humain est composé de pièces comme la tête, les mains et les jambes. Chacune de ces parties a une ou deux choses. De la même façon, nommez 4 parties d'une plante. nommez la fonction de chaque partie énonce</td><td>les élèves donnent des réponses orales. d'autres les écoutent et essaie trouver une réponse, si par hasard il est nomme.</td></tr>
</table>

PLAN DE LEÇON QUOTIDIENNE SUR L'ÉDUCATION ENVIRONNEMENTALE

Sujet : La pollution
Leçon Six : pollution de lâair
Objectif : Après la présentation, l'illustration, explication et lâétude comparative par les enseignants et les élèves, à la fin de la leçon, les élèves doivent être capables de donner 4 sur 5 types dâagents de pollution en 5minutes.
Connaissance Précédente : les élèves connaissent déjà l'air pollué par les fumées d'échappement, poussières, odeurs, etc..
Matériel pédagogique: un dessin démontant lâair pollué
Heure : 1:05pm-1:35 pm
Durée : 30minutes

Classe: 6 Age moyenne: 10

ETAPES	ACTIVITÉS DE L'ENSEIGNANT	ACTIVITÉS DES ÉLÈVES
Révision et observation (5mins)	L'enseignant pose des questions: quâest-ce qui sort dâun tuyau dâéchappement de camion lourd surtout en montant dâune pente ? 2) lorsquâon allume une lampe, quâest-ce que vous observer ? 3) quelle odeur sentez-vous dâune ordure pourrit ? Lâenseignant écoute aux réponses.	Les élèves regardent avec attention et répondre oralement lâun après lâautre.
Questions fondamentales (5mins)	Lâenseignant montre le dessin aux élèves	Les élèves observent le dessin avec attention
Situation de la recherche et la vérification	Lâenseignant demande : dites ce que vous avez observe dans le dessin.	Les élèves répondent aux questions selon se quâils ont observe dans le dessin.

de l'hypothèse (3mins)	A votre avis, quêest-ce qui est émis a lêair.	
Synthèse et les réponses (4mins)	Lêenseignant pose également des difficiles : quêest-ce qui brule dans la voiture pour quêelle marche? 2) quêest-ce qui est émis suite a la brulure ? 3) quêest-ce qui fait que la mèche d'une lampe du buisson brûle ? quêest-ce qui est émis a lêatmosphère ? lorsquêil ya une éruption, quêest-ce qui est émis a lêatmosphère ? etc.	Les élèves répondent aux questions un après lêautre
Tableau récapitulatif (10mins)	Lêenseignant écrit sur le tableau-noir. **<u>Introduction</u>** : La pollution de l'air se produit lorsque la décomposition de composés dans l'atmosphère est changée dû aux gaz toxiques d'industries, combustion de l'hydrocarbure, éruption et la décomposition du gaspillage organique. 1. Gaz d'échappement du véhicule automobile: Le brûler de combustibles (eg. Essence, l'huile) dans les voitures émis les gaz (gaz toxiques) par exemple monoxyde du carbone qui peut nuire a l'atmosphère.	Les élèves copient sur leurs cahiers.

	2. brûler de substances organiques: Le brûle de charbon, de gaz, et d'huile peuvent émettre des gaz notamment dioxyde du sulfure qui est très toxique. 3. Disposition de déchets: Accumulation de déchets entraine à la production d'odeur forte qui pollue l'atmosphère. 4.éruption volcanique: Gaz malfaisants et toxiques tels que le dioxyde du sulfur, le dioxyde de l'azote sont émis a l'atmosphère. La chaleur émis provoque donc l'élévation de la température atmosphérique. 5. Les installations sanitaires médiocres: l'accumulation de fécales et d'urine entrainent à l'installation sanitaire médiocre. cela provoque une forte odeur et la contamination de l'environnement.	
Évaluation (8mins)	L'enseignant écrit sur le tableau: Les gaz toxiques peuvent être émis à l'atmosphère par les activités humaines et les sources naturelles. donnez 5 agents de	Ils répondent aux questions sur leurs cahiers.

	pollution de l'air dans votre livre.	

PLAN DE LEÇON QUOTIDIENNE SUR L'ÉDUCATION ENVIRONNEMENTALE

Sujet : Les risques environnementaux
Leçon sept: les risques artificiels
Objectif : Après la présentation, lœxplication, la discussion et les réponses aux questions par les enseignants et les élèves, les élèves doivent être capables de donner et expliquer au moins 4 sur 5 activités humaines qui sont susceptibles de nuire a lœnvironnement.
Connaissances précédente : les élèves connaissent déjà les ruisseaux sales, les inondations, les incendies etc.
Matériel pédagogique: Une dessine démontrant les activités humaines nuisibles à lœnvironnement.
Heure : 1:05-1:35
Durée : 30minutes

Classe : 6 Age moyenne : 10

ETAPES	ACTIVITÉS DE L'ENSEIGNANT	ACTIVITÉS DES ÉLÈVES
Révision et observation (5mins)	Lœnseignant pose de questions : 1 Qu'est-ce qui polluent certaines sources dœaux naturelles ? 2 Apres la pluie torrentielle dans un terrain plat, quœst-ce qui se présent? 3 Quelles sont les causes dœincendies à la maison et à la forêt ?	Par voie orale, les élèves nommés, fournissent des réponses.
Questions fundamentals (5mins)	L'enseignant présent un dessin qui démontrent les activités humaines qui nuire a lœnvironnement.	Les élèves regardent et observent le dessin avec toute tranquillité et attention
Situation de la recherché et la vérification de l'hypothèse	Lœnseignant demande : les activités démontres dans ce dessin, sont-elles dangereuses ou favorables à lœhomme.	Les élèves répondent que ces activités sont dangereuses.

(3mins)		
Resume au tableau noir	Introduction Les risques artificiels sont des risques environnementaux qui se produisent suite aux activités humaines. 1. Pollution Elle se produit lorsque les déchets nuisibles a la sante humaine et les vivres sont jettes ou déposes a lôenvironnement par lôhomme. A savoir ; les agents de polluant de lôair, du sol, et de lôeau. 2. Lôinondation Elle est provoquée par : (1) la construction médiocre de drainage, (2) la construction des barrages faible qui peuvent sortir de son lit. (3) les bords des mers ou rivières érodant (4) lôinsouciance et la mal gestion ou contrôle des sources de feu peut provoquer les détruites des bâtiments, des champs et même la mort des humains et des animaux. 3. Les glissements de terrain Ceux-ci peuvent être causés par: (i) construction de route médiocre avec les côtés escarpés. (ii) Construction sur les inclinaisons délicates. (iii) Déboisement de la forêt en colline. (iv) Creusement de la colline pour les minéraux notamment l'or, charbon etc 5. Les guerres: l'avidité pour la richesse et la renomme, le désir de venger le mal, l'intolérance, etc entrainent les guerres qui par conséquence détruisent des bâtiments, des végétations, de la faune et de la population.	Les élèves copient dans leurs cahiers d'exercices. Et lôenseignant Corrige leur travail.
Evaluation (8min)	Lôhomme est à la tête des détresses et des problèmes majeurs : Ecrivez les cinq activités humaines qui nuire a lôenvironnement. (dans votre cahier)	Les élèves fournissent des réponses aux questions dans leurs cahiers de brouillon. Ils permettent à l'enseignant de corriger leurs réponses.

PLAN DE LEÇON QUOTIDIENNE SUR L'ÉDUCATION ENVIRONNEMENTALE

Sujet : l'élimination des déchets
Leçon eight : Élimination de déchets organique

Objectif : Après la présentation, explication et démonstration par l'enseignant, à la fin de la leçon, les élèves doivent êtres capables de donner 3 méthodes d'élimination des déchets dans 5 minutes.

Connaissances Précédentes : les élèves ont pris part à l'élimination des déchets et ont vu des déchets éliminés par les autres..
Matériel pédagogique: un dessin et une poubelle
Heure : 12:35pm-1:00 pm
Durée : 35minutes

Classe: 6 Age moyenne: 10

ETAPES	ACTIVITÉS DE L'ENSEIGNANT	ACTIVITÉS DES ÉLÈVES
Révision et observation (5mins)	L'enseignant demande : cocoyam, pelures de banane plantain et Feuilles, destinés à être jeté est généralement appelé quoi ? les Feuilles et les herbes sèches peuvent être débarrassées de quelle façon ? Décomposition de la végétation et les organes des animaux morts sont convertis en quoi ?	Les élèves nommé répondent aux questions oralement comme : déchets domestique, nous les brûlons, fumier…
Questions fondamentales (5mins)	L'enseignant présente un dessin montrant les moyens d'élimination des déchets. Il présente également une poubelle. Il demande les élèves dôobserver.	Les élèves observent avec attention
Research (5mins)	L'enseignant pose la question suivante : les éléments présentés sont utilisés dans quel but ? Lôenseignant fait des commentaires sur les réponses fournies par les élèves.	Un élève donne la réponse a la question, par voie orale.

synthesis (5mins)	l'enseignant pose une autre question : Pourquoi les poubelles et le bac à ordure a un couvercle ? Pourquoi pensez-vous que l'incinérateur est conçu avec une composante de la cheminée ? Les ordures sont élimines ou ?	Élèves tentent de donner des réponses par voie orale comme : pour prévenir la propagation de maladies et d'odeur, etc..
Tableau récapitulatif (12mins)	L'enseignant écrit sur le tableau noir. **Introduction** : Lôacte de jeter des ordures (les papiers, les loques, pelures de fruits, etc.) n'importe où n'est pas bon parce qu'elles provoquent des risques a la santé. Pour en éviter, les méthodes pour bien éliminer les déchets sont si après : 1) la création des ordures dépotoirs ou fosses éloigner de la maison. Le Conseil peut prévoir des fosses profondes dans lesquelles les ordures seront jetées. Voici ce que fait HYSACAM dans la municipalité de Buea. 2) La Composition peut être conçue. Ici, les matières végétales sont accueilli et laisses en vue de la décomposition aboutissant a la formation dôhumus, utilise comme lôengrais. 3) Incinération ou le brûlage : ici, les herbes sont recueillies dans un incinérateur et brûlé loin des maisons, car les gaz produits peuvent provoquer une pollution atmosphérique. L'enseignant fait autour de la classe pour s'assurer que les notes sont bien copiées.	Les élèves copient dans leurs cahiers d'exercices
Revision (5mins)	Une bonne élimination des déchets favorise la bonne santé. 1) Nommez trois méthodes par lesquelles les déchets organiques peuvent être bien éliminés. (dans votre cahier). 2) Expliquer comment chacun des méthodes énoncées est effectuée. Lôenseignant corrige leurs cahiers..	Les élèves répondent a ces questions dans leurs cahiers, après ils les soumettent pour la correction.

DEPARTMENT OF ARTS EDUCATION
UNIVERSITY OF NIGERIA NSUKKA

Prof. Uju C. Umo
Head of Department
08038944857
E-Mail: hod.artseducation.unn.edu.ng

Our Ref. UN/DAE/B.2 **DATE: 5 October, 2012**

The Divisional Delegate,
Basic Education.

Dear Sir,

A LETTER OF INTRODUCTION

The bearer of this note is a postgraduate student in the Department of Arts Education, university of Nigeria, Nsukka. The Student registration number is PG/Ph.D/10/57722. She is carrying out a Ph.D research project in the department on Effect of Language of Instruction on Pupils Attitude and Achievement in Environmental Education in Cameroon.

The purpose of this letter of introduction is to enable her to get assess to your schools to carry out the experiment and administer the tests to your pupils.
Any aid will be highly appreciated.

Thank you.

Yours faithfully,

Professor Uju C. Umo
Head of Department

APPENDIX V

Table of Specification for Environmental Education Achievement Test

Environmental Education	Levels in Blooms Taxonomy		
Topics from EE scheme of work to be treated for the study	**# of test items under Knowledge and its % tage**	**# of test items under Comprehension and its % tage**	**Total**
1. Living Things	3 (1, 2, 3) 9.37 %	1(18) 3.13%	4
2. Transpiration	4 (7, 8, 9, 19) 12.5 %	------	4
3. The Seed	4 (6, 10, 11, 12) 12.5 %	------	4
4. Seed Germination	4 (13, 14, 15, 16) 12.5 %	------	4
5. The Plants	4 (4, 5, 6, 20) 12.5 %	-------	4
6. Pollution	2 (26, 28) 6.25%	2 (27, 29) 6.25%	4
7. Environmental Hazards	3 (20, 30, 31) 9.37%	1 (22) 3.13%	4
8. Waste Disposal	2 (24, 25) 6.25%	2 (33, 32) 6.25%	4
Grand Total	81.24 +	18.76 = 100%	32

The above table shows the distribution of the achievement test items under the first two levels of blooms taxonomy (Knowledge and Comprehension). This are the two levels mostly tested at the primary level of education because of the ages of the pupils. The question numbers in brackets reflects the numbering on the achievement test items to serve for pre-test. The table shows the number of test items formulated from each lesson to be taught and each level of the objective it is testing according to blooms taxonomy of educational objectives.

SCIENCE ii. ENVIRONMENTAL EDUCATION

CLASSES ONE AND TWO

OBJECTIVES	CONTENT
Pupils will be able to: • instil awareness and the appreciation of the immediate environment.	**The Immediate Environment** • Home, School, Farms, Hills, Valleys, Streams
• develop awareness and appreciation of plants. • develop skills in the conservation of plants/flowers. • Conduct simple experiments on trees, flowers and seeds	PLANTS • Trees – importance; Conservation of trees • Flowers – importance; Conservation of flowers • Seeds – uses, and seeds conservation
• state, appreciate and to develop skills in animals care and protection.	**Animals** • Types of animals, Domestic animals, Wild animals • Domestic/wild animals food/habitat/care.
• appreciate and care for parts of their bodies.	**Parts of the body and care** • Parts of the body, Personal body hygiene
• develop skills in keeping their immediate environment, clean and beautify them.	**Care of the Environment** • Cleaning in the home (toilets, kitchen, lawn etc) • Classroom care (sweeping, dusting, decoration). • Compound care (sweeping, cleaning, growing flowers).
• Appreciate the importance of water and to • State uses of water and care • Qualities of good water. • Conduct experiments on good and bad drinking water.	**Water** • Water (sources and uses) • Qualities of good drinking water, Care of water
• identify and appreciate man-made features. • differentiate between man-made and the physical environment.	**Man-Made Environment** • Settlements (urban/rural) • Roads, Airport, Seaports, Parks.
• identify the different types of wastes. • identify various methods of disposing waste.	**Disposal of waste** • Types of waste, • Types of bins
• name the various seasons in their environment and the various activities carried out.	**Seasons** • Dry season – activities carried out • Rainy season – activities carried out
• identify the different soil types and their importance. • Develop skills on how to conserve and preserve the soil.	**Soil:** • Types of soil – clay soil, loam soil etc. • Importance of soil • Animals that live in the soil, Conservation of soil.
• identify and appreciate the various food crops in the locality. • develop skills in growing some local food crops.	**Food-crops** • Types of local food-crops • How and when to grow.
• identify and name common diseases.	**Some Common Diseases** - Malaria, chicken pox, Typhoid, Scabies, Measles, Mumps
• develop skills in preventing some common diseases.	**Prevention of the diseases:** - Malaria, chicken pox, typhoid, scabies, measles, mumps
• identify and name some living and non-living things and to differentiate their characteristics.	• Elementary notions of living and non-living things. • Living things: Trees, Animals, Insects. • Non-living things: Rocks, Furniture, Utensils etc.

CLASSES THREE AND FOUR

OBJECTIVES	CONTENT
Pupils will be able to: • identify the characteristics of living and non-living things.	• Living and Non living things and their characteristics • Characteristics of living things:- • Characteristics of non-living things.
• name the seasons of their environment and the effect on both plants and animals	Seasons and their effects on plants and animals • The different seasons • Their effects on plants and animals.
• identify different soil types. • develop skills in conserving their soil.	Kinds of soil and soil conservation • Kinds of soil • Conservation of soil.
• develop an interest in the growing of vegetables and flowers. • on the case of vegetables and flowers gardening.	Gardening • Vegetable gardening • Flowers gardening
• develop skills in the conservation and protection of plants.	Plant conservation • Importance of plant conservation • Methods of plants conservation.
• know the different types of grasses and uses.	Grasses • Types and uses of grasses
• identify some water creatures, their uses to the environment and to develop skills to conserve them.	Water creatures, uses and conservation.
• identify where animals eat and live. • develop skills on animal care.	Animals food, habitat and care.
• develop health skills that can help them avoid diseases.	Health Education • Care of the various body parts. • Immediate environmental care.
• identify various health foods and their classifications.	Food and Nutrition • Health foods and classification
• identify dangerous practices that can destroy our environment. • develop skills on how to avoid such dangers.	Dangers in the Environment
• identify harmful and useful insects. • develop skills on how to encourage the development of harmful insects.	Harmful/useful insects

CLASSES FIVE AND SIX

OBJECTIVES	CONTENT
Pupils will be able to: • effectively observe weather by using different weather instruments.	**Weather observation** Different instruments for the observation of weather.
• identify the consequences of pollution in the environment. • develop skills in the prevention of pollution.	**Pollution** 1. Types of pollution (water, soil, air) 2. Prevention of various pollution
• identify types of matter in their vicinity. • know how matter is used for manufacturing things for mans use.	**Matter and the Environment:** • Types of matter and their properties.
• know the various forest and animals reserves in Cameroon.	Forest and Park reserves • Forest reserves • Animal reserves.
• state the relationship between respiration and plants, and transpiration and animals. • conduct experiments on respiration and transpiration	Respiration and the Environment • Respiration and its importance to plants • Transpiration its importance to man in his environment.
• identify natural and man-made hazards, their risks to man and his environment. • state how to prevent or control certain hazards.	Environmental Hazards, its effects and prevention • Natural hazards • Man-made hazards • Prevention of environmental hazards.
• identify cash crops in their environment. • develop skills in protection of cash crops from various pests and parasites.	**Cash crops and their protection** • Types of cash crops and their importance. • Protection of various cash crops.
• identify different waste types and the effective disposals. • with skills to enable them transform some waste into useful products.	**Disposal/Transformation of waste** • Appropriate waste disposals. • Transformation of waste.
• identify causes and types of migration and their effects in urban and rural areas.	**Migration and urbanisation.** • Types of migration • Causes of migration • Effects of migration • Problems of urbanisation.
• identify the activities and the attractions of rural areas. • To enable them develop skills in avoiding rural decay.	**The rural Environment** • Activities of the rural areas. • Their attractions and problems • How to maintain our rural areas.
• identify various drugs, their negative effects. • develop skills in avoiding destructive drugs.	**Drugs/avoidance:** Drug types • Positive and negative effects of drugs in pupils. • How to avoid the negative intake of drugs.
• identify the usefulness of fire. • identify how fire can be a source of danger to people and the environment.	**Fire:** • Fire and its usefulness • Fire as a source of danger

OBJECTIVES	CONTENT
• identify and describe drugs, their sources and their abuses. • avoid careless use of drugs and to also enable pupils develop skills on how to destroy harmful insects.	Drugs: • Types of drugs, Useful drugs • Harmful drugs, Abuse of drugs.
• identify and appreciate various occupations. • develop interest in certain occupations.	Peoples and occupations
• identify the different types of buildings. • identify the various building materials – develop their appreciation and conservation skills.	Types of buildings
• state the important element of sex education, the diseases associated with sex and to develop preventive skills.	Sex education, diseases and prevention.
• develop skills to carryout positive environment campaigns at both the local and National levels.	Environmental campaigns at local and National levels.
• identify the major forest/animal reserves in their locality and in the country as a whole.	Forest and animal reserves, and their importance
• identify the richness of the tropical forest, its characteristics.	Tropical rainfall, it characteristics, importance and conservation.
• identify some local and International organisations involved in Environmental, preservation and conservation.	Some major Environmental organisations.

TEACHING STRATEGIES

Teachers should emphasize active learning by encouraging pupils to observe, experiment, collect and analyse material, carry out projects and write reports. Frequent excursions and visits in the environment are important for developing curiosity and a spirit of discovery. Group work, discussion, demonstrations and practical activities are useful strategies for helping pupils internalise important scientific concepts

TEACHING MATERIALS

A creative use of the environment beyond the classroom should provide a variety of materials: plants, flowers, rocks, animals, soils, insects and so on. In the classroom charts, pictures, models and specimens should be available to facilitate learning. Where possible video cassettes containing scientific information, illustrations and demonstrations should be produced or bought for use in class

ASSESSMENT STRATEGIES

Assessment of learning should emphasize children's reports, projects and other practical work as well as formal tests and examinations in the upper classes.

REPUBLIQUE DU CAMEROUN

PAIX-TRAVAIL-PATRIE

LOI N° 2004 / 003 DU 21 AVR. 2004

REGISSANT L'URBANISME AU CAMEROUN

L'Assemblée Nationale a délibéré et adopté,
le Président de la République promulgue
la loi dont la teneur suit :

TITRE I
DES REGLES GENERALES D'URBANISME, D'AMENAGEMENT URBAIN ET DE CONSTRUCTION

CHAPITRE I
DES DISPOSITIONS GENERALES D'UTILISATION DU SOL

SECTION I
DES DISPOSITIONS GENERALES

ARTICLE 1er .- La présente loi régit l'urbanisme, l'aménagement urbain et la construction sur l'ensemble du territoire camerounais.

A ce titre, elle fixe les règles générales d'utilisation du sol, définit les prévisions, règles et actes d'urbanisme, organise les opérations d'aménagement foncier et les relations entre les différents acteurs urbains.

ARTICLE 2.- Le territoire camerounais est le patrimoine commun de la Nation. L'Etat et les collectivités territoriales décentralisées en sont les gestionnaires et les garants dans le cadre de leurs compétences respectives. Les collectivités territoriales décentralisées harmonisent, dans le respect réciproque de leur autonomie, leurs prévisions et leurs décisions d'utilisation de l'espace.

ARTICLE 3.- L'urbanisme est, au sens de la présente loi, l'ensemble des mesures législatives, réglementaires, administratives, techniques, économiques, sociales et culturelles visant le développement harmonieux et cohérent des établissements humains, en favorisant l'utilisation rationnelle des sols, leur mise en valeur et l'amélioration du cadre de vie, ainsi que le développement économique et social.

ARTICLE 4.- (1) Les établissements humains concernés par le présent texte comprennent les centres urbains ou les communautés rurales concentrées d'au moins deux mille (2 000) habitants, occupant un espace bâti de façon continue et manifeste.

(2) Le classement d'un établissement humain en centre urbain est prononcé par décret.

approuvés, à la date de promulgation de la présente loi, restent en vigueur jusqu'à échéance de leur validité.

Ceux en cours d'élaboration devront se conformer au contenu des documents de planification tels que définis à l'article 26 de la présente loi, ainsi qu'aux procédures d'approbation et de révision définies aux articles 29 et 30 ci-dessus.

ARTICLE 134.- Les modalités d'application de la présente loi sont, en tant que de besoin, précisées par voie réglementaire.

ARTICLE 135.- Sont abrogées toutes les dispositions antérieures contraires à la présente loi, notamment celles de l'ordonnance 73/20 du 29 mai 1973 régissant l'urbanisme en République Unie du Cameroun.

ARTICLE 136.- La présente loi sera enregistrée et publiée selon la procédure d'urgence, puis insérée au Journal Officiel, en français et en anglais./-

Yaoundé, le 2 1 AVR. 2004

Le Président de la République.

Paul BIYA

REPUBLIQUE DU CAMEROUN
Paix – Travail – Patrie
MINISTERE DE L'EDUCATION DE BASE

DELEGATION DEPARTMENTAL DU FAKO.

REPUBLIC OF CAMEROON
Peace – Work – Fatherland
MINISTRY OF BASIC EDUCATION

DIVISIONAL DELEGATION FOR FAKO

Buea, the 14th of October 2012

FROM: The Divisional Delegate,

TO: The Head Teacher
- G S Buca Town I
- G S Limbe I
- G S Bokwaongo
- G S Mutengene
- E P F Limbe I
- E P F Buea I
- E P F Bonadikombo
- E P F Muyuka
- G B P S Muea

AUTHORISATION TO BRENDA NACHUAH LAWYER TO VISIT YOUR INSTITUTION.

Brenda Nachuah Lawyer is a PhD student from the Department of Arts Education, Faculty of Education, University of Nigeria, Nsukka, carrying out research on **"Effect of Language of instruction on pupils' attitude and achievement in Environmental Education in Cameroon".** She wishes to do some research in your institution.

Please grant her the necessary assistance wherever and whenever needed.

Mbua Martha Ngowo
Divisional Delegate

THE DIVISIONAL DELEGATE
OF BASIC EDUCATION FAKO

APPENDIX IX

RELIABILITY COEFFICIENT FOR EEAT AND ATS
SCALE: CORRELATIONS COEFFICIENT OF TEMPORAL STABILITY FOR EEAT

Correlations

		Pretest	Posttest
Pretest	Pearson Correlation	1	.760
	Sig. (2-tailed)		.000
	N	20	20
Posttest	Pearson Correlation	.760	1
	Sig. (2-tailed)	.000	
	N	20	20

*significant at 0.05

SCALE: RELIABILTY COEFFICIENT FOR EEAT

Case Processing Summary

		N	%
Cases	Valid	20	100.0
	Excluded[a]	0	.0
	Total	20	100.0

a. Listwise deletion based on all variables in the procedure.

Reliability Statistics

Cronbach's Alpha	N of Items
.884	32

SCALE: RELIABILITY COEFFICIENT FOR ATS

Case Processing Summary

		N	%
Cases	Valid	20	100.0
	Excluded[a]	0	.0
	Total	20	100.0

a. Listwise deletion based on all variables in the procedure.

Reliability Statistics

Cronbach's Alpha	N of Items
.833	30

Appendix X (a)

ENVIRONMENTAL EDUCATION ACHIEVEMENT TEST (EEAT) FOR CLASS SIX PUPILS (Pre- -Test)

Sex: Male ☐ Female ☐
Name of School: é
Location of School: Rural ☐ Urban ☐
Instructions: *The statements below when completed will be meaningful. Carefully study the answers listed a, b, and c, and choose the right option to fill the blank spaces.*

QUESTIONS

1. Plants and animals are both living things but differ in some ways. One of the ways a plant differs from an animal is that a plant is fixed to a spot while an animal_____
   A. can produce its own food B. has special sense organs

   C. is able to move from place to place

2. Both plants and animals ingest food in one way, but differ in how they obtain their food. Animals generally obtain the food from the body of plants and/or other animals. Plants on the other hand_____
   A. feed on bacteria

   B. synthesize their own food in the process of photosynthesis

   C. break down their food from animal bodies

3. A plant is made up of parts with each part having one or more functions. Which part of the plant manufactures food?
   A. the leaves B. the roots C. the ste

4. The _____ anchors the plant firmly into the soil.
   A. the flowers B. shoots C. roots

5. The part of the plant linking the roots to the branches and leaves thus helping in supporting and protecting the plant is called _____
   A. the stem B. the flowers C. the roots

6. The part responsible for producing plant fruit and seed is. _____
   A. the stem B. the roots C. the flowers

7. Transpiration is the process whereby water is lost from the plant. One of

the factors that affect this process is _____

A. leaf size B. seed type C. dicotyledons

8. Stomata are small pores on the leaves through which water leaves the plant. The more the number of stomata, the _____ the transpiration rate

A. less B. More C. lower

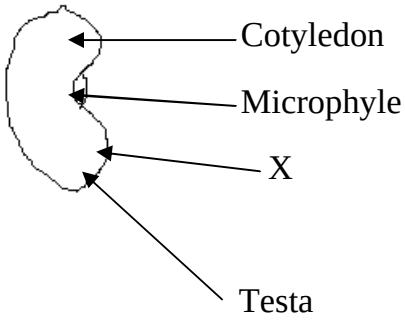
9. In a windy environment, the rate of transpiration is observed to increase. In a humid environment, the rate of transpiration is seen to_____
A. remain the same B. reduce C. increase

10. Plants can be propagated by planting seeds. The part that protects it from harm is called the_____
A. testa B. microphyle C. scar

11. It contains food which nourishes the young plant before leaves and shoots operate. Which part of the seed is referred to here as ñitò
A. the scar B. the cotyledon C. the seed coat

12. The part of the seed used for breathing or respiration is called_____
A. the scar B. the microphyle C. the seed coat

13. Study the diagram of the seed below and name the part lettered X



The part labeled X is called_____

A. the mouth B. the seed leaf C. the scar

14. Young life springs from a process of seed development termed_____
A. seed maturation B. seed preservation C. seed germination

15. Germinating seeds may exhibit one seed leaf or two seed leaves. A

plant with two seed leaves is referred to as a_____

A. bicot B. dicot C. bigamy

16. The carriage of cotyledons above the soil during germination is called?
A. aerial germination B. hypogeal germination C. epigeal germination

17. A bean seed exhibits epigeal germination while a maize seed exhibits?
A. aerial germination B. hypogeal germination C. mono-germination

18. In the face of danger or favorable conditions, both plants and animals manifest either fast or slow responses. Which of the following statements is correct with respect to plant or animal response to a stimulus?

A. Animalôs response to a stimulus is fast

B. Plantôs response to a stimulus is also fast

C. Plants and animals are indifferent to their environmental changes

19. Respiration is the act of taking in air rich in oxygen and sending out air rich in carbon dioxide by living things. Plants respire through_____

A. special Organs B. the nose C. non-specialized structures

20. Plants may check transpiration rate by adopting certain operational modes. In hot weather, the rate of transpiration in some plants is reduced by reducing the number of their existing leaves in a process called _____

A. leaf shedding B. leaf folding C. photosynthesis

21. War is a man-made hazard which is caused by;

A. greed for wealth and fame B. the desire to avenge evil. C. A and B are correct answers

22. How does a human activity cause floods in our environment?

A. through planting of big trees

B. through building of nice houses

C. through poor construction of drainage and the building of dams.

23. Why is it important for waste dumps or pits to be placed a distance away from our homes?

A. to produce manure for our farms B. to prevent land slides C. to avoid health hazards which could come as a result of poor waste disposals

24. One way by which organic waste can be properly disposed is é é é é é é ..

A. by digging refuse dumps and pits away from our homes

B. by dumping on the streets of the town

C. by dumping them into nearby streams

25. The company in charge of waste disposal in the urban areas of Cameroon is called

A. DCAM B. HYSACAM C. WASTECAM

26. The poisonous gas release by moving vehicles is calledé é é é ..

A. carbon monoxide B. carbon dioxide C. oxygen

27. Sulphur dioxide is a poisonous gas that can be explained asé é é é é .

A. gases release through the burning of organic substances like coal and oil

B. gases released through heat from the sun

C. gases sent out of human being out of respiration

28. Nitrogen dioxide can be released through the atmosphere through----------

A. rain fall B. volcanic eruptions C. waste disposal

29. What is poor sanitation? Poor sanitation is ----------

A. not putting on nice dresses

B. inproper accumulation of dirt, feaces and urine in our surroundings

C. burning of organic substances into the atmosphere

30. List two environment hazard caused by human beings?

A. heavy rain fall and lighting B. floods and wild fires C. volcanic eruptions and earthquakes

31. The act of waste disposal such as feaces, dirts, and other poisonous substances in natural water bodies is called ----------

A. flooding B. dumping C. water pollution

32. Why is it not advisable to burn waste near our homes?

A. because it can burn our houses B. because the gases produced during burning could cause air pollution C. because fire is a bad thing.

MARKING GUIDE FOR EEAT ACHIEVEMENT TEST FOR CLASS 6 PUPILS (pre- test)

1. C
2. B
3. A
4. C
5. A
6. C
7. A
8. B
9. B
10. B
11. B
12. B
13. C
14. C
15. B
16. C
17. B
18. A
19. C
20. A
21. C
22. C
23. C
24. A
25. B
26. A
27. A
28. B
29. B
30. B
31. C
32. B

Appendix X (b)

ENVIRONMENTAL EDUCATION ACHIEVEMENT TEST (EEAT) FOR CLASS SIX PUPILS (POST-TEST)

Sex: Male ☐ Female ☐
Name of School: é
Location of school : Rural ☐ Urban ☐
Instructions: *The statements below when completed will be meaningful. Carefully study the answers listed A, B, and C, and choose the right option to fill the blank spaces.*

1. Why is it not advisable to burn waste near our homes?
A. because it can burn our houses B. because the gases produced during burning could cause air pollution C. because fire is a bad thing.

2. List two environment hazard caused by human beings?
A. heavy rain fall and lighting B. floods and wild fires C. volcanic eruptions and earthquakes

3. What is poor sanitation? Poor sanitation is ----------
A. not putting on nice dresses

B. inproper accumulation of dirt, feaces and urine in our surroundings

C. burning of organic substances into the atmosphere

4. The act of waste disposal such as feaces, dirts, and other poisonous substances in natural water bodies is called ----------
A. flooding B. dumping C. water pollution

5. Sulphur dioxide is a poisonous gas that can be explained asé é é é é .
A. gases release through the burning of organic substances like coal and oil

B. gases released through heat from the sun

C. gases sent out of human being out of respiration

6. One way by which organic waste can be properly disposed is é é é é é é ..

A. by digging refuse dumps and pits away from our homes

B. by dumping on the streets of the town

C. by dumping them into nearby streams

7. Nitrogen dioxide can be released through the atmosphere through----------
A. rain fall B. volcanic eruptions C. waste disposal

8. Why is it important for waste dumps or pits to be placed a distance away from our homes?
A. to produce manure for our farms B. to prevent landslides C. to avoid health hazards which could come as a result of poor waste disposals

9. How does a human activity cause floods in our environment?
A. through planting of big trees

B. through building of nice houses

C. through poor construction of drainage and the building of dams.

10. Plants may check transpiration rate by adopting certain operational modes. In hot weather, the rate of transpiration in some plants is reduced by reducing the number of their existing leaves in a process called _____

A. leaf shedding B. leaf folding C. photosynthesis

11. The poisonous gas release by moving vehicles is calledé é é é ..
A. carbon monoxide B. carbon dioxide C. oxygen

12. The company in charge of waste disposal in the urban areas of Cameroon is called
A. DCAM B. HYSACAM C. WASTECAM

13. War is a man-made hazard which is caused by;
A. greed for wealth and fame B. the desire to avenge evil. C. A and B are correct answers

14. In the face of danger or favorable conditions, both plants and animals Manifest either fast or slow responses. Which of the following statements is correct with respect to plant or animal response to a stimulus?

A. Animalôs response to a stimulus is fast

B. Plantôs response to a stimulus is also fast

C. Plants and animals are indifferent to their environmental changes

15. Young life springs from a process of seed development termed_____
A. seed maturation B. seed preservation C. seed germination

16. Germinating seeds may exhibit one seed leaf or two seed leaves. A

plant with two seed leaves is referred to as a_____

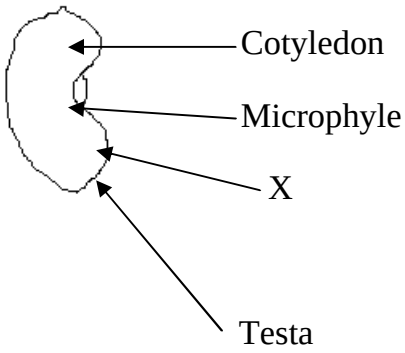
A. bicot B. dicot C. bigamy

17. A bean seed exhibits epigeal germination while a maize seed exhibits?
A. aerial germination B. hypogeal germination C. mono-germination

18. Respiration is the act of taking in air rich in oxygen and sending out air rich in carbon dioxide by living things. Plants respire through_____

A. Special Organs B. The nose C. Non-specialized structures

19. Study the diagram of the seed below and name the part lettered X



The part labeled X is called_____

A. the mouth B. the seed leaf C. the scar

20. The carriage of cotyledons above the soil during germination is called?
A. aerial germination B. hypogeal germination C. epigeal germination

21. The part of the seed used for breathing or respiration is called_____
A. the scar B. the microphyle C. the seed coat

22. It contains food which nourishes the young plant before leaves and shoots operate. Which part of the seed is referred to here as ñitò
A. the scar B. the cotyledon C. the seed coa

23. Plants can be propagated by planting seeds. The part that protects it from harm is called the_____
A. testa B. microphyle C. scar

24. In a windy environment, the rate of transpiration is observed to increase. In a humid environment, the rate of transpiration is seen to_____
A. remain the same B. reduce C. increase

25. Stomata are small pores on the leaves through which water leaves the plant. The more the number of stomata, the _____ the transpiration rate.
A. less B. More C. lower

26. Transpiration is the process whereby water is lost from the plant. One of the factors that affect this process is _____

A. leaf size B. seed type C. dicotyledons

27. The part responsible for producing plant fruit and seed is. _____
A. the stem B. the roots C. the flowers

28. The part of the plant linking the roots to the branches and leaves thus helping in supporting and protecting the plant is called _____
A. the stem B. the flowers C. the roots

29. The _____ anchors the plant firmly into the soil.
A. the flowers B. shoots C. roots

30. A plant is made up of parts with each part having one or more functions. Which part of the plant manufactures food

A. the leaves B. the roots C. the stem

31. Both plants and animals ingest food in one way, but differ in how they obtain their food. Animals generally obtain the food from the body of plants and/or other animals. Plants on the other hand_____
A. feed on bacteria

B. synthesize their own food in the process of photosynthesis

C. break down their food from animal bodies

32. Plants and animals are both living things but differ in some ways. One of the ways a plant differs from an animal is that a plant is fixed to a spot while an animal_____
A. can produce its own food B. has special sense organs

C. is able to move from place to place

MARKING GUIDE FOR EEAT ACHIEVEMENT TEST FOR CLASS Six PUPILS (POST-TEST)

33. B
34. B
35. B
36. C
37. A
38. A
39. B
40. C
41. C
42. C
43. A
44. B
45. C
46. C
47. C
48. B
49. C
50. B
51. C
52. B
53. B
54. B
55. B
56. A
57. B
58. A
59. C
60. A
61. C
62. A
63. B
64. C

Appendix XI(a)

TEST DE PERFORMANCE EN EDUCATION ENVIRONNEMENTALE (TPEE) A L'INTENTION DES ELEVES DU COURS MOYEN II (Pré-test)

Sexe: Masculin ☐ Fémini ☐
Nom de l'école: é
Localisation de l'école: zone Rura ☐ zone urbaine ☐
Instructions: *Donner un sens aux propositions ci-dessous en les complétant. Analyser soigneusement les trois réponses et choisir celle qui convient pour remplacer les tirets.*

QUESTIONS

7. Les plantes et les animaux sont des organismes vivants qui différent sur un certain nombre de points. Une plante est différente d'un animal en ce qu'elle est fixée sur un endroit précis alors que l'animal _____
   A. peut produire sa propre nourriture B. a des organes de sens spéciaux
   C. peut se déplacer d'un endroit à un autre
8. Les plantes et les animaux se nourrissent de la même façon, mais différent dans la manière d'obtenir leur nourriture. En général, les animaux obtiennent leur nourriture des plantes et/ou d'autres animaux. Les plantes par contre _____
   A. se nourrissent des bactéries
   B. synthétisent leur propre nourriture à travers le processus de la photosynthèse
   C. obtiennent leur nourriture des animaux
9. Une plante est composée des parties jouant chacune une ou plusieurs fonctions. Quelle partie de la plante produit les aliments nutritifs?
   A. les feuilles B. les racines C. la tige
10. Les _____ rattachent fermement la plante au sol.
   A. fleurs B. pousses C. racines

A. La partie de la plante qui rattache les racines aux branches et supporte ainsi la plante et la protège s'appelle _____
   A. la tige B. les fleurs C. les racines

B. La partie qui produit les fruits et les grains c'est _____
   A. la tige B. les racines C. les fleurs

7. La transpiration est le processus à travers lequel la plante perd de l'eau. L'un des facteurs qui influencent ce processus est _____

   A. la taille des feuilles B. le type de la graine C. les dicotylédons

8. Les stomates sont de petits pores par lesquels la plante perd de lôeau. Plus une feuille compte de pores, _____ son taux de transpiration est élevé.

A. moins B. plus C. plus faible

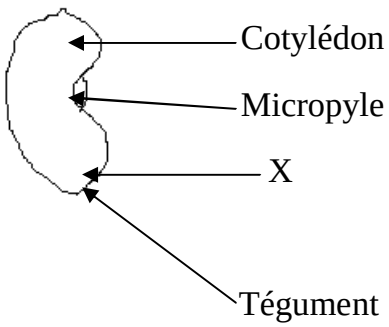
14. Dans un environnement venteux, le taux de transpiration a tendance à augmenter. Dans un environnement humide, le taux de transpiration a tendance à _____
A. rester statique B. baisser C. augmenter

15. Les plantes peuvent se multiplier à travers la semence des graines. La partie qui protège la graine sôappelle _____
A. tégument B. micropyle C. hile (cicatrice)

16. Il contient lôaliment nutritif de la jeune plante avant que les feuilles et les pousses ne deviennent opérationnelles. A quelle partie de la graine se réfère le pronom « Il »
A. le hile (la cicatrice) B. les cotylédons C. lôenveloppe de la graine

17. La partie de la graine qui sert à la respiration sôappelle _____
A. le hile (la cicatrice) B. le micropyle C. lôenveloppe de la graine

18. Etudier la coupe de la graine ci-dessous et donner le nom de la partie portant la lettre X.



La partie portant la lettre X sôappelle _____

A. la bouche B. la feuille de la graine C. le hile (la cicatrice)

15. La jeune vie provient dôun processus de développement de la graine appelé _____

A. maturation de la graine B. préservation de la graine C. germination de la graine.

15. Les grains en germination peuvent avoir un ou deux petits boucliers. Une plante avec deux petits boucliers est connue sous le nom de _____

A. bicot B. dicot C. bigamie

21. Le soulèvement des cotylédons au-dessus du sol pendant la germination sôappelle?
A. germination aérienne B. germination hypogée C. germination épigée

22. La germination de la graine de haricot est une illustration de la germination épigée alors que la germination de la graine de maïs est une illustration de la?
A. germination aérienne B. germination épigée C. mono-germination

23. Face à un danger ou à des conditions favorables, les plantes et les animaux ont des réactions rapides ou lentes. Laquelle des propositions suivantes correspond à la réaction des plantes ou des animaux face à un stimulant ?
A. Lôanimal a une réaction rapide face à un stimulant

B. La plante réagit aussi rapidement face à un stimulant

C. Les plantes et les animaux sont indifférents face aux changements que subit leur environnement

24. La respiration est le fait dôinspirer lôair riche en oxygène et dôexpirer lôair riche en dioxyde de carbone par les êtres vivants. Les plantes respirent à travers _____
A. organes spéciaux B. les narines C. les structures non spécialisées

25. Les plantes peuvent réduire le taux de transpiration en adoptant certains modes opérationnels. En période de chaleur, le taux de transpiration de certaines plantes se réduit par la coupe dôun certain nombre de leurs feuilles dans un processus connu sous le nom d _____
A. élagage des feuilles B. pliage de la feuille C. photosynthèse

21. La guerre est une catastrophe de cause humaine provoquée par:

A. lôavidité pour la richesse et la renommée B. le désir de lutter contre le mal. C. les réponses A et B sont correctes

22. Comment les activités humaines peuvent-elles provoquer lôinondation de notre environnement?

A. à travers la plantation des gros arbres

B. à travers la construction de belles maisons

C. à travers les mauvaises constructions des systèmes dôévacuation et la construction des barrages.

23. Pourquoi est-il important que les décharges ou fosses à ordure soient éloignées des maisons dôhabitation?

A. pour produire les engrais pour nos plantations B. pour éviter les glissements de terrain C. pour éviter les risques pour la santé qui pourraient résulter des méthodes inadéquates dôélimination des déchets

24. lôune des méthodes à travers laquelle les déchets organiques peuvent être adéquatement éliminés consiste à é é é é é é ..

A. creuser des décharges et des fosses à ordure loin des maisons dôhabitation

B. les déverser dans les rues de la cité

C. les déverser dans les cours dôeau environnants

25. La société chargée du ramassage des déchets urbains au Cameroun sôappelle

A. DCAM B. HYSACAM C. WASTECAM

26. Le gaz toxique qui sôéchappe des pots des véhicules en mouvement sôappelle é é é é ..

A. monoxyde de carbone B. dioxyde de carbone C. oxygène

27. Le dioxyde de souffre est un gaz toxique qui sôexplique comme é é é é é .

A. des gaz qui sôéchappent de la combustion des substances organiques comme le charbon et le pétrole

B. des gaz produit par la chaleur du soleil

C. des gaz rejetés par les êtres humains à travers la respiration

28. Le dioxyde dôazote peut être rejeté dans lôatmosphère à travers ----------

A. les précipitations B. les éruptions volcaniques C. élimination des déchets

29. Quôentend-on par pièttres conditions hygiénique? Par pièttres conditions hygiéniques on entend ----------

A. le fait de ne pas sôhabiller cher

B. la mauvaise accumulation des ordures, des selles et des urines dans notre voisinage

C. la combustion des substances organiques dans lôatmosphère

30. Citer deux dangers environnementaux causés par les êtres humains?

A. les fortes précipitations et lôéclairage B. les inondations et les incendies C. les éruptions volcaniques et les tremblements de terre

31. Le fait de déverser les selles, les ordures et dôautres substances toxiques dans les plans dôeau naturelle sôappelle ----------

A. inondation B. déversement des déchets C. pollution de lôeau

32. Pourquoi nôest-il pas conseillé de brûler les déchets à côté des maisons dôhabitation?

A. parce que lôincendie peut se propager à nos maisons B. parce que les gaz rejetés pendant la combustion peuvent polluer lôair C. parce que le feu nôest une bonne chose.

GUIDE DE NOTATION DU TEST DE PERFORMANCE EN EDUCATION ENVIRONNEMENTALE A L'INTENTION DES ELEVES DU COURS MOYEN II (Pré-test)

1. C
2. B
3. A
4. C
5. A
6. C
7. A
8. B
9. B
10. B
11. B
12. B
13. C
14. C
15. B
16. C
17. B
18. A
19. C
20. A
21. C
22. C
23. C
24. A
25. B
26. A
27. A
28. B
29. B
30. B
31. C
32. B

Appendix XI (b)

TEST DE PERFORMANCE EN EDUCATION ENVIRONNEMENTALE (TPEE) A L'INTENTION DES ELEVES DU COURS MOYEN II (Post-test)

Sexe: Masculin ☐ Féminin ☐
Nom de lôécole: é
Localisation de lôécole: zone rurale ☐ zone urbain ☐
Instructions: *Donner un sens aux propositions ci-dessous en les complétant. Analyser soigneusement les trois réponses proposées et choisir celle qui convient pour remplacer les tirets.*

6. Pourquoi nôest-il pas conseillé de brûler les déchets à côté des maisons dôhabitation?
A. parce que lôincendie peut se propager à nos maisons B. parce que les gaz rejetés pendant la combustion peuvent polluer lôair C. parce que le feu nôest une bonne chose.

7. Citer deux dangers environnementaux causés par les êtres humains?
A. les fortes précipitations et lôéclairage B. les inondations et les incendies C. les éruptions volcaniques et les tremblements de terre

8. Quôentend-on par piètres conditions hygiénique? Par piètres conditions hygiéniques on entend ----
A. le fait de ne pas sôhabiller cher

B. la mauvaise accumulation des ordures, des selles et des urines dans notre voisinage

C. la combustion des substances organiques dans lôatmosphère

9. Le fait de déverser les selles, les ordures et dôautres substances toxiques dans les plans dôeau naturelle sôappelle ----------
A. A. inondation B. déversement des déchets C. pollution de lôeau

10. Le dioxyde de souffre est un gaz toxique qui sôexplique comme é é é é é .
A. des gaz qui sôéchappent de la combustion des substances organiques comme le charbon et le pétrole

B. des gaz produit par la chaleur du soleil

C. des gaz rejetés par les êtres humains à travers la respiration

6. Lôune des méthodes à travers laquelle les déchets organiques peuvent être adéquatement éliminés consiste à é é é é é é ..

A. creuser des décharges et des fosses à ordure loin des maisons dôhabitation

B. les déverser dans les rues de la cité

C. les déverser dans les cours dôeau environnants

30. Le dioxyde dôazote peut être rejeté dans lôatmosphère à travers ----------
A. les précipitations B. les éruptions volcaniques C. lôélimination des déchets

31. Pourquoi est-il important que les décharges ou fosses à ordure soient éloignées des maisons dôhabitation?
A. pour produire les engrais pour nos plantations B. pour éviter les glissements de terrain
C. pour éviter les risques pour la santé qui pourraient résulter des méthodes inadéquates dôélimination des déchets

32. Comment les activités humaines peuvent-elles provoquer lôinondation de notre environnement?
A. à travers la plantation des gros arbres

B. à travers la construction de belles maisons

C. à travers les mauvaises constructions des systèmes dôévacuation et la construction des barrages.

33. Les plantes peuvent réduire le taux de transpiration en adoptant certains modes opérationnels. En période de chaleur, le taux de transpiration de certaines plantes se réduit par la coupe dôun certain nombre de leurs feuilles dans un processus connu sous le nom de _____
A. élagage des feuilles B. pliage de la feuille C. photosynthèse

34. Le gaz toxique qui sôéchappe des pots des véhicules en mouvement sôappelle é é é é ..
A. monoxyde de carbone B. dioxyde de carbone C. oxygène

35. La société chargée du ramassage des déchets urbains au Cameroun sôappelle
A. DCAM B. HYSACAM C. WASTECAM

36. la guerre est une catastrophe de cause humaine provoquée par :
A. lôavidité pour la richesse et la renommée B. le désir de lutter contre le mal. C. les réponses A et B sont correctes

37. Face à un danger ou à des conditions favorables, les plantes et les animaux ont des réactions rapides ou lentes. Laquelle des propositions suivantes correspond à la réaction des plantes ou des animaux face à un stimulant ?
A. Lôanimal a une réaction rapide face à un stimulant

B. La plante réagit aussi rapidement face à un stimulant

C. Les plantes et les animaux sont indifférents face aux changements que subit leur environnement

38. La jeune vie provient dôun processus de développement de la graine appelé _____

A. maturation de la graine B. préservation de la graine C. germination de la graine

39. Les graines en germination peuvent avoir un ou deux petits boucliers. Une plante avec deux petits boucliers est connue sous le nom de _____

A. bicot B. dicot C. bigamie

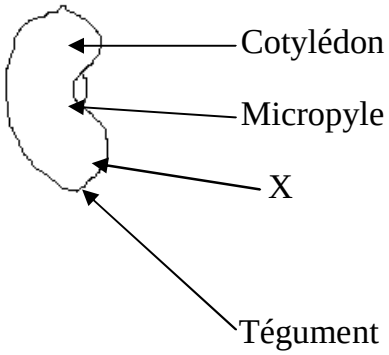
40. La germination de la graine de haricot est une illustration de la germination épigée alors que la germination de la graine de maïs est une illustration de la?

A. germination aérienne B. germination épigée C. mono-germination

41. La respiration est le fait dôinspirer lôair riche en oxygène et dôexpirer lôair riche en dioxyde de carbone par les êtres vivants. Les plantes respirent à travers _____

A. organes spéciaux B. les narines C. les structures non spécialisées

42. Etudier la coupe de la graine ci-dessous et donner le nom de la partie portant la lettre X



La partie portant la lettre X sôappelle _____

A. la bouche B. la feuille de la graine C. le hile (la cicatrice)

43. Le soulèvement des cotylédons au-dessus du sol pendant la germination sôappelle?

A. germination aérienne B. germination hypogée C. germination épigée

44. La partie de la graine qui sert à la respiration sôappelle _____

A. le hile (la cicatrice) B. le micropyle C. lôenveloppe de la graine

45. Il contient lôaliment nutritif de la jeune plante avant que les feuilles et les pousses ne deviennent opérationnelles. A quelle partie de la graine se réfère le pronom « Il » ?
A. le hile (la cicatrice) B. les cotylédons C. lôenveloppe de la graine

46. Les plantes peuvent se multiplier à travers la semence des graines. La partie qui protège la graine sôappelle _____
A. tégument B. micropyle C. hile (cicatrice)

47. Dans un environnement venteux, le taux de transpiration a tendance à augmenter. Dans un environnement humide, le taux de transpiration a tendance à _____
A. rester statique B. baisser C. augmenter

48. Les stomates sont de petits pores à travers lesquels la plante perd de lôeau. Plus une feuille compte de pores, _____ son taux de transpiration est élevé.
A. moins B. plus C. plus faible

49. La transpiration est le processus à travers lequel la plante perd de lôeau. Lôun des facteurs qui influencent ce processus est _____
A. la taille des feuilles B. le type de la graine C. les dicotylédons

50. La partie qui produit les fruits et les grains côest _____
A. la tige B. les racines C. les fleurs

51. La partie de la plante qui rattache les racines aux branches et supporte ainsi la plante et la protège sôappelle _____
A. la tige B. les fleurs C. les racines

52. Les _____ rattachent fermement la plante au sol.
A. fleurs B. pousses C. racines

30. Une plante est composée des parties jouant chacune une ou plusieurs fonctions. Quelle partie de la plante produit les aliments nutritifs?

A. les feuilles B. les racines C. la tige

31. Les plantes et les animaux se nourrissent de la même façon, mais différent dans la manière dôobtenir leur nourriture. En général, les animaux obtiennent leur nourriture des plantes et/ou dôautres animaux. Les plantes par contre _____
A. se nourrissent des bactéries

B. synthétisent leur propre nourriture à travers le processus de la photosynthèse

C. obtiennent leur nourriture des animaux

32. Les plantes et les animaux sont des organismes vivants qui différent sur un certain nombre de points. Une plante est différente dôun animal en ce quôelle est fixée sur un endroit précis alors que lôanimal _____

A. peut produire sa propre nourriture B. a des organes de sens spéciaux

C. peut se déplacer dôun endroit à un autre

GUIDE DE NOTATION DU TEST DE PERFORMANCE EN EDUCATION ENVIRONNEMENTALE A L'INTENTION DES ELEVES DU COURS MOYEN II (Post-test)

33. B
34. B
35. B
36. C
37. A
38. A
39. B
40. C
41. C
42. C
43. A
44. B
45. C
46. C
47. C
48. B
49. C
50. B
51. C
52. B
53. B
54. B
55. B
56. A
57. B
58. A
59. C
60. A
61. C
62. A
63. B
64. C

Appendix XII (a)

Attitude scale on the attitudes of pupils towards Environmental Education

Name of School.....

Please put an (X) against the answer option that corresponds to your view.

SA – Strongly Agree; A – Agree; D – Disagree; SD – Strongly Disagree.

S/N	STATAMENTS	SA	A	D	SD
1	I like environmental education.				
2	Environmental education is not important to me.				
3	Environmental education classes are very interesting to me.				
4	Environmental education is not one of my best subjects				
5	Twice a week is too much for EE classes.				
6	Poisonous animals are threats to me				
7	Poisonous animals should not be killed				
8	I like disposing waste in my environment				
9	I prefer disposing waste by burning				
10	I like activities to save the environment, eg planting trees				
11	I like feeding and protecting animals				
12	I enjoy protecting and caring for plants				
13	EE teaches me different types of plants and animals				
14	EE teaches me how to care for the environment				
15	EE is one of my best subjects				
16	I like EE to be taught more than once a week				
17	It is harmful to combine organic and inorganic waste				
18	I will rather combine organic and inorganic waste				
19	I like keeping domestic animals as pets				
20	Seed planting is important to our environment				
21	Plants help in beautifying my environment.				
22	I donôt like environmental activities like planting of trees.				
23	Environmental activities are very stressful to carry out				
24	Living organisms are necessary in our environment.				
25	I dislike feeding and taking care of animals				
26	I donôt like environmental education classes				
27	I like my Environmental education teacher				
28	I dislike the way my teacher teaches environmental education.				
29	I like government to punish those who destroy the environment.				
30	I like dumping pieces of paper by the roadside				

Appendix XII (b)

Echelle dôattitude des écoliers vis-à-vis de lôéducation environnementale
Nom de lôécole.....
Prière de cocher la réponse qui correspond à votre point de vue.
FA ï Fortement dôaccord; A ï Dôaccord; D ï Désaccord; FD ï Fortement en désaccord.

N/D	DECLARATIONS	FA	A	D	FD
1	Jôaime lôéducation environnementale.				
2	Je nôaccorde aucune importance à lôéducation environnementale.				
3	Je trouve les cours dôéducation environnementale très intéressants.				
4	Lôéducation environnementale ne compte pas parmi mes meilleures matières				
5	Les cours dôEE deux fois par semaine, côest trop.				
6	Les animaux vénéneux constituent des menaces pour moi				
7	Les animaux vénéneux ne doivent pas être tués				
8	Jôaime déverser les déchets dans lôenvironnement				
9	Je préfère brûler les déchets				
10	Jôaime môadonner aux activités de protection de lôenvironnement , ex. Planter les arbres				
11	Jôaime nourrir et protéger les animaux				
12	Jôadore protéger et prendre soin des plantes				
13	LôEE me permet de connaître de différents types de plantes et dôanimaux				
14	LôEE môapprend comment prendre soin de lôenvironnement				
15	LôEE est lôune de mes meilleures matières				
16	Je souhaite que les cours dôEE soient dispensés plus dôune fois par semaine				
17	Il est dangereux de mettre ensemble les déchets organiques et les déchets inorganiques				
18	Je préfère mettre ensemble les déchets organiques et les déchets inorganiques				
19	Jôaime avoir les animaux domestiques comme animaux de compagnie				
20	Les semences sont importantes pour notre environnement				
21	Les plantes permettent dôembellir mon environnement.				
22	Je nôaime pas les activités environnementales comme planter les arbres.				
23	Les activités environnementales sont difficiles à mener				
24	Les organismes vivants sont nécessaires pour notre environnement.				
25	Je déteste nourrir et prendre soins des animaux				
26	Je nôaime pas les cours dôéducation environnementale				
27	Jôaime mon maître dôEducation environnementale				
28	Je nôaime pas la manière dont mon maître dispense les cours dôEducation environnementale.				
29	Je souhaite que le gouvernement punisse ceux qui détruisent lôenvironnement.				
30	Jôaime jeter les bouts de papier en route				

Appendix XIII

MAP OF FAKO DIVISION WITH ITS SUB-DIVISIONS AND MAJOR TOWNS.

Source: Adapted from the Administrative Map of Cameroon, N.I.C., (2009)

A teacher invigilating the EEAT test.

One of the sample schools with pupils ready for the EEAT test.

Teacher giving instructions before the test is administered.

Researcher invigilating the EEAT test with the class teacher.

Appendix XV

Univariate Analysis of Variance

Between-Subjects Factors

		Value Label	N
Language of instruction	1.00	English	145
	2.00	French	103
	3.00	Bilingual	43
Location	1.00	Urban	145
	2.00	Rural	146
Gender	1.00	Male	153
	2.00	Female	138

Descriptive Statistics (Table 1)

Dependent Variable:Post test achievement score

Language of instruction	Location	Gender	Mean	Std. Deviation	N
English	Urban	Male	22.4815	3.81032	54
		Female	23.0312	4.56130	32
		Total	22.6860	4.08804	86
	Rural	Male	19.2500	4.97737	32
		Female	17.1111	4.99487	27
		Total	18.2712	5.05770	59
	Total	Male	21.2791	4.53393	86
		Female	20.3220	5.58150	59
		Total	20.8897	4.99043	145
French	Urban	Male	21.5600	2.12289	25
		Female	21.0588	3.58398	34
		Total	21.2712	3.03900	59
	Rural	Male	18.5217	3.55310	23
		Female	19.9048	2.96487	21
		Total	19.1818	3.32204	44
	Total	Male	20.1042	3.25014	48
		Female	20.6182	3.38018	55
		Total	20.3786	3.31401	103
Bilingual	Rural	Male	17.1053	3.28117	19
		Female	16.8750	3.18027	24
		Total	16.9767	3.18843	43
	Total	Male	17.1053	3.28117	19
		Female	16.8750	3.18027	24
		Total	16.9767	3.18843	43
Total	Urban	Male	22.1899	3.38199	79

		Female	22.0152	4.17499	66
		Total	22.1103	3.75114	145
	Rural	Male	18.4730	4.21095	74
		Female	17.8472	4.08246	72
		Total	18.1644	4.14567	146
	Total	Male	20.3922	4.22592	153
		Female	19.8406	4.61234	138
		Total	20.1306	4.41433	291

Tests of Between-Subjects Effects (Table 2)

Dependent Variable:Post test achievement score

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	4502.742[a]	10	450.274	109.795	.000
Intercept	435.662	1	435.662	106.232	.000
Pretestachievementscore	3094.826	1	3094.826	754.641	.000
Languageofinstruction	41.626	2	20.813	5.075	.007
Location	40.059	1	40.059	9.768	.002
Gender	.973	1	.973	.237	.627
Languageofinstruction * Location	9.491	1	9.491	2.314	.129
Languageofinstruction * Gender	5.833	2	2.916	.711	.492
Location * Gender	1.021	1	1.021	.249	.618
Languageofinstruction * Location * Gender	17.632	1	17.632	4.299	.039
Error	1148.296	280	4.101		
Total	123576.000	291			
Corrected Total	5651.038	290			

a. R Squared = .797 (Adjusted R Squared = .790)

Estimated Marginal Means

1. Grand Mean

Dependent Variable:Post test achievement score

Mean	Std. Error	95% Confidence Interval	
		Lower Bound	Upper Bound
1.999E1	.124	19.744	20.233

a. Covariates appearing in the model are evaluated at the following values: Pre-test achievement score = 18.5258.

b. Based on modified population marginal mean.

2. Language of instruction

Dependent Variable:Post test achievement score

Language of instruction	Mean	Std. Error	95% Confidence Interval	
			Lower Bound	Upper Bound
English	20.534[a]	.174	20.192	20.877
French	19.934[a]	.203	19.534	20.334
Bilingual	1.901E1	.319	18.378	19.635

a. Covariates appearing in the model are evaluated at the following values: Pre-test achievement score = 18.5258.

b. Based on modified population marginal mean.

3. Location

Dependent Variable:Post test achievement score

Location	Mean	Std. Error	95% Confidence Interval	
			Lower Bound	Upper Bound
Urban	2.067E1	.182	20.317	21.032
Rural	19.531[a]	.178	19.182	19.881

a. Covariates appearing in the model are evaluated at the following values: Pre-test achievement score = 18.5258.

b. Based on modified population marginal mean.

4. Gender

Dependent Variable:Post test achievement score

Gender	Mean	Std. Error	95% Confidence Interval	
			Lower Bound	Upper Bound
Male	2.002E1	.175	19.674	20.362
Female	1.996E1	.176	19.613	20.305

a. Covariates appearing in the model are evaluated at the following values: Pre-test achievement score = 18.5258.

b. Based on modified population marginal mean.

5. Language of instruction * Location (Table 3)

Dependent Variable:Post test achievement score

Language of instruction	Location	Mean	Std. Error	95% Confidence Interval	
				Lower Bound	Upper Bound
English	Urban	21.179[a]	.233	20.720	21.638
	Rural	19.889[a]	.272	19.354	20.424
French	Urban	20.169[a]	.270	19.638	20.701
	Rural	19.698[a]	.306	19.095	20.300
Bilingual	Urban	.[a,b]	.	.	.
	Rural	19.007[a]	.319	18.378	19.635

a. Covariates appearing in the model are evaluated at the following values: Pre-test achievement score = 18.5258.

b. This level combination of factors is not observed, thus the corresponding population marginal mean is not estimable.

6. Language of instruction * Gender (Table 4)

Dependent Variable:Post test achievement score

Language of instruction	Gender	Mean	Std. Error	95% Confidence Interval	
				Lower Bound	Upper Bound
English	Male	20.461[a]	.226	20.016	20.907
	Female	20.607[a]	.265	20.085	21.130
French	Male	19.921[a]	.293	19.345	20.497
	Female	19.946[a]	.282	19.392	20.501
Bilingual	Male	1.933E1	.472	18.398	20.255
	Female	1.869E1	.419	17.863	19.511

a. Covariates appearing in the model are evaluated at the following values: Pre-test achievement score = 18.5258.

b. Based on modified population marginal mean.

7. Location * Gender (Table 5)

Dependent Variable:Post test achievement score

Location	Gender	Mean	Std. Error	95% Confidence Interval	
				Lower Bound	Upper Bound
Urban	Male	2.070E1	.250	20.207	21.189
	Female	2.065E1	.255	20.149	21.151
Rural	Male	19.565[a]	.245	19.082	20.048
	Female	19.498[a]	.246	19.013	19.983

a. Covariates appearing in the model are evaluated at the following values: Pre-test achievement score = 18.5258.

b. Based on modified population marginal mean.

8. Language of instruction * Location * Gender (Table 6)

Dependent Variable:Post test achievement score

Language of instruction	Location	Gender	Mean	Std. Error	95% Confidence Interval	
					Lower Bound	Upper Bound
English	Urban	Male	20.895[a]	.282	20.341	21.449
		Female	21.464[a]	.363	20.750	22.177
	Rural	Male	20.027[a]	.359	19.321	20.734
		Female	19.751[a]	.401	18.961	20.542
French	Urban	Male	20.501[a]	.407	19.701	21.302
		Female	19.837[a]	.350	19.148	20.527
	Rural	Male	19.341[a]	.423	18.507	20.174
		Female	20.055[a]	.442	19.185	20.925
Bilingual	Urban	Male	.[a,b]	.	.	.
		Female	.[a,b]	.	.	.
	Rural	Male	19.327[a]	.472	18.398	20.255
		Female	18.687[a]	.419	17.863	19.511

a. Covariates appearing in the model are evaluated at the following values: Pre-test achievement score = 18.5258.

b. This level combination of factors is not observed, thus the corresponding population marginal mean is not estimable.

Univariate Analysis of Variance

Between-Subjects Factors

		Value Label	N
Language of instruction	1.00	English	145
	2.00	French	103
	3.00	Bilingual	43
Location	1.00	Urban	145
	2.00	Rural	146
Gender	1.00	Male	153
	2.00	Female	138

Descriptive Statistics

Dependent Variable:Post test attitude score

Language of instruction	Location	Gender	Mean	Std. Deviation	N
English	Urban	Male	81.1667	7.45490	54
		Female	82.5625	6.47545	32
		Total	81.6860	7.09973	86
	Rural	Male	79.6875	5.72170	32
		Female	80.4074	6.01446	27
		Total	80.0169	5.81761	59
	Total	Male	80.6163	6.86366	86
		Female	81.5763	6.30873	59
		Total	81.0069	6.63796	145
French	Urban	Male	80.2000	5.88784	25
		Female	80.1176	6.34734	34
		Total	80.1525	6.10487	59
	Rural	Male	82.0000	9.15523	23
		Female	82.3810	6.80056	21
		Total	82.1818	8.02691	44
	Total	Male	81.0625	7.60013	48
		Female	80.9818	6.55600	55
		Total	81.0194	7.02653	103
Bilingual	Rural	Male	81.0526	11.36991	19
		Female	78.0417	7.92618	24
		Total	79.3721	9.59668	43
	Total	Male	81.0526	11.36991	19
		Female	78.0417	7.92618	24
		Total	79.3721	9.59668	43
Total	Urban	Male	80.8608	6.97382	79
		Female	81.3030	6.47829	66
		Total	81.0621	6.73323	145
	Rural	Male	80.7568	8.48820	74

		Female	80.1944	7.04440	72
		Total	80.4795	7.78789	146
	Total	Male	80.8105	7.71768	153
		Female	80.7246	6.77777	138
		Total	80.7698	7.27480	291

Tests of Between-Subjects Effects

Dependent Variable:Post test attitude score

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	12646.790[a]	10	1264.679	131.114	.000
Intercept	23.598	1	23.598	2.447	.119
Pretestattitudescore	12202.372	1	12202.372	1265.064	.000
Languageofinstruction	37.669	2	18.835	1.953	.144
Location	18.760	1	18.760	1.945	.164
Gender	5.966	1	5.966	.619	.432
Languageofinstruction * Location	92.641	1	92.641	9.604	.002
Languageofinstruction * Gender	1.163	2	.582	.060	.941
Location * Gender	3.593	1	3.593	.373	.542
Languageofinstruction * Location * Gender	.059	1	.059	.006	.938
Error	2700.784	280	9.646		
Total	1913760.000	291			
Corrected Total	15347.574	290			

a. R Squared = .824 (Adjusted R Squared = .818)

Estimated Marginal Means

1. Grand Mean

Dependent Variable:Post test attitude score

		95% Confidence Interval	
Mean	Std. Error	Lower Bound	Upper Bound
8.067E1	.190	80.294	81.041

a. Covariates appearing in the model are evaluated at the following values: Pre-test attitude score = 78.3505.

b. Based on modified population marginal mean.

2. Language of instruction

Dependent Variable:Post test attitude score

Language of instruction	Mean	Std. Error	95% Confidence Interval	
			Lower Bound	Upper Bound

English	81.023[a]	.267	80.497	81.548
French	80.254[a]	.312	79.640	80.869
Bilingual	8.078E1	.478	79.843	81.726

a. Covariates appearing in the model are evaluated at the following values: Pre-test attitude score = 78.3505.

b. Based on modified population marginal mean.

3. Location

Dependent Variable:Post test attitude score

Location	Mean	Std. Error	95% Confidence Interval	
			Lower Bound	Upper Bound
Urban	8.092E1	.268	80.397	81.452
Rural	80.496[a]	.261	79.983	81.010

a. Covariates appearing in the model are evaluated at the following values: Pre-test attitude score = 78.3505.

b. Based on modified population marginal mean.

4. Gender

Dependent Variable:Post test attitude score

Gender	Mean	Std. Error	95% Confidence Interval	
			Lower Bound	Upper Bound
Male	8.052E1	.268	79.991	81.046
Female	8.082E1	.269	80.288	81.346

a. Covariates appearing in the model are evaluated at the following values: Pre-test attitude score = 78.3505.

b. Based on modified population marginal mean.

5. Language of instruction * Location

Dependent Variable:Post test attitude score

Language of instruction	Location	Mean	Std. Error	95% Confidence Interval	
				Lower Bound	Upper Bound
English	Urban	81.944[a]	.346	81.262	82.626
	Rural	80.101[a]	.406	79.302	80.900
French	Urban	79.905[a]	.409	79.099	80.710
	Rural	80.604[a]	.471	79.677	81.530
Bilingual	Urban	.[a,b]	.	.	.
	Rural	80.785[a]	.478	79.843	81.726

a. Covariates appearing in the model are evaluated at the following values: Pre-test attitude score = 78.3505.

b. This level combination of factors is not observed, thus the corresponding population marginal mean is not estimable.

6. Language of instruction * Gender

Dependent Variable:Post test attitude score

Language of instruction	Gender	Mean	Std. Error	95% Confidence Interval	
				Lower Bound	Upper Bound

English	Male	80.846[a]	.347	80.164	81.528
	Female	81.199[a]	.406	80.400	81.998
French	Male	80.010[a]	.450	79.125	80.896
	Female	80.498[a]	.432	79.648	81.347
Bilingual	Male	8.088E1	.713	79.477	82.282
	Female	8.069E1	.638	79.434	81.947

a. Covariates appearing in the model are evaluated at the following values: Pre-test attitude score = 78.3505.

b. Based on modified population marginal mean.

7. Location * Gender

Dependent Variable:Post test attitude score

				95% Confidence Interval	
Location	Gender	Mean	Std. Error	Lower Bound	Upper Bound
Urban	Male	8.059E1	.376	79.850	81.329
	Female	8.126E1	.382	80.507	82.013
Rural	Male	80.471[a]	.370	79.744	81.199
	Female	80.522[a]	.368	79.797	81.246

a. Covariates appearing in the model are evaluated at the following values: Pre-test attitude score = 78.3505.

b. Based on modified population marginal mean.

8. Language of instruction * Location * Gender

Dependent Variable:Post test attitude score

Language of instruction	Location	Gender	Mean	Std. Error	95% Confidence Interval	
					Lower Bound	Upper Bound
English	Urban	Male	81.659[a]	.423	80.826	82.491
		Female	82.230[a]	.549	81.149	83.311
	Rural	Male	80.033[a]	.549	78.952	81.114
		Female	80.169[a]	.598	78.992	81.345
French	Urban	Male	79.520[a]	.621	78.296	80.743
		Female	80.289[a]	.533	79.241	81.338
	Rural	Male	80.501[a]	.649	79.224	81.779
		Female	80.706[a]	.679	79.369	82.044
Bilingual	Urban	Male	.[a,b]	.	.	.
		Female	.[a,b]	.	.	.
	Rural	Male	80.879[a]	.713	79.477	82.282
		Female	80.690[a]	.638	79.434	81.947

a. Covariates appearing in the model are evaluated at the following values: Pre-test attitude score = 78.3505.

b. This level combination of factors is not observed, thus the corresponding population marginal mean is not estimable.

General Linear Model

Between-Subjects Factors

		Value Label	N
Language of instruction	1.00	English	145
	2.00	French	103
	3.00	Bilingual	43
Location	1.00	Urban	145
	2.00	Rural	146
Gender	1.00	Male	153
	2.00	Female	138

Descriptive Statistics

	Language of instruction	Location	Gender	Mean	Std. Deviation	N
Pre-test achievement score	English	Urban	Male	20.5556	3.52707	54
			Female	20.5313	5.48890	32
			Total	20.5465	4.32953	86
		Rural	Male	17.5313	5.55898	32
			Female	15.1481	5.27479	27
			Total	16.4407	5.51572	59
		Total	Male	19.4302	4.60317	86
			Female	18.0678	5.99098	59
			Total	18.8759	5.23594	145
	French	Urban	Male	19.8800	2.26053	25
			Female	20.0882	3.61284	34
			Total	20.0000	3.09059	59
		Rural	Male	17.4783	4.52136	23
			Female	18.3333	2.83431	21
			Total	17.8864	3.79238	44
		Total	Male	18.7292	3.69439	48
			Female	19.4182	3.41939	55
			Total	19.0971	3.54941	103
	Bilingual	Rural	Male	15.6842	3.90232	19
			Female	16.2083	3.91185	24
			Total	15.9767	3.86984	43
		Total	Male	15.6842	3.90232	19
			Female	16.2083	3.91185	24
			Total	15.9767	3.86984	43
	Total	Urban	Male	20.3418	3.18203	79
			Female	20.3030	4.58751	66
			Total	20.3241	3.87098	145
		Rural	Male	17.0405	4.86655	74
			Female	16.4306	4.37286	72

			Total	16.7397	4.62386	146
		Total	Male	18.7451	4.39427	153
			Female	18.2826	4.86457	138
			Total	18.5258	4.62100	291
Pre-test attitude score	English	Urban	Male	77.8519	6.66845	54
			Female	78.6875	5.49156	32
			Total	78.1628	6.23625	86
		Rural	Male	78.0000	4.94486	32
			Female	78.5926	5.63136	27
			Total	78.2712	5.23197	59
		Total	Male	77.9070	6.05393	86
			Female	78.6441	5.50787	59
			Total	78.2069	5.82964	145
	French	Urban	Male	79.0400	5.98247	25
			Female	78.1765	6.73512	34
			Total	78.5424	6.38782	59
		Rural	Male	79.8696	7.74188	23
			Female	80.0476	6.86641	21
			Total	79.9545	7.25276	44
		Total	Male	79.4375	6.81958	48
			Female	78.8909	6.78417	55
			Total	79.1456	6.77279	103
	Bilingual	Rural	Male	78.5263	10.29762	19
			Female	75.6667	7.01344	24
			Total	76.9302	8.62829	43
		Total	Male	78.5263	10.29762	19
			Female	75.6667	7.01344	24
			Total	76.9302	8.62829	43
	Total	Urban	Male	78.2278	6.44493	79
			Female	78.4242	6.12199	66
			Total	78.3172	6.27905	145
		Rural	Male	78.7162	7.43284	74
			Female	78.0417	6.63630	72
			Total	78.3836	7.03514	146
		Total	Male	78.4641	6.92158	153
			Female	78.2246	6.37515	138
			Total	78.3505	6.65770	291
Post test achievement score	English	Urban	Male	22.4815	3.81032	54
			Female	23.0312	4.56130	32
			Total	22.6860	4.08804	86
		Rural	Male	19.2500	4.97737	32
			Female	17.1111	4.99487	27
			Total	18.2712	5.05770	59
		Total	Male	21.2791	4.53393	86
			Female	20.3220	5.58150	59

			Total	20.8897	4.99043	145
	French	Urban	Male	21.5600	2.12289	25
			Female	21.0588	3.58398	34
			Total	21.2712	3.03900	59
		Rural	Male	18.5217	3.55310	23
			Female	19.9048	2.96487	21
			Total	19.1818	3.32204	44
		Total	Male	20.1042	3.25014	48
			Female	20.6182	3.38018	55
			Total	20.3786	3.31401	103
	Bilingual	Rural	Male	17.1053	3.28117	19
			Female	16.8750	3.18027	24
			Total	16.9767	3.18843	43
		Total	Male	17.1053	3.28117	19
			Female	16.8750	3.18027	24
			Total	16.9767	3.18843	43
	Total	Urban	Male	22.1899	3.38199	79
			Female	22.0152	4.17499	66
			Total	22.1103	3.75114	145
		Rural	Male	18.4730	4.21095	74
			Female	17.8472	4.08246	72
			Total	18.1644	4.14567	146
		Total	Male	20.3922	4.22592	153
			Female	19.8406	4.61234	138
			Total	20.1306	4.41433	291
Post test attitude score	English	Urban	Male	81.1667	7.45490	54
			Female	82.5625	6.47545	32
			Total	81.6860	7.09973	86
		Rural	Male	79.6875	5.72170	32
			Female	80.4074	6.01446	27
			Total	80.0169	5.81761	59
		Total	Male	80.6163	6.86366	86
			Female	81.5763	6.30873	59
			Total	81.0069	6.63796	145
	French	Urban	Male	80.2000	5.88784	25
			Female	80.1176	6.34734	34
			Total	80.1525	6.10487	59
		Rural	Male	82.0000	9.15523	23
			Female	82.3810	6.80056	21
			Total	82.1818	8.02691	44
		Total	Male	81.0625	7.60013	48
			Female	80.9818	6.55600	55
			Total	81.0194	7.02653	103
	Bilingual	Rural	Male	81.0526	11.36991	19
			Female	78.0417	7.92618	24

			Total	79.3721	9.59668	43
		Total	Male	81.0526	11.36991	19
			Female	78.0417	7.92618	24
			Total	79.3721	9.59668	43
	Total	Urban	Male	80.8608	6.97382	79
			Female	81.3030	6.47829	66
			Total	81.0621	6.73323	145
		Rural	Male	80.7568	8.48820	74
			Female	80.1944	7.04440	72
			Total	80.4795	7.78789	146
		Total	Male	80.8105	7.71768	153
			Female	80.7246	6.77777	138
			Total	80.7698	7.27480	291

Multivariate Tests[c]

Effect		Value	F	Hypothesis df	Error df	Sig.
Intercept	Pillai's Trace	.993	10288.190[a]	4.000	278.000	.000
	Wilks' Lambda	.007	10288.190[a]	4.000	278.000	.000
	Hotelling's Trace	148.032	10288.190[a]	4.000	278.000	.000
	Roy's Largest Root	148.032	10288.190[a]	4.000	278.000	.000
Languageofinstruction	Pillai's Trace	.071	2.554	8.000	558.000	.010
	Wilks' Lambda	.931	2.545[a]	8.000	556.000	.010
	Hotelling's Trace	.073	2.537	8.000	554.000	.010
	Roy's Largest Root	.041	2.887[b]	4.000	279.000	.023
Location	Pillai's Trace	.145	11.791[a]	4.000	278.000	.000
	Wilks' Lambda	.855	11.791[a]	4.000	278.000	.000
	Hotelling's Trace	.170	11.791[a]	4.000	278.000	.000
	Roy's Largest Root	.170	11.791[a]	4.000	278.000	.000
Gender	Pillai's Trace	.005	.346[a]	4.000	278.000	.847
	Wilks' Lambda	.995	.346[a]	4.000	278.000	.847
	Hotelling's Trace	.005	.346[a]	4.000	278.000	.847
	Roy's Largest Root	.005	.346[a]	4.000	278.000	.847
Languageofinstruction * Location	Pillai's Trace	.060	4.419[a]	4.000	278.000	.002
	Wilks' Lambda	.940	4.419[a]	4.000	278.000	.002
	Hotelling's Trace	.064	4.419[a]	4.000	278.000	.002
	Roy's Largest Root	.064	4.419[a]	4.000	278.000	.002
Languageofinstruction * Gender	Pillai's Trace	.025	.888	8.000	558.000	.526
	Wilks' Lambda	.975	.888[a]	8.000	556.000	.526
	Hotelling's Trace	.026	.888	8.000	554.000	.526
	Roy's Largest Root	.022	1.537[b]	4.000	279.000	.192
Location * Gender	Pillai's Trace	.005	.333[a]	4.000	278.000	.856
	Wilks' Lambda	.995	.333[a]	4.000	278.000	.856
	Hotelling's Trace	.005	.333[a]	4.000	278.000	.856
	Roy's Largest Root	.005	.333[a]	4.000	278.000	.856

Languageofinstruction * Location * Gender	Pillai's Trace	.022	1.551[a]	4.000	278.000	.188
	Wilks' Lambda	.978	1.551[a]	4.000	278.000	.188
	Hotelling's Trace	.022	1.551[a]	4.000	278.000	.188
	Roy's Largest Root	.022	1.551[a]	4.000	278.000	.188

a. Exact statistic

b. The statistic is an upper bound on F that yields a lower bound on the significance level.

c. Design: Intercept + Languageofinstruction + Location + Gender + Languageofinstruction * Location + Languageofinstruction * Gender + Location * Gender + Languageofinstruction * Location * Gender

Tests of Between-Subjects Effects

Source	Dependent Variable	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	Pre-test achievement score	1128.034[a]	9	125.337	6.954	.000
	Pre-test attitude score	322.507[b]	9	35.834	.804	.613
	Post test achievement score	1407.915[c]	9	156.435	10.360	.000
	Post test attitude score	444.418[d]	9	49.380	.931	.498
Intercept	Pre-test achievement score	84835.044	1	84835.044	4706.988	.000
	Pre-test attitude score	1560185.291	1	1560185.291	34984.132	.000
	Post test achievement score	99619.550	1	99619.550	6597.286	.000
	Post test attitude score	1656291.694	1	1656291.694	31229.490	.000
Language of instruction	Pre-test achievement score	53.120	2	26.560	1.474	.231
	Pre-test attitude score	171.155	2	85.578	1.919	.149
	Post test achievement score	91.372	2	45.686	3.026	.050
	Post test attitude score	74.998	2	37.499	.707	.494
Location	Pre-test achievement score	566.674	1	566.674	31.441	.000
	Pre-test attitude score	27.226	1	27.226	.610	.435
	Post test achievement score	639.208	1	639.208	42.331	.000
	Post test attitude score	.661	1	.661	.012	.911
Gender	Pre-test achievement score	.109	1	.109	.006	.938
	Pre-test attitude score	25.387	1	25.387	.569	.451
	Post test achievement score	1.550	1	1.550	.103	.749
	Post test attitude score	6.385	1	6.385	.120	.729
Language of instruction * Location	Pre-test achievement score	64.865	1	64.865	3.599	.059
	Pre-test attitude score	25.162	1	25.162	.564	.453
	Post test achievement score	88.291	1	88.291	5.847	.016
	Post test attitude score	212.706	1	212.706	4.011	.046
Language of instruction * Gender	Pre-test achievement score	58.545	2	29.272	1.624	.199
	Pre-test attitude score	99.067	2	49.533	1.111	.331
	Post test achievement score	22.382	2	11.191	.741	.478
	Post test attitude score	110.741	2	55.370	1.044	.353
Location * Gender	Pre-test achievement score	10.521	1	10.521	.584	.445
	Pre-test attitude score	2.289	1	2.289	.051	.821
	Post test achievement score	2.323	1	2.323	.154	.695
	Post test attitude score	.162	1	.162	.003	.956

Language of instruction * Location * Gender	Pre-test achievement score	32.430	1	32.430	1.799	.181
	Pre-test attitude score	5.924	1	5.924	.133	.716
	Post test achievement score	75.067	1	75.067	4.971	.027
	Post test attitude score	4.659	1	4.659	.088	.767
Error	Pre-test achievement score	5064.523	281	18.023		
	Pre-test attitude score	12531.741	281	44.597		
	Post test achievement score	4243.122	281	15.100		
	Post test attitude score	14903.156	281	53.036		
Total	Pre-test achievement score	106065.000	291			
	Pre-test attitude score	1799246.000	291			
	Post test achievement score	123576.000	291			
	Post test attitude score	1913760.000	291			
Corrected Total	Pre-test achievement score	6192.557	290			
	Pre-test attitude score	12854.247	290			
	Post test achievement score	5651.038	290			
	Post test attitude score	15347.574	290			

a. R Squared = .182 (Adjusted R Squared = .156)

b. R Squared = .025 (Adjusted R Squared = -.006)

c. R Squared = .249 (Adjusted R Squared = .225)

d. R Squared = .029 (Adjusted R Squared = -.002)

Estimated Marginal Means

1. Grand Mean

Dependent Variable	Mean	Std. Error	95% Confidence Interval	
			Lower Bound	Upper Bound
Pre-test achievement score	18.144[a]	.259	17.634	18.654
Pre-test attitude score	78.446[a]	.408	77.643	79.249
Post test achievement score	19.690[a]	.237	19.223	20.157
Post test attitude score	80.762[a]	.445	79.886	81.637

a. Based on modified population marginal mean.

2. Language of instruction

Dependent Variable	Language of instruction	Mean	Std. Error	95% Confidence Interval	
				Lower Bound	Upper Bound
Pre-test achievement score	English	18.442	.365	17.724	19.159
	French	18.945	.425	18.108	19.782
	Bilingual	15.946[a]	.652	14.663	17.229
Pre-test attitude score	English	78.283	.574	77.154	79.412
	French	79.283	.669	77.967	80.600
	Bilingual	77.096[a]	1.025	75.078	79.115

Post test achievement score	English	20.468	.334	19.811	21.126
	French	20.261	.389	19.495	21.027
	Bilingual	16.990[a]	.597	15.816	18.165
Post test attitude score	English	80.956	.626	79.725	82.187
	French	81.175	.729	79.739	82.610
	Bilingual	79.547[a]	1.118	77.346	81.748

a. Based on modified population marginal mean.

3. Location

				95% Confidence Interval	
Dependent Variable	Location	Mean	Std. Error	Lower Bound	Upper Bound
Pre-test achievement score	Urban	20.264[a]	.366	19.543	20.985
	Rural	16.731	.356	16.029	17.432
Pre-test attitude score	Urban	78.439[a]	.576	77.304	79.573
	Rural	78.450	.561	77.347	79.554
Post test achievement score	Urban	22.033[a]	.335	21.373	22.693
	Rural	18.128	.326	17.486	18.770
Post test attitude score	Urban	81.012[a]	.629	79.774	82.249
	Rural	80.595	.611	79.392	81.798

a. Based on modified population marginal mean.

4. Gender

				95% Confidence Interval	
Dependent Variable	Gender	Mean	Std. Error	Lower Bound	Upper Bound
Pre-test achievement score	Male	18.226[a]	.366	17.505	18.946
	Female	18.062[a]	.367	17.339	18.785
Pre-test attitude score	Male	78.658[a]	.576	77.524	79.791
	Female	78.234[a]	.578	77.097	79.371
Post test achievement score	Male	19.784[a]	.335	19.124	20.443
	Female	19.596[a]	.336	18.935	20.258
Post test attitude score	Male	80.821[a]	.628	79.585	82.057
	Female	80.702[a]	.630	79.462	81.942

a. Based on modified population marginal mean.

5. Language of instruction * Location

					95% Confidence Interval	
Dependent Variable	Language of instruction	Location	Mean	Std. Error	Lower Bound	Upper Bound
Pre-test achievement score	English	Urban	20.543	.474	19.611	21.476
		Rural	16.340	.555	15.248	17.432
	French	Urban	19.984	.559	18.883	21.085
		Rural	17.906	.641	16.645	19.167
	Bilingual	Urban	.[a]	.	.	.

		Rural	15.946	.652	14.663	17.229
Pre-test attitude score	English	Urban	78.270	.745	76.803	79.736
		Rural	78.296	.873	76.579	80.014
	French	Urban	78.608	.880	76.877	80.340
		Rural	79.959	1.008	77.975	81.942
	Bilingual	Urban	.[a]	.	.	.
		Rural	77.096	1.025	75.078	79.115
Post test achievement score	English	Urban	22.756	.433	21.903	23.610
		Rural	18.181	.508	17.181	19.180
	French	Urban	21.309	.512	20.302	22.317
		Rural	19.213	.586	18.059	20.368
	Bilingual	Urban	.[a]	.	.	.
		Rural	16.990	.597	15.816	18.165
Post test attitude score	English	Urban	81.865	.812	80.266	83.464
		Rural	80.047	.952	78.174	81.920
	French	Urban	80.159	.959	78.270	82.047
		Rural	82.190	1.099	80.027	84.354
	Bilingual	Urban	.[a]	.	.	.
		Rural	79.547	1.118	77.346	81.748

a. This level combination of factors is not observed, thus the corresponding population marginal mean is not estimable.

6. Language of instruction * Gender

Dependent Variable	Language of instruction	Gender	Mean	Std. Error	95% Confidence Interval	
					Lower Bound	Upper Bound
Pre-test achievement score	English	Male	19.043	.474	18.111	19.976
		Female	17.840	.555	16.748	18.932
	French	Male	18.679	.613	17.472	19.886
		Female	19.211	.589	18.051	20.370
	Bilingual	Male	15.684[a]	.974	13.767	17.601
		Female	16.208[a]	.867	14.503	17.914
Pre-test attitude score	English	Male	77.926	.745	76.460	79.392
		Female	78.640	.873	76.922	80.358
	French	Male	79.455	.965	77.556	81.354
		Female	79.112	.927	77.288	80.936
	Bilingual	Male	78.526[a]	1.532	75.511	81.542
		Female	75.667[a]	1.363	72.983	78.350
Post test achievement score	English	Male	20.866	.433	20.013	21.719
		Female	20.071	.508	19.072	21.071
	French	Male	20.041	.561	18.936	21.146
		Female	20.482	.539	19.420	21.543
	Bilingual	Male	17.105[a]	.891	15.350	18.860
		Female	16.875[a]	.793	15.314	18.436
Post test attitude score	English	Male	80.427	.812	78.828	82.026

		Female	81.485	.952	79.612	83.358
	French	Male	81.100	1.052	79.029	83.171
		Female	81.249	1.011	79.260	83.239
	Bilingual	Male	81.053[a]	1.671	77.764	84.341
		Female	78.042[a]	1.487	75.115	80.968

a. Based on modified population marginal mean.

7. Location * Gender

Dependent Variable	Location	Gender	Mean	Std. Error	95% Confidence Interval	
					Lower Bound	Upper Bound
Pre-test achievement score	Urban	Male	20.218[a]	.513	19.207	21.229
		Female	20.310[a]	.523	19.281	21.339
	Rural	Male	16.898	.505	15.904	17.892
		Female	16.563	.503	15.573	17.553
Pre-test attitude score	Urban	Male	78.446[a]	.808	76.856	80.036
		Female	78.432[a]	.822	76.813	80.051
	Rural	Male	78.799	.794	77.235	80.362
		Female	78.102	.791	76.545	79.660
Post test achievement score	Urban	Male	22.021[a]	.470	21.096	22.946
		Female	22.045[a]	.479	21.103	22.987
	Rural	Male	18.292	.462	17.382	19.202
		Female	17.964	.460	17.057	18.870
Post test attitude score	Urban	Male	80.683[a]	.881	78.949	82.417
		Female	81.340[a]	.897	79.575	83.105
	Rural	Male	80.913	.866	79.208	82.619
		Female	80.277	.863	78.578	81.975

a. Based on modified population marginal mean.

8. Language of instruction * Location * Gender

Dependent Variable	Language of instruction	Location	Gender	Mean	Std. Error	95% Confidence Interval	
						Lower Bound	Upper Bound
Pre-test achievement score	English	Urban	Male	20.556	.578	19.418	21.693
			Female	20.531	.750	19.054	22.009
		Rural	Male	17.531	.750	16.054	19.009
			Female	15.148	.817	13.540	16.756
	French	Urban	Male	19.880	.849	18.209	21.551
			Female	20.088	.728	18.655	21.521
		Rural	Male	17.478	.885	15.736	19.221
			Female	18.333	.926	16.510	20.157
	Bilingual	Urban	Male	.[a]	.	.	.
			Female	.[a]	.	.	.
		Rural	Male	15.684	.974	13.767	17.601

			Female	16.208	.867	14.503	17.914
Pre-test attitude score	English	Urban	Male	77.852	.909	76.063	79.641
			Female	78.688	1.181	76.364	81.011
		Rural	Male	78.000	1.181	75.676	80.324
			Female	78.593	1.285	76.063	81.122
	French	Urban	Male	79.040	1.336	76.411	81.669
			Female	78.176	1.145	75.922	80.431
		Rural	Male	79.870	1.392	77.129	82.611
			Female	80.048	1.457	77.179	82.916
	Bilingual	Urban	Male	.[a]	.	.	.
			Female	.[a]	.	.	.
		Rural	Male	78.526	1.532	75.511	81.542
			Female	75.667	1.363	72.983	78.350
Post test achievement score	English	Urban	Male	22.481	.529	21.441	23.522
			Female	23.031	.687	21.679	24.383
		Rural	Male	19.250	.687	17.898	20.602
			Female	17.111	.748	15.639	18.583
	French	Urban	Male	21.560	.777	20.030	23.090
			Female	21.059	.666	19.747	22.371
		Rural	Male	18.522	.810	16.927	20.117
			Female	19.905	.848	18.236	21.574
	Bilingual	Urban	Male	.[a]	.	.	.
			Female	.[a]	.	.	.
		Rural	Male	17.105	.891	15.350	18.860
			Female	16.875	.793	15.314	18.436
Post test attitude score	English	Urban	Male	81.167	.991	79.216	83.117
			Female	82.563	1.287	80.028	85.097
		Rural	Male	79.688	1.287	77.153	82.222
			Female	80.407	1.402	77.649	83.166
	French	Urban	Male	80.200	1.457	77.333	83.067
			Female	80.118	1.249	77.659	82.576
		Rural	Male	82.000	1.519	79.011	84.989
			Female	82.381	1.589	79.253	85.509
	Bilingual	Urban	Male	.[a]	.	.	.
			Female	.[a]	.	.	.
		Rural	Male	81.053	1.671	77.764	84.341
			Female	78.042	1.487	75.115	80.968

a. This level combination of factors is not observed, thus the corresponding population marginal mean is not estimable.