

**IMPACT OF FIELD -TRIP ON MOTIVATION, RETENTION AND  
PERFORMANCE IN PLANT ADAPTATION AMONG SECONDARY  
SCHOOL STUDENTS IN GUMEL, JIGAWA STATE, NIGERIA**

**BY**

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**October, 2016**

## **DECLARATION**

I hereby declare that this dissertation titled “Impact of Field-trip on Motivation, Retention and Performance in Plant Adaptation among Secondary School Students in Gumel, Jigawa State, Nigeria” has been written by me and it is record of my own research work. It has not been presented in any previous publication for a higher degree. All quotations and sources of information are fully acknowledged and referenced.

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## CERTIFICATION

This dissertation titled “Impact of Field-trip on Motivation, Retention and Performance in Plant Adaptation among Secondary School Students in Gumel, Jigawa State, Nigeria” by Nazifi Salisu WADA meets the regulation governing the award of Master’s Degree in Science Education Ahmadu Bello University, Zaria and is approved for its contribution to knowledge and literary presentation

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## **DEDICATION**

This study is dedicated to the family of Alhaji Wada Salisu for their moral, spiritual and financial support to me throughout the period of this research work.

## **ACKNOWLEDGEMENTS**

All praise is due to Allah who gave me the opportunity and sustained me throughout this programme. I wish to appreciate most indefatigable supervisors Dr. B. Abdulkarim and Dr. M.A Lakpini for their guidance, constructive criticism, suggestion and cooperation without which this work would have never been completed. Your love, patience and words of advice, encouragement are highly appreciated. I wish to express my sincere gratitude to the Head of Department in person of DR. M. Musa and to all my lecturers in Science Education Department such as Prof. I.A. Usman, DR. M.O. Ibrahim, DR. S.S Bichi, DR. (Mrs.) Olorukooba, DR. F.K Lawal, DR. J.O. Olajide, Prof. J.S Mari, DR. S.S Obeka, DR. T.E. Lawal, DR. M.M. Atadoga among others for imparting me with knowledge, words of encouragement and moral support which added quality to this research study. I also appreciate the inspiration and co-operation given by my friend and brother Gali Musa. My acknowledgement will not be completed without mentioning my wife and best friend Barrister Basira Yunus Musa for her encouragement. I sincerely thank all other people too numerous to mention who have made one input or another in this study. God bless and appreciate you all.

## **LISTS OF ABBREVIATIONS**

<b>WAEC</b>	West African Examinations Council
<b>NECO</b>	National Examinations Council
<b>PAPT</b>	Plant Adaptation Performance Test
<b>PAMQ</b>	Plant Adaptation Motivation Questionnaire
<b>STAN</b>	Science Teachers Association
<b>MDG</b>	Millennium Development Goal
<b>JERD</b>	Jigawa Education Resource Department
<b>NGOs</b>	Non-governmental Organizations
<b>UNESCO</b>	United Nation for Education, Science and Culture
<b>FME</b>	Federal Ministry of Education

## OPERATIONAL DEFINITION OF TERMS

**Field-trip:** A Field-trip is an outdoor type of laboratory activity or field work or learning exercise undertaken by teachers and students in certain aspects of a subject, to give students the opportunity to acquire knowledge.

**Retention:** Retention is the ability to recall and consequently remember things, experience on what is learnt by an individual at a later time.

**Motivation:** is reason for directing behavior toward a particular goal, engaging in a certain activity, or increasing energy and effort to achieve the goal.

**Lecture Method:** is a teacher centered method (talk-chalk method), is a method that teacher dominate the lesson disseminating knowledge where ideas, concepts, generalization and facts are presented to the students who are mainly passive hearers.

**Reconnaissance survey:** is an examination or survey to the general characteristics of a geographical region.

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## ABSTRACT

This study was carried out to investigate the impact of Field-trip on motivation, retention and performance on plant adaptation among secondary school students in Gumel, Jigawa State, Nigeria. Quasi-experimental research design, which utilized pretest, posttest and postpost test, was adopted. The population of the study consisted of 3449 SSII students from 15 public schools in Gumel, Jigawa State. Two out of 15 schools were randomly selected as a sample, where one school each were used as experimental and control group. The experimental group was taught using Field-trip teaching strategy while the control group was taught using lecture method. Two intact classes were selected to form a sample of 124 students. Instruments used for the study were Plant Adaptation Performance Test (PAPT) and Plant Adaptation Motivation Questionnaire (PAMQ) with the reliability value of  $r = 0.78$ . Research questions were answered descriptively using means and standards deviation and the hypotheses were tested at 0.05 level of significance. t-test and Kruskal Wallis statistical tools were used in analyzing the data collected. Major findings of the study revealed that plant adaptation concept favoured Field-trip teaching strategy. The study further confirmed that Field-trip teaching strategy enhanced retention, motivated students and it is gender friendly. From the results of analysis discussed, recommendations were made one of which was that there is need for teaching and learning strategies involving student's participation such as Field-trip teaching strategy which enhanced performance, retention and motivation of students.

## **CHAPTER ONE**

### **THE PROBLEM**

#### **1.1 Introduction**

Science as a branch of knowledge is the systematic study of things around us. Eneh, (2000) opined that the totality of knowledge obtained from such study constitutes scientific knowledge. The basic understanding of the universe and its content comes from science. Nwagbo (2006) defined science as an intellectual activity carried out by humans, designed to discover information about the natural world and to discover the ways in which this information can be organized to benefit human race. Science is also seen as complex human activities that leads to the production of a body of universal statement, called laws, theories or hypotheses which serve to explain the observable behavior of the universe or part of it which in themselves have predictive characteristics (Shaibu, 2008). In addition science deals with nature, by observing it and later subject observed phenomena to experimental investigation (Anaso, 2008). In science education students are exposed to several methods of teaching and learning of science. These include lecture method, demonstration, discussion, laboratory activities, and cooperative learning few to be mentioned, depending on the aspect one want to teach. Usman, (2008), defines science as to consist of specific branch of a general body of knowledge such as biology, chemistry, physics, geography, astronomy to mention but a few. These definitions indicate that science is an organized body of knowledge and a way of thinking in order to understand and explain natural phenomena.

Biology is the science that is concerned with the study of life and living organisms, including their structure, function, growth, evolution, distribution, taxonomy, interrelationship between living things and their environment (ecology), with the social implications of what we

know about livings. Farah (2011) observed that with biology one can study any of the health science courses, be a teacher, laboratory assistance, and can conduct research on related fields of botany, ichthyology, zoology among others. The Federal Ministry of Education, in the National Policy on Education (FME 2013) made Biology a core science subject at Senior Secondary School (SSS). The objectives of biology curriculum include:

- i. Good laboratory and field skills in biology
- ii. Meaningful and relevant knowledge in biology
- iii. Ability to apply scientific knowledge to everyday life in matters of personal and community health and agriculture
- iv. Reasonable functional scientific attitudes and
- v. Emphasis of content and context of the syllabus is placed on field studies, guided-discovery/biology as inquiry. Pg.12

The Poor performance in Biology among Nigerian secondary school students has been the major concern of parents, teachers and general public. Jibrin and Nuru (2007) independently identified poor methods of teaching and improper use of instructional materials as some of the deficiencies of science teachers. Okebukola (1997) also attributed the poor achievement in Biology to the use of ineffective teaching and learning strategies and lack of appropriate learning environment under which Biology teaching takes place. Research studies shown that several factors such as anxiety, Lack of motivation, poor methods of teaching, family background, school/classroom environment, peer group, over-loaded biology syllabus, difficulty of topic and some concept as well as absence of dedication and resourcefulness on the part of the teachers among others were found to be some of the reasons why the academic performance of Senior Secondary School students fall below (Vogel and Collins, 2010).

**Table 1.1 NECO Examination Result for Biology Students from 2010-2014 in Nigeria.**

Years	Total number of students sat for examination	% with A1-C6	% with D7-F9
2010	1,249,028	57.27	42.73
2011	1,268,213	47.04	52.96
2012	1,348,528	41.95	58.05
2013	1,306,535	42.98	57.02
2014	1,508,965	52.17	47.83

**Source: National Examinations Council, Kaduna (NECO, 2014)**

Table 1.1 shows students performance from 2010-2014 in all over the federation of students that pass at credit level and above with the percentage of those who failed in biology were clearly shown. The Table shows that for three years, the percentage failure is higher than fifty percent and only in 2010 and 2014 percentage pass is higher than fifty percent.

One of the common method of teaching science at secondary school level is lecture method. According to Bichi (2002), it is the method of teaching that emphasizes “talk and chalk” in teaching of science subjects. More than 80% of the scientific information and principles are delivered as lecture. Obeka (2009) described lecture method as a teacher-centered method. He further said that the method comprises the acquisition of subject matter usually by memorization and close supervision of the students by the teacher. However, teachers embraced this method for easy coverage of school syllabus. It is characterized by one way flow of information from the teacher who is always active, to the students who are always passive. Usman (2008) opined that the use of lecture method in science teaching lead to rote learning, and essential part of it will be missing. The use of lecture method alone by teachers creates a lot of tension among students because often little or no room is given to students to express their

areas of difficulties either by way of asking questions or contributing to the progress of the lesson. This situation leads to restlessness, frustration and anxiety which impair students' learning (Geddes and Grossel 2007). Any teaching method that will help students to develop scientific attitude and skills will also help the students to achieve high in science (Millan 1995).

A Field-trip, which may also be termed as an instructional trip, school excursion, or school journey, is defined by Krepel and Durrall (2008) to be a school or class trip with an educational intent, in which students interact with the setting, displays, and exhibits to gain an experiential connection to the ideas, concepts, and subject matter. Tal and Morag (2009) described Field-trips as students' experiences outside of the classroom at interactive locations designed for educational purposes.

Field-trips may be planned for five purposes; namely to:

- i. provide firsthand experience,
- ii. stimulate interest and motivation in science,
- iii. add relevance to learning and interrelationships,
- iv. strengthen observation and perception skills, and
- v. promote personal (social) development (Michie, 2004). Pg 6.

According to Obeka (2010) Field-trip is an outdoor type of laboratory activity or field work or learning exercise undertaken by teachers and students in certain aspects of a subject, to give students the opportunity to acquire knowledge of the real world in which organisms live. In addition, Aliyu (2008) observes that Field- trip is taking students out of the classroom to places where they can see concrete illustration of classroom theories. Field-trips take students to locations that are unique and cannot be duplicated in the classroom. Each student observes natural settings and creates personally relevant meaning to the experience. Interactive exhibits

help students play with concepts, activities often not possible in the classroom. Earlier course content suddenly becomes relevant as students assimilate and accommodate new understanding and cognition (Lei, 2010a) The connection between the Field trip venue and the classroom links the Field-trip's experiential learning with prior experiences and learning from the classroom (Lei, 2010b).

Motivation is a theoretical construct used to explain behaviour. It represents the reasons for people's actions, desires, and needs. Motivation can also be defined as one's direction to behavior and vice versa, (Elliot, Kratochiwill, Cook & Traveres, 2001). Mills (2005) revealed that motivation is a significant variable in shaping the attitude of individual. There are two type of motivation namely; intrinsic and extrinsic. The intrinsic motivation means that the individual's motivation stimuli are coming from within. The individual has the desire to perform a specific task, because its result are inaccordance with his belief system or fulifill a desire and therefore importance is attached to it. The extrinsic motivation means that individual's motivational stimuli are coming from outside. In other words our desires to perform a task are controlled by an outside source. Many researchers have suggested many strategies that would be used by the teacher to motivate the students to learn. In the view of Krapp (2005) every educator needs to have concern about motivation. It is a quality that students, teachers, parents, school administrators and other members of the community must have if our educational system is to prepare young people adequately for the challenges and demands of coming century. Morris (2008) contended that it is important for students to be motivated and well prepared for class units and activities in the school. Equally, students' motivation is said to be as important as any other variables in a learning situation. For instance, Badola (2013) had found achievement levels to be joint result of ability and motivation. Their recommendations for

teachers based on study results included the allowing students to have choice between equally challenging tasks, and minimizing external rewards as motivators for achievement. Haines (2010) in a study on ‘Consumer Testing’: applying the scientific method to every life’ recommended that teachers should use real life opportunities and experiences to design experiments to motivate middle school science students. Cury (2010), noted that classroom environment is more important than even individual goals in influencing pupils’ interest. Mitchell and Gilson (2011) found that environment is very important in student’s motivation to learn.

Voninnvich (2012), in a study on improving students’ motivation in the secondary classroom through the use of Critical Thinking Skills, Cooperative Learning Techniques and Reflecting Journal Writing reported that lack of students’ motivation can come from content-oriented classroom that provides little opportunity for students to create individual expressions and find relevance in the materials presented. Heyson, Copple, Jones (2006) noted that because of poor motivation due to inadequate remuneration, poor teaching environment as a result of lack of basic teaching materials, unmotivated learners in the classroom, among others, the teachers have become the endangered species in their own profession. They no longer teach and the students in turn no longer learn. The researcher suggested that motivated students are problem solvers and academic achievers. He further maintained that motivation sustain students’ interest in studies and reduce the rate of dropout, truancy and low enrollment.

Whereas retention is the ability to recall and consequently remember things, experience on what is learnt by an individual at a later time. Retention was described as a form of reaction to what has been presented in the past. In other words, it is as a result of orientation or attitudes which marked an original perception. Lakpini (2006) in her study described retention as the

ability of the memory to recall information which can be retrieved after exposure to a series of instruction and training. Retaining the effect of learning could be possible into memory. However, things that lead confusion or interference among learned material decrease the speed and efficiency of learning. Where as anything that aids learning should improve retention. Bichi (2002).

The academic performance of males and females in science, technology and mathematics has been perceived differently, where males are rated higher than females(Bello, 2002).Researchers in science education such as Bichi (2002), Linver, Davis-kean and Eccles (2002), have expressed concern on gender related issues with the view to improving science teaching and learning. Jimoh (2001) reported that the position of females in science, mathematics and vocational education is below average when compared to males. Fanstosterling (1992) opined that the difference is in socialization and not biological. Ibe (2006) believed that gender discrimination in science in Nigeria is the practice of the day, because people always think that science is only for males while languages are for females. Habeeb (2001) also believed that quite a number of factors are responsible for the low achievement of females in sciences. Oluwatoyin (2007) observed that women perform better when they are exposed to science. The result of some studies also showed no significant difference between the achievement of boys and girls in science before they enter primary or secondary school. The finding of Bichi (2002), Aweriale (2006) and Joseph (2000) reported no significant difference between male and female achievement in science,but Ifamuyiwa (2005) stressed females are intellectually incapable of competing in science and mathematics and difficult task with the males. Some parents discourage their girls from science and technology careers saying that they are abnormal and may not be capable of managing marital home. The girls themselves feel

discouraged by the attitudes of teacher and parents and often suffer from self esteem. Research findings have shown that female students have less positive attitude to mathematics than the male and also demonstrated less superiority at secondary school level. This probably ought to be the result of stereo typing of task that takes place with more attention given to the training and education of males in science area (Ogwuazor 1992).

Ogunleye, (1999) identified different methods of teaching biology ranging from lecture, laboratory, demonstration, Field-trip few to be mention. Even with these varied strategies, student's performance in biology remained poor. A number of reasons were identified as being responsible for this failure rate, prominent among them are the teachers' use of inappropriate teaching methods, lack of motivation, over-loaded biology syllabus, difficulty of topic and some concept as well as absence of dedication and resourcefulness on the part of the teachers.

### **1.1.1 Theoretical Framework**

Field-trip Teaching Strategy was embedded in inductivism learning theories which emphasized the active role of learner in the learning process. This active role allows learners to interact with one another and construct their own knowledge. Inductivism was very paramount theory in research, teaching and learning of education that allows individual to construct their own knowledge. Inductivism learning theory has an important place in Biology. Inductivism was a theory of knowledge that argues that human beings generate knowledge and meaning from an interaction between their experiences and ideas. It has influenced a number of disciplines, including psychology, sociology, education and history of science. Inductivism was a kind of learning strategy that laid emphasis on active role of learners in the process of constructing their own knowledge. Field-trip Teaching Strategy has overwhelming theoretical supports which justify its wide prevalence and acceptance in different subject areas. Modern theories of

learning emphasize the important role played by the learners in the learning process. One of such theories was inductivism theory proposed by Bacon (1972). Inductivism is a learning theory founded on the idea that students construct knowledge in the process of learning through interaction with the phenomenon, as they develop shared-meaning of the phenomenon within social context. According to constructivist Novak (1997) learning is an active process in which learners are active sense-makers who seek to build coherent and organized knowledge. Learning become meaningful only after the new materials are well connected with existing related knowledge or schema. Inductivism as a theory of scientific knowledge placed emphasis on the role of observation and experience, as a secure basis from which scientific knowledge was derived. The process was considered to begin with observation of natural phenomena using senses which leads to the formation of relevant observation statements from which universal statement were derived by inductive reasoning. This type of reasoning began from specific to generalization. Bacon created methods, like the scientific method, because he believed in a research based learning system. His revolutionary ideas being that students need to learn dynamically rather than scholastically.

Therefore the present study adopted Field- trip teaching strategy and investigate its Impact on Motivation, Retention and Performance in Plant Adaptation among Secondary School Students in Gumel, Jigawa State, Nigeria.

## **1.2 Statement of Problem**

In spite of the popularity of biology among Nigerian students, performance at senior secondary schools level had remained poor (Ahmed 2014). Research studies showed that several factors such as lack of motivation, anxiety, poor methods of teaching, family background, school/classroom environment, peer group, over-loaded biology syllabus, difficulty of topic and

some concept as well as absence of dedication and resourcefulness on the part of the teachers among others were found to be some of the reasons why performance of Senior Secondary School students (including biology students) falls below what might ordinarily be expected of individuals of similar intellectual capacities (Vogel & Collins, 2010). Part of the reasons for Failure of students in Examination were attributed to the methods of teaching adopted by teachers in teaching Biology, which is mostly lecture method, which is not recommended for teaching science (Lakpini, 2006). The used of lecture method was attributed to the fact that the school calendar in Nigeria is often interrupted by both teaching and non teaching staff, Industrial actions and public holidays, and there is a need for completion and covering of the syllabus to prepare the students for both external and internal Examinations. Lack of or insufficient laboratory facilities and equipments are also the contributing factor of such failure.

The high level of failure may not be unconnected with poor performance in plant adaptation concept because WAEC/NECO biology questions show that students cannot escape answering questions on plant adaptation. This is indicated from the analysis on question paper for 2013/2014 WAEC and 2012/2013 NECO as shown in Table 1.2.

**Table 1.2: Final Year Examination Number of Questions on Plant Adaptation in WAEC/NECO.**

	Objectives Total questions	Plant adaptation concept	EssayTotal questions	Plant adaptation concept	PracticalTotal questions	Plant adaptation concept
WAEC	60	14	12	4	3	1
WAEC	60	12	12	4	3	-
NECO	60	14	15	5	3	1
NECO	60	14	15	5	3	1

Source: WAEC/NECO 2013/2014. Kano Office

Table 1.2 indicated that, WAEC and NECO always ask questions on plant adaptation concept every years. The number of questions asked both in essay and practicals shows that students cannot escape answering questions on plant adaptation concept. This may also be part of the reasons for the poor performance of students in Biology.

Field-trip has been found to develop interest, stimulates curiosity, empowering students to ask questions, discuss observations, consider past experiences, or simply ponder the topic (Farmer, Knapp, & Benton, 2007b; NRC, 2009). Kisiel (2006b) has found a significance differences in performance of students exposed to Field-trip experiences and those who were not exposed. Researchers like Badola (2013), have suggested many strategies that would be used by the teacher to motivate the students to learn. Mills (2005) revealed that motivation is a significant variable in shaping the attitude of individual. Therefore this study investigated the impact of Field-trip on motivation, retention and performance in Plant Adaptation among secondary school students in Gumel, Jigawa, Nigeria.

### **1.3 Objectives of the Study**

The study was guided by the following objectives, to:

- i. examine the impact of Field-trip on performance of students taught Plant adaptation concept.
- ii. determine the effect of Field-trip method on the retention ability of students
- iii. compare the academic performance of male and female students taught Plant adaptation concept using Field-trip.
- iv. investigate the effect of motivation level of students taught PlantAdaptation concept using Field-trip method.

## 1.4 Research Questions

The following research questions were raised:

- i. What is the difference between the mean scores of students taught Plant Adaptation concept using Field-trip method?
- ii. What is the is difference between retention ability of students taught Plant adaptation concept using Field-trip method?
- iii. What is the difference between performance of male and female students taught Plant Adaptation concept using Field method?
- iv. What is the difference between the motivation levels of students taught Plant Adaptation concept using Field-trip method?

## 1.5 Null Hypotheses

The following null hypotheses were formulated and tested at  $p \leq 0.05$  level

HO1: There is no significant difference between the mean scores of students taught Plant Adaptation concept using Field-trip method and those taught using lecture method.

HO2: There is no significant difference between the retention ability of students taught Plant Adaptation concept using Field-trip method and lecture method of teaching.

HO3: There is no significant difference between the mean scores of male and female students taught Plant Adaptation concept using Field-trip.

HO4: There is no significant difference on students' motivation taught Plant Adaptation concept using Field-trip method and lecture method of teaching.

## 1.6 Significance of the Study

The finding of this study would hopefully be useful to the following:

**Biology students** It is hoped that finding of this study would build a proper link between students' performance in Plant Adaptation and the quality needed for teachers' effectiveness in handling the subject across the state.

**Science teachers:** would benefit from the study by adopting the strategy used in teaching plant adaptation concept, this may make the lesson interesting to the students,

**Educational planners** The finding could also be useful to educational planners, science curriculum planners, administrators and principals.

**Professional Bodies and Associations** such as Science Teachers Association of Nigeria (STAN), Millennium Development Goal (MDGs) and other related body in training their prospective members on the effective use of field method and proper selection of appropriate teaching method.

## 1.7 Scope of the Study

In this study the researcher examined the impact of Field-trip on motivation, retention and performance in Plant Adaptation among secondary school students in Gumel Zone, Jigawa, Nigeria. All students offer biology in senior classes. According to monitoring and evaluation unit of Jigawa Education Resource Development (JERD), Gumel Education Zone has a total number of fifteen (15) secondary schools. The main concept taught was Plant Adaptation (under the topic conservation of water of xerophytes, mesophytes, hydrophytes and halophytes plants) which is one of the major concepts in Ecological Adaptation in Senior Secondary (SSII) curriculum and the topic is more of Field-trip in which the students can see the plants in their natural environment. Plant Adaptation Performance Test (PAPT) and Plant Adaptation

Motivation Questionnaire (PAMQ) were used to collect information. Note that the questionnaire only measure intrinsic motivation.

### **1.8 Basic Assumptions**

The following are the basic assumption of the study:

- i. All the schools have qualified and experienced biology teachers.
- ii. Students have prior knowledge of adaptation from SSI and the concept of plant adaptation is included in SSII syllabus.
- iii. The schools under study run the same academic calender and use same curriculum.

## CHAPTER TWO

### REVIEW OF RELATED LITERATURE

#### 2.1 Introduction

This research study examines the Impact of Field-trip on Motivation, Retention and Performance in Plant Adaptation among Secondary School Students in Gumel, Jigawa State, Nigeria. The literature was reviewed in the following sub-headings:

- 2.2 Biology as a school science
- 2.3 Science Teaching Methods
  - 2.3.1 The Role of Field-Trip in Science Teaching
  - 2.3.2 Types of Field-Trips
  - 2.3.3 The Role of Teacher in Field-Trip
  - 2.3.4 Lecture Method
- 2.4 Students' Performance in Biology
- 2.5 Field-trip and Motivation in Learning biology
- 2.6 Field-trip and Retention
- 2.7 Field-trip and Gender
- 2.8 Overview of Similar Studies
- 2.9 Implications of Literature Reviewed to the Present Study

#### 2.2 Biology as a School Sciences

As a science subject, Biology at senior secondary school level is often regarded as a “soft” option, which has led to the explanation of the relatively enrolment in Biology. Biology is the study of plants and animals as a core subject for many science disciplines in post primary

institution in Nigeria; it is designed ultimately to produce educated individuals some of whom may take to biological studies in science professional pursuit. The study of biology education benefits an individual in a number of ways as stated by (Farah,2011). Biological science is at the forefront to finding answers to some society most vexing problems.

The influence of biology is related to both biotic and abiotic environments comprising elements such as water, nutrient, light, temperature and later comprising animals, plants and microorganisms. Biological science can be traced to the development of agriculture, animal husbandry, medicine and food production. Due to the recognition and the contributions of biological studies, scientific and technological problems have been solved as confirmed (Abdullahi 1982).

Biology as an important discipline has contributed tremendously to financial, physical and aesthetic benefit to man and to the nation building. The areas of contribution of biology include:

- Medicine: Most of the major discoveries in medicine have been developed from practical study of physiological processes.
- Fisheries: The propagation, management and conservation of fish and aquatic animal for food, sports and other non-edible products.
- Apiculture: The breeding of honey bees for production of honey wax and pollination of crops.
- Parasitology: The investigation and control of parasite of man, domestic and wild animals.
- Forestry: Planting, culture and development of forest tree for timber, wood, pulps, poles, food and raw material.

- Crime detection: The knowledge of genetics helps to detect crime using fingerprint as well as using insect to detect crime (forensic entomology).

From the above mentioned a good knowledge of these benefits will be of utmost importance to students and create interest of learning in them. Hence, the need for effective study of biology in secondary schools is emphasized

### **2.3 Science Teaching Methods**

Knowledge of the nature of science can enable individual to make more informed decision with respect to scientifically based issues; promote students in depth understanding traditional subject matter and help them distinguish science from other ways of knowing.

Science teaching generally and teaching biology in particular cannot be effectively done unless effective instructional methods are employed. There are various methods of teaching biology, some of which are lecture method, demonstration, Field-trip and laboratory methods among others. James (2000) viewed lecture method as one of the most popular method of instruction commonly used for science teaching. He described lecture method as that traditional approach which is referred to as didactic approach, and thus can be defined as a teaching technique in which one person usually the teacher present a spoken discourse on a particular subject. Lecture method of teaching emphasize “Talk and Chalk” in the teaching of science subjects. More than 80% of the scientific information and principles are delivered as lecture Usman (2000). Teachers embraced this method for easy coverage of school syllabus. It is characterized by one way flow of information from the teacher who is always active, to the students who are always passive. The method saves time and energy. It allows easy handling of large classes without much stress and is not expensive as only the chalkboard is require.

Lecture method is not effective for science teaching. James (2000) argued that lecture method does not promote meaningful learning of science, because difference in student's ability is not considered and it cannot satisfy the individual learning modes. Students easily become restless and disruptive since their attention span is very limited, the researchers added.

Demonstration is another method in science teaching which Anaso (2008) simply described as "to display something". This approach involves showing a particular procedure or skill to the learners who after careful teaching and learning and interaction repeat and practice the same process shown to them. Demonstration method can be used when the available resource, equipment cannot go round for all students in the class. The teacher or some groups of students usually carry it out. The method is less costly in term of materials and it can be used to teach certain techniques or skills, theory and practice. It allows teachers to handle activities that could be harmful to students if carried out by them. However, demonstration does not allow students to develop their skills or manipulate and therefore do not satisfy their entire psychomotor domain. Students always have problems in seeing the details of the objects or activities being carried out during demonstration (Anaso 2008 & Obeka 2010).

### **2.3.1 Field-Trip Teaching Strategy in Science**

A Field-trip, which may also be termed as an instructional trip, school excursion, or school journey, is defined by Krepel and Durrall (2008) to be a school or class trip with an educational intent, in which students interact with the setting, displays, and exhibits to gain an experiential connection to the ideas, concepts, and subject matter. Tal and Morag (2009) described Field trips as student's experiences outside of the classroom at interactive locations designed for educational purposes.

Field-Trips may be planned for five purposes; namely to:

- i. provide firsthand experience,
- ii. stimulate interest and motivation in science,
- iii. add relevance to learning and interrelationships,
- iv. strengthen observation and perception skills, and
- v. promote personal (social) development (Michie, 2004).

Field-trips take students to locations that are unique and cannot be duplicated in the classroom. Each student observes natural settings and creates personally relevant meaning to the experience. Interactive exhibits help students play with concepts, activities often not possible in the classroom. Earlier course content suddenly becomes relevant as students assimilate and accommodate new understanding and cognition (Lei, 2010a). The connection between the Field- trip venue and the classroom links the Field-trip's experiential learning with prior experiences and learning from the classroom (Lei, 2010b). Students who directly participate during a field experience generate a more positive attitude about the subject. Many researchers have investigated knowledge gain and learning that occurred during Field trips (Hudak, 2003; Kisiel, 2006; Mawdsley, 1999; Michie, 2007; Nadelson & Jordan, 2012; Scarce, 1997; Scribner-MacLean & Kennedy, 2007). Research by Wilson (2011) suggested that eighth grade students with an interest in science were significantly more likely to acquire science related careers than students with no interest in science. Yet, science is often limited in elementary school curricula despite the recognized importance of early development of science concepts and skills. Teachers are in position to motivate and capture students' interest in the sciences. Effective methods to develop student's interest include experiential activities and Field-trips, which create authentic learning opportunities for students, regardless of the content area.

However, experiential activities and Field-trips do not simply happen, teachers need to understand that such activities require organization, planning, and student reflection to maximize the learning experience, the same as classroom-based experiential learning. The purpose of this paper is to examine literature concerning experiential learning activities and Field-trips, focusing on science-related Field-trips and the role of the classroom teacher prior to, during and after the field experience.

To save money and time from preparation and traveling, some instructors choose to simply use the school computers and take digital Field-trips. Options are plentiful and students no doubt learn from the digital experience, but students only experience what the media thinks is important, and the students do not encounter a multidimensional activity in which all their senses are fully involved (National Research Council (NRC), 2009). In contrast, Field-trips are experiential, authentic social events that create a new way of knowing an object, concept, or operation. Quality experiences lead to deeper learning and interest development (NRC, 2009).

### **2.3.2 Types of Field-Trips**

Formal Field-trips consist of planned, well-orchestrated experiences where students follow a documented format. Government agencies, museums, and businesses offer excellent formal experiential learning activities and programs, which are usually run by the venue's staff. One student's experience is essentially the same as any other student's experience. Teachers find such programs comfortable because the students are bound to a choreographed agenda. However, there are minimal opportunities for students to personally interact and connect to the experience (Rennie, 2007).

Informal Field-trips are less structured and offer students some control and choice concerning their activities or environment. When observing students interacting in an informal

education setting such as a science center or field station, teachers are often amazed by how much students know and which students possess the most knowledge (Rennie, 2007). Informal education is a legitimate cognitive learning model. “Informal science experiences - in school-based Field-trips, student projects, community based science youth programs, casual visits to informal learning settings, and press and electronic media can be effectively used to advance science learning” (Hofstein & Rosenfeld, 1996, p. 106 ). Students feel at ease in an informal learning environment. The focus may be individualized, activities are not competitive or assessed, interaction is voluntary and unforced, and social interaction is encouraged. Together, these qualities create an intrinsically motivated students (Rennie, 2007) that encourages students to examine their connection to the local and national communities, as well as their connection to the local and global ecosystems (Krepel & Durrall, 2008).

Non-school related informal Field-trips such as family activities, also contribute significantly to children’s science knowledge (Rennie & McClafferty, 1995), although science knowledge and interest acquired at home may be compromised if the majority of experience occurs through the media such as television and the Internet, in which the children may have difficulty determining reality from entertainment.

Field-trips offer a unique opportunity for students to create connections, which will help them gain understanding and develop an enjoyment of learning. Students on Field-trips sharpen their skills of observation and perception by utilizing all their senses (Nabors et al., 2009). Students develop a positive attitude for learning, motivating them to develop connections between the theoretical concepts in the classroom and what has been experienced (Falk, Martin,&Balling, 1978). Outdoor Field-trips provide an opportunity for students to develop increased perception, a greater vocabulary, and an increased interest in the outdoors

(Hoisington, Savleski, & DeCosta, 2010). Developed interest stimulates curiosity, empowering students to ask questions, discuss observations, consider past experiences, or simply ponder the topic (Farmer, Knapp, & Benton, 2007b; NRC, 2009). When on a Field-trip, the venue is not the only location that affects students; they also gain knowledge and understanding about their neighborhoods and communities as they travel from the school to the Field-trip venue (Nabors et al., 2009). Therefore this study will investigate the impact of Field-trip on motivation, academic performance and retention in Plant Adaptation among Secondary School Students in Gumel Zone, Jigawa State, Nigeria.

### **2.3.3 Role of the Teacher in Field-trip**

Teachers have little training or pedagogical knowledge relating to the process of Field-trip planning and preparation (Tal and Morag, 2009). Pre-service teachers experience a Field trip during each clinical classroom observational visit, and it is not unusual if the pre-service teacher went on a Field-trip during clinical classroom observations or student teaching. In spite of these many field experiences, pre-service teachers generally are not taught the pedagogy or methods necessary to plan and orchestrate a Field-trip (Kisiel, 2006b; Tal, 2004). Anderson, Lawson, and Mayer-Smith (2006) illustrated that pre-service teachers who gain field experience at a non-school venue gain a more functional, applicable view of constructivist education and teaching skills. For this reason, teacher education programs should include experiential education, and Field-trip preparation and implementation for all pre-service teachers, who need to understand their responsibilities and role before, during and after a Field-trip (Tal & Morag, 2009). According to Tal and Steiner (2006), teachers tend to fall into one of three patterns while on a Field-trip:

- i. Teachers are involved and participate in all the preparation and Field trip activities;
- ii. If the Field trip is one that has occurred regularly over the years, school tradition may dictate that teachers follow an established routine, which may or may not be participatory;
- iii. Passive teachers do not participate with the students during the experience.

For example, a teacher may rely completely on the school administration to set up a Field-trip, the teacher may not personally communicate with or visit the venue, or during the Field-trip, the teacher disassociates from the Field-trip activities. Just as professional development is necessary to train teachers how to present a new curriculum, professional development focusing upon Field-trips would help teachers understand the necessity of preplanning, participation, and student reflection (Dori & Herscovitz, 2005). Experience in planning and attending Field-trips is important for both teachers and students. The teachers need understand how to prepare and teach the students to learn out of the classroom, because the novelty of informal learning is a distraction to students who are unaccustomed to attending Field-trips or non-classroom settings.

### **Before the Field-Study**

The teacher should visit the venue prior to the Field-trip, to learn the layout of the venue and determine whether the venue is suitable for all the students. Religious beliefs, for example, may require a realignment of the activities or development of a differentiated plan for the concerned students. During the student orientation prior to the Field-trip, the teacher should prepare students by describing the venue and its layout. The students should understand the focus or purpose of the experience, through a lesson designed to prepare a conceptual foundation on which the students may connect their experiences (Pace, 2004; Tesi, 2007). Orion

and Hofstein (1994) cited three variables that prepare students for Field-trips: understanding the venue layout, the focus of the activities, and being prepared to be in an open informal venue, what the authors call “novelty space.” Reduction of the novelty space would enhance learning during the Field-trip. Prepared students know behavior expectations, increase interaction with the exhibits and look for the connections between the exhibits and classroom concepts. The school’s science curriculum should connect to the venue and its focus. There is little question that a Field- trip is a valuable experience for the students, but it is important that the teacher connect the students’ experiences on the trip with concepts and lessons taught in the classroom. The Field-trip should not be a stand-alone experience (Kisiel, 2006a).

### **During the Field-Study**

As the Field-trip begins, the teacher may need to help some students become comfortable in the new environment. As activities begin, the teacher should be prepared to interpret the venue’s program leader’s commentary to any unfocused or confused students (Rennie& McClafferty, 1995). During the Field-trip, students experience learning in an authentic, informal, natural setting. Each student’s prior knowledge gained both from the classroom and from their personal out-of-school experiences, is used to make connections to the Field-trip experience (Pasquier & Narguizian, 2006). The teacher should keep the students engaged. The venue’s staff should work in concert with the teacher to help students make connections between the experience and the concepts involved. Generally it is the venue’s staff’s duty to keep the activities interesting.

Teachers often utilize worksheets to help students focus on exploring and learning the targeted concepts. Worksheets are quite effective when one worksheet is given to a small group, in which the students are better observers, interact more frequently, discuss the concepts, and

ultimately develop more connections between the concepts and the experience (Kisiel, 2006). Simple fill-in-the-blank task completion worksheets are not effective, when every student is responsible for his or her own data, where the focus is solely to fill in the data and not to explore or participate in activities (Kisiel, 2006).

Students respond to a Field-trip in a variety of ways. Average students may suddenly reveal a never seen before level of excitement, focus, and inquiry (Hefferan, Heywood, & Ritte, 2002). Conversely, some students known for strong classroom performances might be less proficient in the field and may or may not enjoy the challenge to succeed in the new informal environment. Each student is unique and each field experience is unique, so that every field experience will result in many different academic, cognitive, and social gains (Rennie, 2007). Students' prior knowledge and experience define the cognitive foundation onto which new connections can be made (NRC, 2009). If done properly, students will build long term memories of the Field-trip experiences, especially among high school and college students (Wilson, 2011).

### **After the Field-Study**

The teacher's actions after the field-trip are very important. The students' experiences need to be reinforced through discussion, activities, reading, a television show or movie (Falk & Dierking, 2000; Kisiel, 2006a; Orion & Hofstein, 1994; Pace & Tesi, 2004; Tal & Steiner, 2006). Students need to solidify their new ideas and observations which have not yet made connections. Reflection will help build those connections, as well as reinforce the successful connections already made on the trip. Students generate greater understanding as teachers develop potential connections through reflection (Kisiel, 2006a). Students should discuss their observations and experiences, and in the case of elementary grades, create presentations to share

with their classmates. During the remainder of the school year, the teacher should connect new classroom concepts to the students' Field-trip experiences (Rennie & McClafferty, 1995). In Tal & Steiner's (2006) examination of teacher's roles during Field-trips to museums, neither elementary nor secondary grade level teachers carried out quality post-visit activities. Teachers must recognize the importance of post Field-trip reflection and debriefing to maximize student's interest and learning.

### **Safety Rules for a Field-Trip**

Field-trip is an interactive and engaging method of learning in environment outside the classroom. Whether planning a zoo expedition with elementary school children or an ecological field study research with a college students, this rules are excellent guidelines for maintaining a safe atmosphere.

#### **i. Safety waivers and permission slips**

Most schools program safety waivers or permission slip. Students under eighteen years must have a parents or guidance sign a legal permission slip stating that they accept the child's permission in the Field trip. Students eighteen years and above must sign a waiver stating they accept full responsibility for their action and legal implication in the Field-trip..

#### **ii. Attendance checklist**

Make an attendance list of each participant. This is helpful to check at period throughout the trip, specifically getting on or off transportation and in the middle of the trip. There is nothing worth than realizing you forgot a kid at the field when arriving to school greeted by questioning parents.

### **iii. Closing**

Rain in the Field-trip can ruin the day and jeopardize the safety of participants, but not if you plan ahead and required them to bring umbrella and raincoat or winter closing. Most Field-trip location requires long pant and sleeves and close-toed shoes.

### **iv. Chaperones**

Chaperones help maintain safety of the group and control the chaos that a large group of kids can course. A good rule is to have one adult for every three or five kids. The chaperone should be a school employee or parents who all participants will respect and follow. If you a planning an extensive or overnight trip, have references of background check conducted for each chaperone.

### **v. Cancelling a field-trip**

You may have to cancel Filed-trip depending on weather. If there is flash-flooding, storm or lightening reschedules the trip. Most location reschedule the trip for free or even offer to send a representative to your school.

### **vi. Bring a first aid kit**

Having a basic first aid kit can save hours of stress and potential injury. A complete kit includes bandage gauze and antiseptic, tape, scissors and home-made splint material. While you can prevent an accident, having a first aid kit in each group can limit the potential for disaster in an emergency.

### **vii. Group**

Participants can be divided into groups and assign to an adult. If students are less than ten years, consider varioustechniques to keep the group cohesion. For example sing a colored rope the each group that each must to hold on to while walking through a museum or ask each

chaperone to hold a painted sign so high so that school kid can identify their group while walking through the field.

### **viii. Rules**

Most students need a structure of rule spelled out for them. Before embarking of make a copy of rules and regulation for each participant. To ensure each student will follow the guideline have each kid sign the rule 'contract' promising to act respective. Rules include; don't run, stay with the group, complete all field course work in a timely manner, obey all traffic laws, listing to the chaperone, and don't talk to strangers few to be mentioned.

### **ix. Stanger Danger**

The safety and security of each child is in your hand. Talking and interactive with stranger can be dangerous. Younger kid especially get confuse in large public places and may lose track of their chaperones. Be sure to stress to participants that they are only to talk Field-trip chaperone or staff in marked uniform. If the safety rules enlisted above are maintained and properly followed, the pupils or students could best enjoy, benefit and retained knowledge gained from seeing real object in their natural environment during the trip.

### **Merits and demerits of Field-trip**

Abdullahi (1982) and Obeka (2010) outline some of the merits and demerits of Field-trip

#### **Demerits**

- i. Expensive to undertake
- ii. Interrupt time program
- iii. Exposes participants to danger

#### **Merits of Field-Trip**

- i. It enables students to have first-hand experience of real things. Thus, it is considered as providing learning experiences which cannot be brought in to the classroom practically.
- ii. It tends to relate things studied in the classroom with actual activities outside the classroom that is the society and community. This makes class work or subject matter and instruction more meaningful and enhance students understanding of the subject matter.
- iii. It affords valuable opportunities to develop interest in some subject area and career opportunities.
- iv. It helps to arouse students' interest and increases their motivation to learn a subject and related subject.
- v. It makes the students to be more imaginative and inquest live observers. Hence, they acquire skills for careful observation and objective report.
- vi. It creates opportunities for the students to interact with the experts, and enhances effective learning and teaching.

Most Field-trip experiences make demand of all senses. This makes the students to gain a complete picture of the concept than from any other mode of teaching. Teacher-students relationship becomes more cordial and develops more intimately during Field-trip. In the light of the above, the study investigate the impact of Field-trip on motivation, retention and performance in Plant Adaptation among Secondary School Students in Gumel Zone, Jigawa State, Nigeria.

#### **2.3.4 Lecture Method**

The lecture method (talk-chalk method), is a method that involve the teacher centered method of disseminating knowledge where ideas, concepts, generalization and facts are presented to the students who are mainly passive hearers. The students on their own part are expected to memorize the fact and principles presented to them whether they understood or not and even produce verbatim during examination. James, (2000) further stated that the term lecture method of teaching is used to describe teaching in which large part or possible the whole of the lesson is occupied by the teacher in exposition and by the students in listening or making note.

This method has come under the sledge hammer of many science educators and researchers as being deficient in the training of qualitative and even quantitative students with commitment for science and technology (Usman, 2000). In this method the pupils centered activities for developing scientific reasoning and skills are lacking. This therefore creates lack of interest in science (Bichi, 2002). Unfortunately, the traditional lecture method dominated the teaching of science in our secondary school this therefore results in a general low level performance in science subjects (James, 2000).

Science educators having identified method of teaching as one the factors that contributes poor achievement of students in science as well as to the difference of achievement level of students in science, has therefore called for a change in the teaching methods in our schools. Lakpini (2006) has called for a change from convectional lecture method to individual instructional category. In his view, this will enable pupil carryout higher cognitive operation of analysis, synthesis and evaluation which do not occur in the lecture method. Jibrin and Nuru, (2007) has also called for change from lecture to experimental method in teaching science.

Notwithstanding, the numerous criticism associated with lecture method in teaching science, other science educators are strongly of the view that lecture method is still very good in teaching science. Ausubel (1971), a strong advocate lecture method which he called reception teaching describe it as more effective method of teaching science. In his view, meaningful learning occurs if the knowledge is linked to the relevant existing concepts in the learners' cognitive structure and this learning takes place when new knowledge are arbitrarily incorporated into cognitive structure. He further stated reception learning of concept is the foundation upon which higher learning build and without traditional lecture method there can be no laboratory, discovery or inquiry learning. Olarinoye, (2000) also found no significant different between lecture, enquiring role approach and inquiry method of teaching science in Nigerian schools.

#### **2.4 Students' Performance in Biology**

Performance of students in a particular subject or course is determined by short or long term goals acquired. Achievement in Biology goes to emphasize the effort or skill put in to acquire or achieve success in Biology as a science subject.

Most research findings in achievement in science are also applicable to Biology as a science subject. The teaching of Biology as a science subject requires laboratory strategy and different pedagogical methods that will enhance meaningful learning of the subject. A lot of factors militating against the teaching and learning of sciences in which Biology is included have been discussed. The factors range from instructional materials, teaching strategy, gender disparity, ignorance and attitude of teachers, provision of instructional materials, and student's behavior toward learning to facilities provided to mention but some of the factors.

James (2000) opined that Biology stands out easy to teach and learn among other science subject. This was due the availability of materials and teaching aid that are available in open fields. According to James (2000) one major reason why Biology has an advantage over other science subject is the fact that Biology could be taught and verified within the wall of the school laboratory or even the open field. It was also reported that a popular method of teaching Biology was to collect plants and animals materials for observation and dissection in the laboratory which is called “practical”. This instructional strategy does not allow active participation of students and thus does not contribute to scientific attitude of students. The Field-trip method of teaching was advocated for students where they solve problems by themselves. The indiscriminate use of lecture method by science teachers which is attributed to the teacher’s academic level, contributes to seventy percent of the scientific information receive by the pupil(Bichi, 2002).

There is much failure in NECO result in recent times, for example, for the past four years 2010 – 2014. The NECO result have been reported to be poor, 39% pass in 2013 according to the director of NECO. Some of the factors for the failure mentioned were lack of adequate facilities and unqualified number of teachers unable to apply positive teaching strategies. Martin (1994) and Oyedokun (1998) as in the Bichi (2002) investigated the effect of lecture method and inquiry method and concluded that the lecture method was inferior to inquiry in term of enhancing student’s achievement. James (2000) suggested, biological garden as a teaching strategy and could motivate students.

It is an indication from modern findings that indoor and outdoor facilities and improvisation of materials are mere proposals which have fully implemented. Recent research findings have shown that most teachers of science do not use instructional materials properly

either as a result of ignorance or negative attitude of teachers towards improvisation and use of instructional materials. Olarinoye (2000) pointed out that mere use of the materials do not guarantee effective communication or teaching but proper use of it, careful selection and skillful handling by the teacher render its usefulness in facilitating teaching and learning.

## **2.5 Field-trip and Motivation in Learning Biology**

Feng and Hung (2010) opined that Field-trip motivates students through increased interest and curiosity. Field-trip can add variety to the regular classroom instruction program and they tend to be special and enjoyable learning experiences. As a result, students will develop positive attitude towards classroom activities. Increase student-student and student-teacher social interaction. Field-trip provide an opportunity to involve students, parents teachers in the instructional program. Liu and Lin (2010), have defined motivation as reason for directing behavior toward a particular goal, engaging in a certain activity, or increasing energy and effort to achieve the goal. Guay, Chanal, Ratelle, Marsh, Larose & Boivin (2010) refers motivation as “the reasons underlying behavior”.

In the context of metacognition, motivation is defined as belief and attitudes that affects the use of development of cognitive and metacognitive skills (Schraw, Crippen and Hartley, 2006). Metacognition entails that the management of effective and motivational state and metacognitive persistence challenging task (Martinez, 2006). Effortful control, which refers to the ability to monitor and to regulate the impact of emotion and motivational state on ones performance, is one aspect of executive functioning inherent in metacognition.

Motivation is a theoretical construct used to explain behavior. It represents the reasons for people’s actions, desires, and needs. Motivation can also be defined as one’s direction to behavior and vice versa, (Elliot, Kratochwill, Cook, Traveres, 2001). Similarly, Mills (2005)

revealed that motivation is a significant variable in shaping the attitude of individual. Many researchers have suggested many strategies that would be used by the teacher to motivate the students to learn. It is a quality that students, teachers, parent, school administrators and other members of the community must have if our educational system is to prepare young people adequately for the challenges and demands of coming century. Morris (2008) contended that it is important for students to be motivated and well prepared for class units and activities in the school. Equally, students' motivation is said to be as important as any other variables in a learning situation. Their recommendations for teachers based on study results included the allowing students to have choice between equally challenging tasks, and minimizing external rewards as motivators for achievement. Haines (2010) in a study on 'Consumer Testing': applying the scientific method to every life' recommended that teachers should use real life opportunities and experiences to design experiments to motivate middle school science students. Cury (2010), noted that classroom environment is more important than even individual goals in influencing pupil interest. Cury (2010) found that environment is very important in motivating students to learn. Vonjnovich (2012), in a study on improving students' motivation in the secondary classroom through the use of Critical Thinking Skills, Cooperative Learning Techniques and Reflecting Journal Writing reported that lack of students' motivation can come from content- oriented classroom that provides little opportunity for students to create individual expressions and find relevance in the materials presented. Christiana, (2009) noted that because of poor motivation due to inadequate remuneration, poor teaching environment as a result of lack of basic teaching materials, listless and unmotivated learners in the classroom, among others, the teachers have become the endangered species in their own profession. They no longer teach and the students in turn no longer learn. The researcher suggested that

motivated students are problem solver and academic achievers. He further maintained that motivation sustain students' interest in studies reduce the rate of dropout, truancy and low enrollment.

## **2.6 Field-trip and Retention**

Nussbauma, (2000) examine differences in retention in learned material using lecture-based and small-group based teaching method in a continuing medical education course. The result demonstrated that all though both group had a significant decline on a three month follow up examination. The group who attended lecture class retained information better than the group who attended small group class. In another study, Okoli, (2006) separated second year gastrointestinal medical students into two, group one attended teacher-center based classes and the other student-center classes. They concluded that small group based classes led to greater learning and retention compare to lecture-based classes. Lei, (2010b) stated that biological science trip has long being recognized as a teaching device since it present the concept being studied in its natural environment. In addition Maikano, (2010) made comparism between outdoor and indoor laboratory teaching strategies on secondary school students academic achievement and retention in ecology. The result shows that, the experimental taught ecological concept using outdoor laboratory approach achieved significantly higher than the control group taught the same concept using the indoor laboratory. In addition, Obeka (2010), study on the effect of inquiry and demonstration methods on students' achievement and retention in some environmental education concept of geography. It founds that there was a significant effect due the impact of Field-trip on motivation, performance and retention in Plant Adaptation Among Secondary School Students in Gumel, Jigawa State, Nigeria.

## 2.7 Field-trip and Gender

The concept 'gender' could be discussed in term of masculinity and feminist observed in an individual. The academic achievement of boys and girls in science, technology and mathematics has been perceived differently, where boys are rated higher than girls. Some researchers in science education such as Bichi (2002), Bello (2002), Linver, Davis-kean and Eccles (2002), have expressed concern on gender related issues with the view to improving science teaching and learning. Jimoh (2001) observed that the position of females in science, mathematics and vocational education is below average when compared to female. Fanstosterling (1992) opined that the difference is in socialization and not biological. Ibe (2006) believed that gender discrimination in science in Nigeria is the practice of the day, because people always think that science is only for male while languages are for female. Habeeb (2001) also believed that quite a number of factors are responsible for the low achievement of female in sciences. Oluwatoyin (2007) observed that women perform better when they are exposed to science. The result of some studies also showed no significant difference between the achievement of boys and girls in science before they enter primary or secondary school (Lassa, 1984). The finding of Bichi (2002) and Aweriale (2006) showed no significant difference between male and female achievement in science. Some teacher and women are of view that girls are intellectually incapable of competing in science and mathematics and difficult task with the boys (Joseph 2000). Some parents discourage their girls from science and technology careers saying that they are abnormal and may not be capable of managing marital home (Ifamuyiwa 2005). The girls themselves feel discouraged by the attitudes of teacher and parents and often suffer from self esteem. Research findings have shown that female students have less positive attitude to mathematics than the male and also demonstrated less superiority

at secondary school level. This probably ought to be the result of stereo typing of task that takes place with more attention given to the training and education of males in science area (Ogwuazor 1992).

Despite the fact that certain measures have been taken to bridge the gap between boys and girls, gender inequality is still a limiting factor to the achievement of desired learning outcome and developments in science enrolment and performance and results in unequal access to education, health and employment (Agholar 1993)

For the teaching and learning of science in schools to progress, and especially bridge the gap in gender inequality, certain factors have to be considered; household factors, socio-cultural factors and policy related factors, school related factors, school curriculum (gender based) and environmental factors (Fansto-sterling, 1992). Gender concept has actually attracted different world bodies and NGOs such as UNESCO. The study tends to investigate impact of Field-trip on Motivation, Performance and Retention in Plant Adaptation Among Secondary School Students in Gumel, Jigawa State, Nigeria.

## **2.8 Overview of Similar Studies**

Biology has been listed as a compulsory subject in the senior secondary school curriculum due to its importance to scientific courses like medicine, pharmacy, botany, zoology, biochemistry, biotechnology among others. Biology need to be taught using appropriate teaching strategies.

Lealey and Michael (2005) investigated the impact of field-trip on students' achievement and attitude; a comparison of physical verses virtual field-trip to IndianRiver lagoon. A total of 847 students were used as a population for the sample size of 413 students. t-test and analysis of variance (ANOVA) were used to analyze the data. The finding of the study showed that there is

no significance difference between learning style or students' ability to answer question at different level. The result also implies that both field-trips promote learning. Baliel, Duran and Bilgili (2011) carried out a research work on the effect of teaching the unit space puzzle by using field-trip observation method in science and technology course on the seventh grade students' achievement, motivation and attitude. The study consists of sixty-two students from Milas District of Magla city. The instrument used for data collection was motivation and learning strategies questionnaire (MLSQ). Multiple analyses of variance were used to analyze the result. The results reveal that field-trip observation method was influential on students' motivation in relation to internal target regulation and perception of self-efficacy for learning and performance. Igwebuike, (2013) carry out a work on a test of efficacy of Field-trip and discussion approaches to teaching integrated science within constructivist flavour. The population consists of 47 junior secondary students using non-equivalent group design. Analysis of variance (ANOVA) indicated that there were no significant effects of method on gender. Ahmad, (2014) investigated the effect of Field-trip on academic achievement and the retention in ecology among senior secondary school students of rural and urban location in Zaria Educational Zone, Kaduna State. The research design used was an experimental design. The population of study consists of 2934 SSI students. 200 students were sampled. The instrument used was ecology achievement test (EAT) and ecology retention test. T-test statistical tool were used to analyze the data. The finding of the study showed that field-trip teaching strategies favoured the experimental group in ecology concept. The study further confirmed that field-trip teaching favoured urban experimental group.

Adedeji, (2007) investigated the impact of students' academic achievement and learning outcome in mathematics among secondary students in Nigeria using 450 secondary school

students drawn from ten schools in two local government areas in Ibadan. The instrument used was achievement test in mathematics (ATM). Data were analyzed using t-test and analysis of variance (ANOVA). The result showed that gender differences were significant when impact of motivation and academic achievement were compared in male and female students. Also another result indicated the significant different when extent of motivation was taken as variable on interest on academic achievement in mathematics based on degree of their motivation.

Malik and Jamil (2012) worked on the effect of motivation and parental influence on the educational attainment of students at secondary level in Pakistan. A sample of 4000 secondary school students from 8 different schools were taken. 20 items questionnaires were used to measure students level of motivation and parental influence. Simple correlation was used to analyze the result. The result showed that there is strong correlation between parental influence, motivation and academic achievement.

Badola (2013) conducted a study on the academic achievement and motivation of secondary school level students in Garhwal U.K. The population consists of 480 students. The data was collected using academic achievement motivation test (AAMT). The data was analyzed using analysis of variance (ANOVA). The result showed that there was a significant difference among government, public and convent schools on their academic achievement motivation. Insignificant difference was found between public and convent school students on their academic achievement motivation.

Thomas and Stocton (2010) investigated the impact of socioeconomic status, race, gender and retention on students' achievement. The population used was 148 students. The instrument used was socioeconomic status achievement test (SST). Descriptive statistic was used to

analyzed the data. The result of the finding indicated that there is higher retention rate in children from rich family compared to those from poor family background.

Pruett, (2010) investigated the differences in academic achievement and academic self concept based on intellectual ability, grade retention and special education status. The population consists of students with broad line intellectual ability (IQ) between (70 and 85). Basic achievement skill inventory (BASI) was used. Pearson correlation and multiple independent t-test were used to analyzed the impact of IQ. The result indicated that better retention in mean achievement scores of students taught with self concept based over control the group. Abduraheem (2011) investigated the effect of discussion method on secondary school students' achievement and retention in social studies. The study adopted quasi experimental, pretest, posttest group design. The sample of the study consists of 240 junior secondary school class II students. The instrument used was social studies achievement test (SSAT). The data were analyzed using t-test and analysis of covariance (ANCOVA). The result indicates that there was a significant difference between pretest and achievement mean scores of students in experimental and control group. There was significance difference between retention mean scores of students in the experimental and control group. Schwerdt and West (2013) investigated the effect of test-based retention on students outcomes over time in Florida. The population consists of 128 students of gradeII Florida. The instrument used was Florida assessment test (FAT). The result indicates that test-based retention has positive impact on students' performance and retention.

## **2.9 Implication of Literature Reviewed to the Present Study**

From the literature examined, some significant observations that have implication to this study were made thus:

Field-trip has been found to be veritable tool for making learning result oriented. Studies have shown the effectiveness of this teaching strategy on student's performance and retention in sciences. However, other studies showed otherwise. Most researchers devoted to the use of Field-trip on students' academic achievement for teaching ecology, (Lagoke, 2002) all concluded that students and teachers showed negative attitude to ecology field work. However, it was also established from the studies that field work could have a strong motivating effect on the students because what is seen, touched and felt usually facilitates permanency of learning. This research therefore, will differ from those reviewed in the sense that it will investigate the impact of Field-Trip on motivation, retention and performance in relatively new location and using different concept. There has been little done with regard to Field-trip on motivation. None of the literature reviewed work on Field-trip and plant adaptation concept. Also the study was conducted at Gumel Education Zone which is relatively new area. A major questions not yet properly address by most of the literature reviewed in an empirical way is what could be done to improve student's motivation for a better performance in sciences? Some instructional strategies suggested by some researchers for teaching biology may not yield the desired result of low or poor performance syndrome. Evidence abounds which shows that lecture method of teaching is inadequate for improving students' performance towards biology.

## **CHAPTER THREE**

### **METHODOLOGY**

#### **3.1 Introduction**

This research study investigated the Impact of Field-trip on Motivation, Retention and Performance in Plant Adaptation Among Secondary school students in Gumel, Jigawa State, Nigeria. This chapter presents a general outline used in the methodology of this study under the following sub-headings:

3.2 Research Design

3.3 Population of the Study

3.4 Sample and Sample Techniques

3.5 Instrumentation

3.6 Validity of the Instruments

3.7 Pilot Testing

3.8 Reliability of the Instruments

3.9 Administration of Treatment

3.10 Procedure for Data Collection

3.11 Procedure for Data Analysis

#### **3.2 Research Design**

This study employed pretest, posttest and post-posttest quasi-experimental of non-equivalent control design. The study used two groups; experimental and control. The experimental group (EG) were taught using Field-trip method ( $X_1$ ) while control group (CG) were taught using lecture method only ( $X_0$ ). The two groups (experimental and control) was given a pre-test ( $O_1$ ) to determine the entry level of students. The two groups were taught

PlantAdaptation for a period of six weeks. Then posttest (O<sub>2</sub>) were administered to the groups in order to determine the impact of Field-trip on motivation, retention and performance in Plant Adaptation among Secondary School Students in Gumel Zone, Jigawa State, Nigeria. Post-post-test (O<sub>3</sub>) were administered to all groups in order to determine the level of retention on Plant Adaptation. The research design illustration of the study which was recommended by Fraenkle and Willen (2000) and Kerlinger (1970) is represented figure 3.1



EG = Experimental Group

CG = Control Group

X<sub>1</sub> = Field method

X<sub>0</sub> = Traditional lecture method of teaching strategy

O<sub>1</sub> = pretest

O<sub>2</sub> = posttest

O<sub>3</sub> = post-posttest

### 3.3 Population of the Study

The population of the study is made up of all public senior secondary (SSII) biology students for 2014/2015 session in Gumel Education Zone Jigawa State. The size of the population is Three Thousands four Hundred and fourty-nine students (3449) with total number of male students 2271 and female students 1178.

**Table 3.1 Population of the Study**

S/N	Schools	Type	No of Males	No of Females	Total
1.	GDSS Gagarawa	Co-edu	88	60	148
2.	GASS Maigatari	Co-edu	65	61	126
3.	GDSS Bosuwa	Male	70	-	70
4.	GDSS Danzomo	Co-edu	70	80	150
5.	GDSS Gumel	Co-edu	29	32	61
6.	GDSS Maigatari	Co-edu	128	121	249
7.	GDSS Medi	Co-edu	67	52	119
8.	GDSS S. Tankarkar	Co-edu	60	71	131
9.	GGSS Danzomo	Female	-	350	350
10.	GGSS S,Tankarkar	Female	-	351	351
11.	GSS Lautai Gumel	Male	400	-	400
12.	GSS Maigatari	Male	420	-	420
13.	GSSS Lautai	Male	400	-	400
14.	GDSS Danladi	Male	250	-	250
15.	GDSS Ma'azu	Male	224	-	224
	<b>Total</b>		<b>2271</b>	<b>1178</b>	<b>3449</b>

Source: Jigawa State Ministry of Education (2014)

### 3.4 Sampling and Sampling Technique

Purposive sampling technique was used to select two schools out of the 15 schools. Purposive sampling is a sampling technique done best on laid down criteria. The criteria set for this selection were:

- i. The school is coeducation in nature
- ii. Schools having qualified biology teachers
- iii. School with adequate science teaching facilities

An intact classes were used in conducting this research, because most of the schools do not allow their students to be randomized and assigned in to different class for research work.

**Table 3.2 Sample for the Study**

Type	Schools	Males	Females	Total
Experimental	GDSS Gumel	29	32	61
Control	GDSS Maigatari	33	30	63
Total		62	62	124

### 3.5 Instrumentation

The instrument for the study tagged Plant Adaptation Performance Test (PAPT) was used for data collection. PAPT consisted of 30 items, 4-option multiple choice objective tests developed by the researcher. Therefore, students choose correct answer from the option letter A-D respectively. Plant Adaptation Motivation Questionnaire (PAMQ) was also used to collect information on motivation. PAMQ was adopted from Salihu (2012)(Appendix B & D)

**Table 3.3: Table of Specification based on Bloom Taxonomy of Cognitive Domain**

TOPIC	%	K	C	A	AN	SYN	EVA	TOTAL
Xerophytes	30	2	1	2	1	2	1	9
Mesophytes	26	1	2	1	1	1	2	8
Hydrophytes	22	1	1	1	2	1	1	7
Halophytes	22	1	1	1	1	2	1	7
Total	100	5	5	5	5	5	5	30

**Key:**Knowledge (K): recognition or recall of specific materials

Comprehension (C): grasping the meaning of materials

Application (A): using information in concrete situation

Analysis (AN): breaking down material in parts

Synthesis (S): putting together parts to form the whole and

Evaluation (E): judging the value of material and method for a given purpose

### **3.6 Validity of the Instruments**

The instruments were validated for both face and content validity by experts who are PhD holders with minimum rank of senior lecturer in the department of science education Ahmadu Bello University Zaria and also taken to another senior lecturer in english department to check the clarity and language used.

### **3.7 Pilot Testing**

The instruments were pilot tested at one school from the population which is not part of the schools for the study. Hundred students in SSII class were used for experimental and control groups for the period of two weeks in which experimental group received treatment (Field-trip) while control group received lecture. The pilot test was used to test the effectiveness of the

instruments as well as identify the problems which may affect administration of the instrument during the actual experiment.

### **Reconnaissance Survey**

Gumel zone has land mass of 3054 square kilometers and falls in the northwest senatorial zone of Jigawa State. According to National Population Commission (2006), Gumel zone has a total population of 498119. The area lies between latitude  $11^{\circ}\text{N}$  and  $13^{\circ}\text{N}$  and longitude  $8^{\circ}\text{E}$  and  $10^{\circ} 35'\text{E}$  with a tropical climate. The temperature varied at different times, high temperature are normally recorded between the months of April and September. Maximum temperature range are  $15^{\circ}\text{C}$  and  $35^{\circ}\text{C}$ . Rain season lasts from May to September with average rainfall of 600 to 1000mm. The area is situated within the Sudan savanna vegetation zone. The dominant plant species in the area include the following *Terminalia indica*, *Cassia albidder*, *Adonsonia digitata*, *Acacia* species few to be mentioned (Babandi, 2010).

### **3.8 Reliability of the Instrument**

The test-retest method using Pearson Product-Moment Correlation Coefficient statistics was used to determine the reliability of the PAPT. Test-retest was administered in two weeks intervals as recommended by Tuckman (1975) that students forget after two weeks. The scores from the two administrations correlated as an estimate of reliability of the test Sambo (2008). The reliability of the PAPT after correlation is 0.78 which shows the instrument is reliable for data collection in this study.

## Facility and Discrimination Index

### Items analysis of PAPT

Items analysis was carried out on the scores obtained from the pilot study to determine the facility and difficulty indices of the items in the PAPT the facility index (FI) according to Wood (2008) is the percentage of students that gets an item right its determine by using formula

$$F.I = \frac{R}{T} \times 100$$

Where R= Number of correct responses.

T = Total Number of students.

Usman (2008) recommended values within the range of 0.3 to 0.7 for good test items value in assessing achievement for this study 0.3 to 0.7 chose.

**Discrimination index:** indicates the desire power of each of the test items or is the ability to sort between high and low ranking students in the whole test. The score was done using the scores of the top 27% and bottom twenty score (27%) of the total respondents. This was calculated using formula given by (Furst in Olorukooba, 2001)

$$D.I = \frac{Ru - Ri}{1/2N}$$

Where D = Discriminating index

Ru = No any upper 27% of respondent

Ri = Number any lower 27% of respondent

N = total Number of respondents

The D.I, which from 0.3 to 0.7 is regarded as moderately positive and is selecting the found items of the PAPT

### **3.9 Administration of Treatment**

The researcher and the two research assistants took experimental group to the following habitats located in Maigatari (Nigeria/Niger boarder)

- i. Maitsakuwa pond
- ii. Masara pond
- iii. Maiduhuwa plantation (boarder)

Students were divided into two groups each with a group leader and one assistant/ instructor. Students were instructed to use worksheet and record what they observe in accordance with lesson plan (Appendix F). Students were also given a checklist which will serve as field-trip guide (Appendix E) This last for the period of six weeks after which a posttest was administered to the students at the end of the period. After a period of three week post-posttest was also be given to measure the students' retention level.

#### **3.9.1 Control Group Teaching**

The control group were plant adaptation concept using only lecture for the period of six weeks.They were denied treatment as in experimental group after which they were subjected to posttest and post-posttest.Motivational questionnaire was administred to students as pretest and posttest for the two groups.

#### **3.10 Procedure for Data Collection**

Plant Adaptation Performance Test (PAPT)) was administered at the beginning of the exercise as pretest to determine the entry level of the students and the same instrument was also used to collect data after the administration of treatment as posttest. Post-posttest was given after a period of three weeks. The achievement scores were divided into experimental and control groups and recorded respectively.

### 3.11 Procedure for Data Analysis

The research questions were answered using descriptive statistic. t-test, and Kruskal Wallis were used for research hypotheses. Data generated were analyzed at  $p \leq 0.05$  level of significance. The following are the Research Questions:

- i. What is the difference between the mean score of students taught plant adaptation concept using field-trip method?
- ii. What is the difference between retention ability of students taught plant adaptation concept using field method and those taught using lecture method?
- iii. What is the difference between performance of male and female students taught plant adaptation concept using field-trip method?
- iv. What is the difference between the motivation levels of students taught plant adaptation concept using field method and lecture method?

### Hypotheses Testing

The following Hypotheses were tested at 0.05 level of significance:

- i. There is no significant difference between the mean scores of students taught plant adaptation concept using field method and those taught using lecture method. This hypothesis was analyzed using t-test.
- ii. There is no significant difference between the retention level of students taught plant adaptation concept using field method and lecture method of teaching. This hypothesis was analyzed using t-test.
- iii. There is no significant difference between male and female students taught plant adaptation concept using field-trip method. This hypothesis was tested using t-test.

- iv. There is no significant difference between students' motivation taught plant adaptation concept using Field-trip and lecture methods of teaching. This was tested using kruskal Wallis(H-test).

## CHAPTER FOUR

### ANALYSIS, RESULTS AND DISCUSSION

#### 4.1 Introduction

This chapter contains analysis, result and discussions. The results were presented according to the sequence of the research questions and hypotheses, which guided the study. The level of significance adopted for retaining or rejecting each of the null hypotheses is  $P \leq 0.05$ . The procedure for analysis and results were presented.

#### 4.2 Results

- i. **Research Question 1.** What is the difference between the mean score of students taught plan adaption concept using field-trip method?

Descriptive statistics of mean and standard deviation were used to test this research question and the summary of the result is presented in Table 4.1

**Table 4.1 Mean and Standard Deviation of the Experimental (Field trip) and Control groups (lecture) in Plant Adaptation**

Group	N	Mean	SD	M D
Experimental (posttest)	61	24.28	4.18	11.77
Control (posttest)	63	12.51	2.12	

Result in Table 4.1, shows the mean score of the experimental group was 24.28 and a standard deviation of 4.18 while the mean score for the control group was 12.51 and a standard deviation was 2.12. The mean difference of the experimental and control group was 11.77 in favor of the experimental group. This shows that the

experimental group had mean score than the control group. This implied that the effect of the treatment had impact on the experimental group.

**Research Question 2:** What is the is difference between retention ability of students taught plant adaptation concept using field-trip and those taught using lecture method?

Descriptive statistics of mean and standard deviation were used to test this research question and the summary of the result is presented in Table 4.2

**Table 4.2 Mean and Standard Deviation of the Experimental (Field trip) and Control group in Plant Adaptation**

Group	N	Mean	SD	M	SD	M	SD
Experimental	61	23.74	4.71	13.67	13.67	13.67	13.67
Control	63	10.06	2.21	10.06	10.06	10.06	10.06

Result in Table 4.2, shows the mean score of the experimental group was 23.74 and a standard deviation of 4.71 while the mean score for the control group was 10.06 and a standard deviation was 2.21. The mean difference of the experimental and control group was 13.67 in favour of the experimental group. This proved that the experimental group had mean score than the control group. This implied that the effect of the treatment had impact on the experimental group.

**Research Question 3:**What is the difference between performance of male and female students taught plant adaptation concept using field-trip and lecture method?

Descriptive statistics of mean and standard deviation were used to test this research question and the summary of the result is presented in Table 4.3

**Table 4.3 Mean and Standard Deviation of the Experimental (Field trip) and Control groups (lecture) in Plant Adaptation**

Group	N	Mean	SD	MD
Malesposttest	29	24.72	3.38	1.88
Females posttest	32	22.84	5.55	

Result in Table 4.3 above shows that the mean score of the experimental group was 24.72 and a standard deviation of 3.38 while the mean score for the control group was 22.84 and a standard deviation was 5.55. The mean difference of the experimental and control group was 1.88 in favor of the experimental group. This proved that the experimental group had mean score than the control group. This implied that the effect of the treatment had impact on the experimental group.

**Research Question 4:** What is the difference between the motivation levels of students taught plant adaptation concept using Field-trip and lecture method?

Descriptive statistics of mean and standard deviation were used to test this research question and the summary of the result is presented in Table 4.

**Table 4.4 Mean and Standard Deviation of the Experimental (Field-trip) and Control groups (lecture) in Plant Adaptation**

Groups	N	Mean	SD	MD
Before	61	92.98	9.60	12.21
Before	63	80.78	7.21	
After	61	94.53	8.28	16.54
After	63	77.98	7.23	

Result in Table 4.4 above shows that the descriptive statistic of pretest shows the mean scores of experimental group was 92.98 while the mean scores of control group was 80.78, the mean difference was 12.21 which favored experimental group. Also the descriptive statistics of posttest shows that experimental group has mean scores of 94.53 while control group has 77.98, the mean difference was 16.54 which also favored experimental group.

**Ho1:** There is no significant difference between the mean scores of students taught plant adaptation concept using Field-trip and those taught using lecture method. This hypothesis was analyzed using t-test.

The t-test was used to test this hypothesis, and a summary of the result is presented in Table 4.5

**Table 4.5 t-test analysis of posttest mean score of the Experimental and Control groups in plant Adaptation**

Group	N	Mean	SD	Df	T	p	Remark
Experimental	61	24.28	4.18	122	19.86	0.00	Sig
Control	63	12.51	2.12				

Significant at  $p \leq 0.05$  level

The result in Table 4.5 shows that the t-test = 19.86 and p-value = 0.00 at degree of freedom (df) 122. Since the p-value = 0.00  $\square$   $\alpha = 0.05$ . It means that there is significant difference in the mean scores of the experimental and control groups. The significant difference is in favour of the experimental group exposed to field trip teaching strategy. With this result, therefore null hypothesis one was rejected.

**Ho2:** There is no significant difference between the retention level of students taught plan adaptation concept using field method and lecture method of teaching. This hypothesis was analyzed using t-test.

The t-test was used to test this hypothesis, and a summary of the result is presented in Table 4.6

**Table 4.6 t-test Analysis of posttest mean score of the Experimental and Control groups in Plant Adaptation**

Group	N	Mean	SD	Df	t	p	Remark
Experimental	61	23.71	4.71	22	0.842	0.001	Sig.
Control	63	10.06	2.21				

The result in Table 4.6 shows that the  $t = 20.84$  and  $p = 0.001$  at degree of freedom (df) 122. Since the  $p = 0.001$ . It indicates that there is significant difference in the mean scores of the experimental and control groups. The significant difference in favour of the experimental group exposed to field trip teaching strategy as indicated by the mean scores. With this result, null hypothesis two was therefore rejected.

**Ho3:** There is no significant difference between male and female students taught plant adaptation concept using Field-trip and lecture method. This hypothesis was tested using t-test analysis.

The t-test was used to test this hypothesis, and a summary of the result is presented in Table 4.7

**Table 4.7 t-test Analysis of posttest mean score of the Experimental and Control groups in Plant Adaptation**

Group	N	Mean	SD	df	t	P	Remark
Males posttest	29	25.14	3.21	59	1.546	0.127	Not sig
Females posttest	32	23.50	4.82				

Table 4.7 shows that the p is 0.127 which is greater than alpha  $\alpha= 0.05$  with degree of freedom (df) = 59. This means that there is no significant difference between the posttest scores of male and female exposed to field trip teaching strategy. This implies that the performance level of male exposed to field trip teaching strategy and their female counterparts were at par. Therefore, null hypothesis three was retained.

**Ho4:**There is no significant difference between students' motivation taught plant adaptation concept using field method and lecture method of teaching. This hypothesis was tested using kruskall wallis.

The statistical tool kruskall wallis was used to test this hypothesis, and a summary of the result is presented in Table 4.8

**Table 4.8 Comparism of Level of Motivation Between Experimental and Control Groups**

Variables	N	SD	H-test	P	Remark
Before	61	9.51	123.420	0.001	Sig.
Before	63	7.21			
After	61	8.28	123.420	0.001	Sig.
After	63	7.24			

The result presented in Table 4.8 shows that there is significant different between experimental group and control groups, so the hypothesis is rejected.

## **Summary of Major Finding**

Based on the data analyzed in this study, the following findings were obtained.

- i. There was significant difference between students exposed to Field-trip experiences and those who were taught the concept plant adaptation using lecture method.
- ii. There was significant difference between the mean scores of retention level between experimental and control groups in plant adaptation in favour of experimental group.
- iii. There was no significant difference between the mean scores of male and female students exposed to Field-trip teaching strategy. This implies that the performance level of male exposed to Field-trip teaching strategy is almost the same with their female counter parts.
- iv. There was significant different between motivation level of students taught plant adaptation concept using Field-trip and lecture method of teaching.

## **4.3 Discussion of the Results**

The objective of this study was to investigate the Impact of Field-trip on Motivation, Retention and Performance in Plant Adaptation among secondary school students in Gumel Jigawa State, Nigeria. To achieve this, two groups of students were formed, the experimental and control groups. Students in experimental group were exposed to Field-trip teaching strategy while those in control group were exposed to lectur method. The two groups of students were taught same concept (Plant Adaptation). The dada of this study where based on performance of students in Plant Adaptation Performance Test (PAPT) and responses obtained from Plant Adaptation Motivation Questionnaire

(PAMQ). The results of posttest and post posttest was used to compare their performance according to the variable being measured which were analysed according to research hypotheses developed for the study. This unit presented explanation of results obtained from the hypotheses tested and acknowledged the published works of other authors to be stated herein after.

Table 4.5 revealed that the Field-trip teaching strategy enhanced academic performance of experimental group. This confirmed the findings of Baliel, Duran, Bilgili (2011), Michie (2007) and Ajaja (2010) which stated that knowledge gains were found to be significant with experimental group using field trip teaching strategy more than their counter part that were strictly taught in the class using lecture method.

Table 4.6 showed that there was a significant difference between mean score of experimental and control group. Students taught using Field-trip retained more plant adaptation concept than those taught using traditional lecture method. This agrees with the study of Lealey and Michael, (2005), Thomas and Stocton (2010) who recommended that field trip teaching strategy should be adopted as teaching strategy in science because of its influence on retention more than their counter part that were strictly taught in the class using lecture method. This agrees with the work of Bichi (2002), Aweriale (2006) which showed no significant difference between male and female achievement in science. This result shows that Field-trip teaching strategy is gender friendly.

Table 4.8 showed that there was significant different between experimental and control groups, in term of motivation in favour of experimental group. This study is in conformity with the work of Malik and Jamil (2012) and Badola (2013) which shows that Field-trip teaching strategy motivate students.

The reason for this was that pre-requisite steps of activities in teaching plant adaptation concept were followed. This has stimulated students' motivation, attention that led to good performance in the concept. The experimental group was taught with the strategy (Field-trip) that required the use of basic science process skills such as observation, identification and classification of organisms in their natural surroundings.

## CHAPTER FIVE

### SUMMARY, CONCLUSION AND RECOMMENDATION

#### 5.1 Introduction

This chapter was discussed under the following headings;

5.2 Summary

5.3 Conclusion

5.4 Recommendations

5.5 Contributions to knowledge

5.6 Limitations of the study

5.7 Suggestion for further study

#### 5.2 Summary

The purpose of this study was to find out the impact of Field-trip on motivation, retention and performance in plant adaptation among secondary school students in Gumel Jigawa State, Nigeria. The design of the study was quasi-experimental involving pre-test, posttest and post posttest. The sample of the study consists of 124 SSII biology students. Four research questions were raised and four null hypotheses were formulated. The research questions were answered using descriptive statistics such mean and standard deviation. The null hypotheses were analysed using t-test and Kruskal Wallis statistics.

From the result of analysis discussed in Table 4.2, Field-trip teaching strategy favored the experimental group in plant adaptation concept. The study shows that there is significant difference in performance of students taught plant adaptation using field-trip teaching strategy and those taught by lecture method. The study further confirmed that

Field-trip teaching strategy is a good tool in teaching plant adaptation at secondary school level

### **5.3 Conclusion**

- i. Generally, it was confirmed that there was high significant difference between the mean scores of experimental and control groups in plant adaptation concept.
- ii. In addition, there was high significant difference between experimental and control groups on retention ability.
- iii. There is no significance difference between male and female in learning plant adaptation using Field-trip teaching strategy.
- iv. Also, there was significant difference in motivation level between experimental and control groups. This further confirmed that field trip teaching strategy has gained more than the lecture method of teaching.
- v. However, it was statistically shown that Field-trip teaching strategy favored experimental group in learning plant adaptation concept.

### **5.4 Recommendations**

Based on the finding of the study the following recommendations were made;

- i. Teaching and learning strategy involving students participation such as Field-trip to be encouraged at secondary schools where this is often neglected.
- ii. The use of Field-trip should be encourage in secondary schools, hence it enhanced better retention.
- iii. Field-trip teaching strategy is gender friendly, it should be encourage among Males and Females students at secondary school level.

- iv. All materials needed for carrying out Field-trip should be provided by government because it motivates students to learn effectively.

## **5.5 Contributions to Knowledge**

The finding of the researcher adds new idea to the existing body of knowledge as:

- i. A package of checklist was developed to serve as a Field-trip guide for easy identification of plant species.
- ii. Motivation questionnaire, Plant adaptation Performance Test and a Flow chart were adopted and modified by the researcher.
- iii. Different plant species were discovered during Reconnaissance survey and will be useful to other researchers.
- iv. Field-trip teaching strategy was used on Plant adaptation concept in Gumel which is relatively new area

## **5.6 Limitations of the Study**

- i. Security challenges: there was serious concern about security due to the fact that northern states were under Boko Haram threat, so taking group of students outside caused a lot of distraction.
- ii. Language barrier: It was observed that some students do not understand simple biological terms or even English grammar. Therefore, a means was developed through student-to-student relationship to explain such terms.
- iii. Lack of motivation by the parents: It was observed that some parents do not support or encourage their children to go out for Field-trip.
- iv. Lateness on the part of the students

## **5.7 Suggestions for Further Studies**

This research intended to promote and encourage further finding in the related studies; hence, the following research areas were suggested:

- i. Impact of Field-trip on students' academic performance attitude and school location in plant adaptation at secondary school level
- ii. Impact of Field-trip on student performance and interest among senior secondary school students
- iii. Impact of teacher factor on Field-trip teaching strategy in plant adaptation at senior secondary school level
- iv. Impact of administrator factor on Field-trip on academic performance in plant adaptation concept at senior secondary school.

The study can be repeated in other educational zones

## References

- Abdullahi, A. (1982). *Science Teaching in Nigeria*. Illory, Atoto Press Limited
- Abduraheem, B.O. (2011). Effect of discussion method on secondary school students' achievement and retention in social studies. *European journal of educational studies* 3 (2) 44-50
- Adedeji, T. (2007). the impact of motivation on students academic achievement and learning outcome in mathematics among secondary school students in Nigeria. *Eurasia journal of mathematics, science and technology education*, 2007, 3 (2) 149-156
- Agholar, R.N. (1993). Motivating African Girls to Science. Removing social cultural barriers. A paper presented at the International Conference of Science Education in Developing Countries from Theory to Practice. January 3<sup>rd</sup> -7<sup>th</sup>, Jeruslaman Israel
- Ahmad, Y. (2014). Effect of Field trip on academic achievement and retention of rural and urban location in Zaria educational zone, Kaduna state. An unpublished thesis submitted to the department of science education ABU Zaria
- Ajaja, O.P. (2010). Effect of Field trip study on learning outcome in biology. *Journal of human ecology, department of science education, Delta state university, Abraka, Nigeria*. 31 (3) 171-177
- Aliyu, M.M, (2008). Educational excursion and the students' achievement in business studies. *Journal of educational research and development*. P, 111-124
- Anaso, J.N. (2008). Effects of Class-size on the Academic Achievement and Retention of Different Ability Groups Among Senior Secondary School Chemistry Student. PhD Dissertation ABU Zaria
- Ausubel, D.P. (1971). *The Psychology of Meaningful Verbal Blight*. Advantages and disadvantages of traditional lecture method. *six psychological studies (Pg3-73)*. New York, NY: Random house. press
- Aweriale, P.E.O. (2006). Gender Achievement in Physic. A case study in Auchi Polytechnics Auchi. *Nigeria Journal of Professional Teachers*, 1, (1), 1-2
- Babandi, A. (2010). A History of Jigawa State. Haske Publishing Company, Kano, Nigeria.
- Badola, S. (2013). effect of school on academic achievement, motivation of secondary level students in Garhwal, UK, *Educationia confab* 2, (15) 61-66
- Baliel, B., Duran, M., Bilgili, S. (2011). Effect of field trip observation method on the motivation of students. a paper presented at 2<sup>nd</sup> international conference on new trends in education and their implication, 27-29 antalaya-turkey

- Bacon, F. (1626). *The History of a Character Association*. Yale University Press.
- Bello, G. (2002). Gender Difference in School Science Implication for Science Teacher Education. *Journal of curriculum and instruction* 6, (1), 55-63
- Bichi, S.S. (2002). Effect of Problem-solving Strategy and enriched Curriculum on Students' Achievement in Evolution Concept among Secondary School Students, Unpublished PhD dissertation ABU, Zaria.
- Bichi, S.S. (2002). The effect of Gender on Academic Achievement in Evolution Concept among senior secondary school using problem-solving instructional strategy. *Zaria Journal of students in education* 3, (1), 132-138
- Bruner, J.S. (1960). *The Process of Education*. Newyork: Alfred A. Knopf. Inc.
- Christiana, O. (2009). influence of motivation on students' academic performance in Esan west local government area of Nigeria. *Medwell journal*, 4 (1) 30-36
- Cury, F. (2010). Personal and situational factors influencing intrinsic interest of adolescent girls in school physical education: a structural equation modeling analysis. *Educational psychology*, 16(3) 305-315
- Dori, Y. J., and Herscovitz, O. (2005). Case-based long-term professional development of science teachers. *International Journal of Science Education*, 27(12), 1413–1446.
- Elliot, S.N., Kratochwill, T.R., Cook, J.L., and Traveres, J.F. (2001). *Educational Psychology: Effective Teaching. Effective Learning* (3th edition). New York” McGrey Hill book Co. Federal Ministry of Education 2004. National Policy on Education, Lagos. NERDC Press
- Eneh, J.O. (2000). *History and philosophy of science; An outline*, magnet business enterprise, publishin division. Enugu, Nigeria.
- Falk, J. H., Martin, W. W., & Balling, J. D. (1978). The novel field trip phenomenon: Adjustment to novel settings interferes with task learning. *Journal of Research in Science Teaching*, 15(2), 127–134.
- Fansto-sterling, A. (1992). *Myth of gender. Biological Theories about Women and Men*. New York: Basic Book
- Farah, S. (2011). What is science and science education, a blog on syarafina-tech-science.blogspot.com
- Farmer J. Knapp, D., & Benton, G.M. (2007a). An elementary school environmental education field trip: Long-term effects on ecological and environmental knowledge and attitude development. *The Journal of Environmental Education*, 38(3), 33-41.

- Farmer, J., Knapp, D., & Benton, G. (2007b). The effects of primary sources and field trip experience on the knowledge retention of multicultural content. *Multicultural Education*, 14(3), 27-31.
- Feng, E.Z., and Hung, C. (2010). The survey study of mathematics motivated strategies for learning questionnaire for grades 10-12 Taiwanese students, *TOJET: The Turkish Online Journal of Educational Technology*, 9(2), 221-233
- Fraenkle, J.R and Willen, N.E. (2000). *How to Design and Evaluate Research in Education* 13<sup>rd</sup> Edition, McGraw-Hill, New York.
- Geddes, O. and Goraset, C. (2007). *Webstar Universal Dictionary and Thesaurus* David Dace House, New Larnak, ML 11 9D, Scotland UK
- Guay, F., Channal, J., Ratella, C.F., Marsh, H.W., Larose, S., and Boivin, M. (2010). Intrinsic, identified, and controlled types of motivation for school subjects in young elementary school children. *British journal of educational psychology*, 80(4), pp. 711-735
- Habeeb, N.N. (2001). De-mystifying Science for full Female Participation. In 42<sup>th</sup> Annual of STAN, 153-155
- Haines, L. (2010) Consumer testing: applying the scientific method to everyday life. *Science-scope* 21(4), 34-38
- Hefferan, K.P., Heywood, N.C., and Ritte, M.E. (2002). Integrating field trips and classroom learning into a capstone undergraduate research experience. *Journal of Geography*, 101(5), 183-190..
- Heyson, M., Copple, C., Jones, J. (2006). Play and children's motivation to learn. Retrieved 10th November 2009. [www.researchconnections.org](http://www.researchconnections.org)
- Hofstein, A., and Rosenfeld, S. (1996). Bridging the gap between formal and informal science learning. *Studies in Science Education*, 28, 87-112.
- Hoisington, C., Sableski, N., and DeCosta, I. (2010). A Walk in the woods. *Science and Children*, 48(2), 27-31.
- Hudak, P. (2003). Campus field exercises for introductory geosciences courses. *Journal of Geography*, 102(5), 220-225.
- Ibe, E. (2006). Breaking Gender Barrier on Achievement in STME using hands-on, minds-on science. Implication for Supply of Resources. 47<sup>th</sup> STAN Annual Conference Proceedings.
- Ifamuyiwa, A.S. (2005). Girls Participation and Performance in Secondary School. Further Mathematics in Ijebu-ode Ogun State, Nigeria. P97 standard for Science Technology and Mathematics Education (Research a book for reading)

- Igwebuike, T.B., Atomatofa, R. (2013) A test of efficacy of field trip and discussion approaches to teach integrated science within a constructivist flavor. *Journal of education and practice* 4, (13) 22-35
- James T. (2000): Effect of Combining Reflective writing with Concepts – Mapping and Lecture Method on pre – service NCE teachers Attitude Achievement in Biology Unpublished Ph. D thesis ABU Zaria
- Jibrin, A.G. and Nuru, R.A. (2007) The Role of ICT in Teaching Science Technology and Mathematics Education (STME) in Nigeria institution. A paper presented at the National Conference of Nigeria Primary and Teacher Education Association at University of Jos July 31<sup>st</sup> – 3<sup>rd</sup> August 2007
- Jimoh, A.T. (2001). The Place of Women Education in the Development of Science Mathematics and Technology 42<sup>th</sup> Annual Conference of STAN 170-173
- Joseph, M., and Okaoboh, O. (2000). The Role of Government in Science and Technology Education in Nigeria. *Journal of Research in Science Teaching*. 21, (1), 23-28
- Kerlinger, F.N. (1973). *Foundations of Behavioral Research*. New York. Holt Rinehart and Winston Inc,
- Kisiel, J. (2006a). More than lions and tigers and bears—Creating meaningful field trip lessons. *Science Activities*, 43(2), 7-10.
- Kisiel, J. (2006b). Making field trips work. *Science Teacher*, 73(1), 46-48.
- Krapp, A. (2005). Basics needs in the development of interest and intrinsic motivational orientation. *Learning and instruction*, 12 (6), 383-409
- Krepel, W. J., & Durrall, C. R. (2008). *Field trips: A guideline for planning and conducting educational experiences*. Washington, DC: National Science Teachers Association.
- Lagoke, B. A., (2000). The efficiency of enriching biology teaching with analogy on the performance of students of different achievement levels. *Journal of Science Education*. 7, (1) 40-44
- Lakpini, M.A. (2006). Effects of a conceptual change instructional strategy on achievement, retention and attitude of SS Biology student with varied abilities. Unpublished PhD Thesis ABU Zaria.
- Lealey, C., Michael, A. (2005). Field trips and their effect on students' achievement and attitudes. A comparison a physical verses virtual field trips to the Indian River lagoon. *Journal of college science teaching* 34, (5) 14-17
- Lei, S.A. (2010a). Assessment practices of advanced field ecology courses. *Education*, 130(3), 404-415.

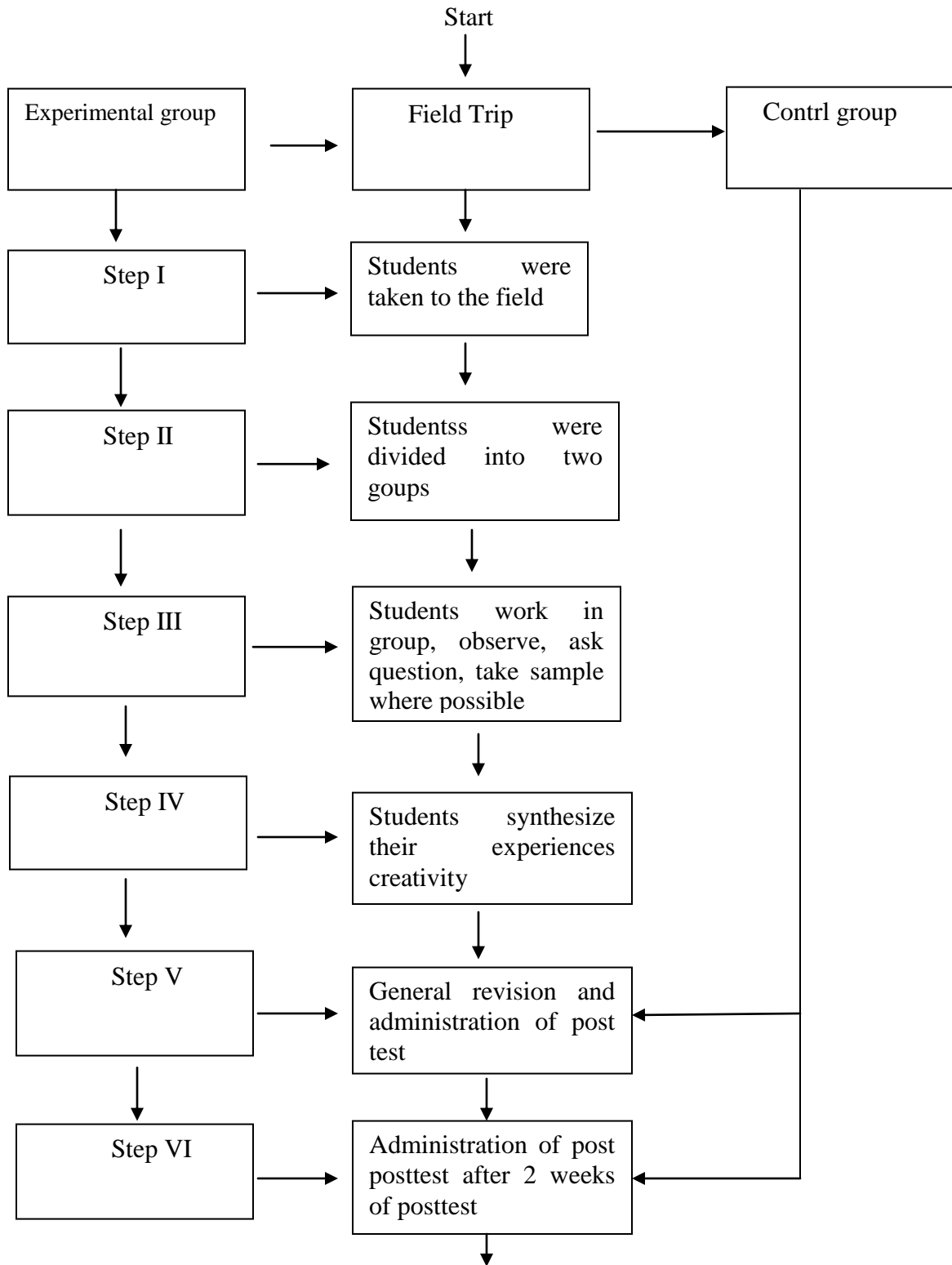
- Lei, S.A. (2010b). Field trips in college biology and ecology courses: Revisiting benefits and drawbacks. *Journal of Instructional Psychology*, 37(1), 42-48.
- Linver, M.R., Davis-kean, P.E. and Ecle, J.S. (2002). Influence of Gender of Academic Achievement. A paper presentation at biennial meeting of the society for research on adolescence, L.A 1-14
- Liu, E., Z., F. and Lin, C.H. (2010). The survey study of mathematics motivated strategies for learning questionnaire for grades 10-12 Taiwanese students, *TOJET: The Turkish Online Journal of Educational Technology*, 9(2), 221-233.
- Maikano, S. (2010). Comparison between indoor and outdoor laboratory teaching strategies on secondary school students academic achievement and retention in ecology. Paper presented in a seminar at department of science education A.B.U. Zaria.
- Malik, A.A., Jamil, A. (2012). Effect of motivation and parental influence on the educational attainments of students at secondary school level. *Journal of academic reserarc international 2*, (15) 61-66
- Martinez, M.E. (2006). What is metacognition? Phi Delta Kappan, 87(a), pp. 696-699
- Mawdsley. R. D. (1999). Legal issues involving fieldtrips. *School Business Affairs*, 65(9), 28-31.
- Michie, M. (2004). Factors influencing secondary science teachers to organize and conduct field trips. *Australian Science Teacher's Journal*, 44, 43-50.
- Michie, M. (2007). Field trip Aren't worth the effort... Or are they? *Science Teachers Association of the Northern Territory Journal*, (15) 82-92
- Millan, D. A. (1995). Field trips: Maximizing the experience. In B. Horwood (ed.), *Experience and the Curriculum*. Dubuque, IA: Kendall/Hunt
- Mills, K.N. (2005). An integrated learning programmed to motivate and improved freshmen English students' grades and attitude toward English. M.S. Practicum, Nova University
- Mitchell, M. and Gilson, J. (2011). Interest and anxiety in mathematics. A paper presented at annual meeting of the American educational research association, Chicago.
- Morris, J.A. (2008). A preview of coming attractions: classroom teachers idea notebook. *Social education*, 59(4) 195-197
- Nabors, M.L., Edwards, L.C., and Murray, R.K. (2009). Making the case for field trips: What research tells us and what site coordinators have to say. *Education 129*(4), 661-667.
- Nadelson, L., and Jordan, J. (2012). Student attitudes toward and recall of outside day: An environmental science field trip. *Journal of Educational Research*, 105(3), 220-231.

- National Research Council (2009). *Learning science in informal environments: People, places, and pursuits*. Washington, DC: The National Academies Press.
- Nussbaum, M. (2000). *Women and human development; the capability of approach* Cambridge university press 158
- Nwagbo C. (2006). Effect of two Teaching Methods on the Achievement and Attitude to Biology Students of Different Level of Scientific Literacy, *Science Direct International Journal of Educational Research* 46(3), 216 -229. [http// dxdoc. Org/10.10.16/j.ijer](http://dxdoc.Org/10.10.16/j.ijer). Retrieves on .01/02/2015
- Obeka, S.S. (2009). *Epodawalad and power stimulation games of geographical education*. A.B.U, Press Ltd, Zaria 28-50
- Obeka, S.S. (2010), *Current trend in geographical and environmental education*. Ahmadu Bello University, Press Ltd.
- Ogunleye, A.O. (1999). *Science education in Nigeria historical development curriculum reforms and research*. Sunshine international publishers (Nig) Ltd.
- Ogwuazor, K.E. (1992). Nigerian Women and Science and Education. The situation so far. *Lagos Journal of Science Education*. 1, (1), 79-82
- Okebukola, P.A. (1997). Some factors in students under-achievement in senior secondary school biology. *Journal of science education vol. 2 No 1&2 Pg1-9*
- Okoli, J.N. (2006). Effect of investigative laboratory approach and expository method on acquisition, different levels of scientific literacy. *Journal of the science teachers association of Nigeria*. 41 (1&2), 79-88
- Olarinoiye, R.D. (2000). Strategies for Effective Teaching of Modern Physics. A keynote address Presented At STAN Physic Panel Workshop held at Government College Katsina, Katsina State from 24<sup>th</sup>-29<sup>th</sup> April
- Olorukooba, S.B.(2001). The relative effects of cooperative learning instructional strategy and traditional method on the performance of senior secondary school students. An Unpublished Ph. D Dissertation. Ahmadu Bello University.
- Oluwatoyin, A.J. (2007). Gender and Subject Choice Effects on Student Psycho-cognitive outcomes in Mathematics. *Journal of Arts and Education (JOLME)*, 1, (1), 1-2
- Orion, N., and Hofstein, A. (1994). Factors that influence learning during a scientific field trip in a natural environment. *Journal of Research in Science Teaching*, 31, 1097–1119.
- Pace, S., Tesi, R. (2004). Adult’s perception of field trips taken within grades K-12: Eight case studies in the New York metropolitan area. *Education*, 125(1), 30-40.

- Pasquier, M., and Narguizian, P.J. (2006). Nature as a resource: Effectively planning an outdoor field trip. *Science Activities*, 43(2), 29-33. Presented at annual meeting of the American educational research association, Chicago. Reflective journal writing. Unpublished thesis saint Xavier University.
- Pruett, K.E. (2010). Difference in academic achievement, self concept based on intellectual ability, grade retention and special education status. A thesis presented to faculty of graduate school western Carolina University
- Rennie, L. J., and McClafferty, T. P. (1995). Using visits to interactive science and technology centers, museums, aquaria, and zoos to promote learning in science. *Journal of Science Teacher Education*, 6(4), 175–185.
- Rennie, L.J. (2007). Learning outside of school. In S.K. Abell and N.G. Lederman (eds.), *Handbook of Research on Science Education*. Mahwah, New Jersey: Erlbaum. Retrieved from media.wix.com/110836\_ez41013794ef>6acd3864de 20, Sep, 2015
- Sambo, A.A. (2008). Research method in education study. Horeden Publishers Nigeria Limited. Ibadan Oyo State, Nigeria.
- Scarce, R. (1997). Field trips as short term experiential education. *Teaching Sociology*, 25, 219–226.
- Schraw, G., Crippen, K.,J. and Hartley, K. (2006). Promoting self-regulation in science education: metacognition as part of a broader perspective on learning. *Research in science education*, 36, 111-139.
- Schwerdt, G., and West, M.R. (2013). Effect of test-based retention on students’ outcomes over time in Florida. Program on education policy and governance working paper series *Research in science education*, 36, 111-139.
- Scribner-MacLean, M., and Kennedy, L. (2007). More than just a day away from school: Planning a great science field trip. *Science Scope*, 30(5), 57-60
- Shaibu, A.A.M. (2008). Science Technology and Mathematics for National Development: The Teacher is the key. Unpublished Paper Presented at 2<sup>nd</sup> Annual Conference of Kaduna State Branch of STAN
- Sorrentino, A.V, and Bell, P.E. (1970). A comparison of attributed values with empirically determined values of secondary school science field trips. *Science education*, 54 (3), 233-236.
- Tal, R. T. (2004). Community-based environmental education—a case study of teacher–parent collaboration. *Environmental Education Research*, 10, 523–543.
- Tal, T., and Morag, O. (2009). Reflective Practice as a Means for Preparing to Teach Outdoors in an Ecological Garden. *Journal of Science Teacher Education*, 20(3), 245-262.

- Tal, T., and Steiner, L. (2006). Patterns of teacher–museum staff relationships: School visits to the educational center of a science museum. *Canadian Journal of Science, Mathematics and Technology Education*, 6, 25–46.
- Thomas, J., Stockton, C. (2010) The effect of socioeconomic status, race, gender and retention: impact on students’ achievement Louisiana tech university 2 (3)
- Tukman, B.W. (1975). Measurement educational fundamental of testing. New York: Harcourt Brace Jovanovich, Inc
- UNESCO: United Nation Educational Science, Cultural Organization. Handbook for Science Teaching. P.89 UNESCO Paris-Heinmenn, 7 Place Deforitenon, London 180
- Usman A.I (2008). Effects of Class Size on Students Academic Performance in Integrated Science at Junior Secondary School Level. 1 (1) 144-149
- Usman, I.A. (2000). The Relationship between Student’s Performance in Practical Activities and Their Academic Achievement in Integrate Science Using NISTEP Mode of Teaching. An Unpublished PhD Thesis ABU, Zaria
- Usman, I.A. (2008) Using selected method of teaching in enhancing slow learners’ academic performance among *junior secondary school integrated science school students*. 115
- Vogel, H.L. and Collins, A.L. (2010). The Relationship Between Test-anxiety and Academic Performance Department of Psychology. Missouri Western University.
- Voninnvich, C. (1997). Improving students’ motivation in the secondary class room through the use critical thinking skills, cooperative learning techniques and reflective journal writing. Unpublished thesis saint Xavier University
- Wilson, M. (2011). Field Trip Fundamentals. *Educational Digest*, 76(6), 63-64
- Wood, R. and Ashfield, J. (2008). The use of interactive white board for creative teaching and learning in literacy and mathematics: a case study. *British journal of educational technology*, 39 (1), 84-96ogy

APPENDIX A



Flow chart: Adapted from Fred (2007) illustrating steps in Field Trip Strategy



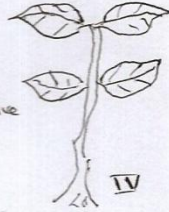
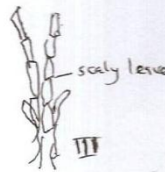
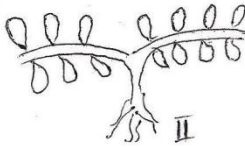
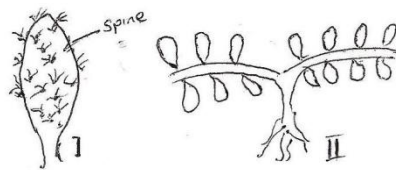
3. Xerophytes plants usually store water in their .....
- A. Succulent stems and leaves
  - B. Nutshell and leaves
  - C. Flower and bud
  - D. Stomata and guard cell
4. Plant adapted to saline environment is called.....
- A. Hydrophytes
  - B. Mesophytes
  - C. Halophytes
  - D. Xerophytes
5. One of the morphological features of hydrophytes plant is
- A. Presence of spine
  - B. Broad and flat leaves
  - C. Presence of scaly leaves
  - D. Presence of thick back
6. Structure that prevent the lost of water from the leaves of mesophytes plant is called
- A. Waxy cuticle
  - B. Broad leaves
  - C. Stomata
  - D. Thick back
7. Examples of xerophytes plants are
- A. Acacia and cactus
  - B. Baobab and spinach
  - C. Bean and aloe
  - D. Pine and water Lilly
8. Halophytes plants are usually found in an environment that is
- A. Saline
  - B. Mountainious
  - C. Freshwatered
  - D. Snowy

9. One example of hydrophyte plant is
- A. Water lily
  - B. Acacia
  - C. Groundnut
  - D. Okra
10. One of the adaptive features of mesophytes plant during dry season is ..... to reduce transpiration rate.
- A. Retaining leaves
  - B. Folding leaves
  - C. Shading leaves
  - D. Producing leaves
11. Deep root system is an adaptive feature of xerophytes plant called
- A. Spinach
  - B. Lettuce
  - C. Acacia
  - D. Swithgrass
12. Small and feathery root is an adaptive feature of .....
- A. Halophyte
  - B. Xerophytes
  - C. Mesophyte
  - D. Hydrophytes
13. The following are morphological adaptation of mesophyte **except**
- A. Extensive fibrous root system
  - B. Broad leaves
  - C. Flat and green leaf
  - D. Leaves modified into thorn
14. Absence of leaves in xerophytes plants in an adaptation to
- A. Conserve water
  - B. Support transpiration rate
  - C. Evaporate water very fast
  - D. Leaves are folded

15. In order to float on the surface of a pond hydrophytes plants have

- A. Flat leaves with air sac
- B. Narrow leaves without air sac
- C. Spines with air sac
- D. Thorn without air sac

Study carefully the diagram below to answer question 16-18



16. An examples of mesophytes plant is

- A. I
- B. II
- C. IV
- D. III

17. The plants that best adapted to desert environment are

- A. I and IV
- B. II and IV
- C. III and IV
- D. II and I

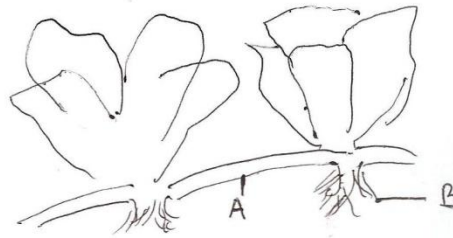
18. One of the morphological features of xerophytes is

- A. Presence of spine
- B. Presence of broad leaves
- C. Presence of air sac
- D. Presence of floating leaves

19. Mesophyte plant can be found in an area which is

- A. Water lodge
- B. Hot environment
- C. Moderate moist place
- D. Dry place

Use diagram below to answer question 20-21



20. The structure marked “A” is known as
- A. Stolon
  - B. Branch
  - C. Twigs
  - D. Thread
21. The structure marked “B” is called
- A. Tap root
  - B. Primary root
  - C. Secondary root
  - D. Feathery root
22. The loss of water vapour from the plant leaves is called
- A. transpiration
  - B. Translocation
  - C. Respiration
  - D. Photosynthesis
23. In dry environments, a typical mesophytic plant evaporate water fast through
- A. Root
  - B. Stomata
  - C. Flower
  - D. Buds
24. Plants with a greater number of stomata on the undersides of leaves is called
- A. Halophyte
  - B. Mesophyte
  - C. Xerophytes
  - D. Hydrophyte

25. A tiny pores on the surface of a xerophytic plant is called
- A. Pore
  - B. Stomata
  - C. Lenticels
  - D. Spores
26. .... in an adaptive feature of halophytic plant
- A. Sweat gland
  - B. Salt excreting gland
  - C. Resin
  - D. Webbed feet
27. .... High osmotic concentration of the cell sap
- A. Hydrophytes
  - B. Xerophytes
  - C. Mesophytes
  - D. Halophytes
28. The leaves of halophyte plant are ..... Structure
- A. Broad and flat
  - B. Big and thin
  - C. Small and scaly
  - D. Big and scaly
29. Halophytes plant can endure extremely salt regions, such as
- A. Salt marshes
  - B. Salt pans
  - C. Sand dunes
  - D. All of the above
30. The unique feature of halophyte plant is
- A. Broad leaves
  - B. Vivipary germination
  - C. Possess flat leaves
  - D. Small root

## APPENDIX C

### Marking Scheme for the Instrument (PAPT)

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

## APPENDIX D

### Plant Adaptation Motivation Questionnaire (PAMQ)

The researcher is conducting a study on “impact of Field-trip on Motivation, Retention and Performance in Plant Adaptation among Secondary School Students in Gumel, Jigawa State, Nigeria”. He is therefore seeking for your cooperation in completing section A and responding to the statements in section B. The researcher is interested in your feelings and ideas about Field -trip. Your response to this questionnaire will be treated with utmost confidentiality.

Section A. Please, kindly complete this section of the questionnaire.

Name of school ..... Class .....

Gender .....

Part B.

Please tell me what you *really* think by putting a mark (✓) in the box corresponding to strongly Agree (**SA**), Agree (**A**), Disagree (**DA**), or Strongly Disagree (**SD**). There is no right or wrong answer. Do not spend much time with any statement, *but be sure to answer every statement*. Thanks for your help.

### Plant Adaptation Motivation Questionnaire (PAMQ)

Statements	SA	A	DA	SD
1. I think plant adaptation class will be challenge, but neither too easy, nor too hard for				
2. There is something interesting about plant adaptation that will capture my attention.				
3. The teaching of plant adaptation is more difficult than I would for it to be.				
4. I am satisfied with the method used for plant adaptation teaching.				
5. It is clear to me how plant adaptation is related to thing I already know.				
6. I believe this lesson will gain and sustain my interest.				
7. I believe that the information contained in this topic will be important to me.				
8. As I learn more about plant adaptation, I am confident that I could learn the content.				
9. I enjoy plant adaptation so much that I would like to know more about the topic.				
10. Plant adaptation teaching seems dry and unappealing.				
11. This method is not relevant to my interest.				
12. I never feel I have prepared enough for the lesson				
13. I will really enjoy completing assignments for this topic.				
14. After working on this lesson for awhile, I believe that I will be confident in my ability to successfully complete all class assignments and requirements.				
15. I think that the method used in the lesson will keep my attention on plant adaptation				
16. The method used to deliver the plant adaptation lesson may be frustrating or irritating.				
17. I will feel good to successfully complete this lesson.				
18. The contents of this topic do not include information that will be useful to me.				

19. I do not think that I will be able to really understand the information in this topic.				
20. I can never perform better in the course plant adaptation.				
21. My biology teacher never motivates me to like lesson on plant adaptation.				
22. It is important for me to learn hard.				
23. I get very nervous during the lesson				
24. I worry that my performance will be poor after the lesson.				
25. I only go for the lesson because I have to.				
26. I often try to think of different way to solve plant adaptation problem				
27. To learn plant adaptation, I try to remember every step in the procedure				
28. When I cannot understand something in plant adaptation, I always look for more information to help me understand the problem.				
29. When I study plant adaptation, I start by working out exactly what I need to learn.				
30. I do not think that taking lesson on plant adaptation will be worth my time and effort.				

**Adopted from Salihu 2012**

## APPENDIX E

### Checklist for the Identification plant species

The following procedures were used as field guide.

Tick appropriately what you observe

1. Types of plants in the locality
  - i. Water Lilly
  - ii. Acacia specie
  - iii. Baobab
  - iv. Cassia albidda
  - v. Termarindis
  - vi. Water lettuce
  - vii. Neem
2. Characteristic feature of the habitat
  - i. Water
  - ii. Lowland/plain
  - iii. Sunday surface
  - iv. Rocky surface
  - v. Epiphytes
3. Mode of adaptation
  - i. Morphological
    - a. Shape orientation
    - b. Size orientation

- ii. Physiological
  - a. Greenness
  - b. Leave
  - c. Stem
  - d. Root
- iii. Genetical
  - a. Grass
  - b. Herb
  - c. Shrub
  - d. Tree
- 4. Other observations
  - a. Height
  - b. Short
  - c. Thin
  - d. Thick
  - e. Broad leave
  - f. Needle-like structure
  - g. Narrow

## APPENDIX F

### LESSON PLAN I

Experimental Group (Field-Trip Teaching Strategy)

Subject: Biology

Topic: Hydrophytes plant

Class: SS II

Duration: 40 minutes

**Instructional material:** charts, essential biology textbook

**Objective:** At the end of the lesson students should be able to:

- i. Define hydrophytes plant
- ii. List four characteristics feature of hydrophytes plant
- iii. Make a well label diagram of a named hydrophyte plant

**Previous knowledge:** Students have taught about general ecology

**Introduction:** lesson will be introduced by asking students some question from the previous knowledge. Example what is habitat?

**Presentation:** lesson starts by given every student a copy of checklist as a guide

**Step1.** Studentswill visit the pond to see the hydrphyte plants in their natural environment

**Step 2.**studentswill collect different sample of hydrophyte plants from the pond.

**Step3.** Studentswill now observe characteristics feature of hydrophyte plants

**Step4.** Teacherdiscussed with the students about the hydrophyte plants.

**Evaluation:** Lesson will be evaluated by asking students question based on the activity done.eg

- i. Define hydrophytes plant.
- ii. List four characteristics feature of hydrophyte plant

**Conclusion:** Lesson will be concluded by summarizing the topic learnt

## LESSON PLAN II

Experimental Group (Field-Trip Teaching Strategy)

Subject: Biology

Topic: mesophytes plant

Class: SS II

Duration: 40 minutes

**Instructional material:** charts, essential biology textbook

**Objective:** At the end of the lesson students should be able to:

- i. Define mesophytes plant
- ii. List four characteristics feature of mesophytes plant
- iii. Make a well lebal diagram of a named mesophyte plant

**Previous knowledge:** Students have taught about hydrophytes plant

**Introduction:** lesson will be introduced by asking students some question from the previous knowledge. Example what is hydrophytes plant?

**Presentation:** lesson starts by given every student a copy of checklist as a guide

**Step1.** Students will visit a nearby plantation (Maiduhuwa) to see the mesophyte plants in their natural environment

**Step 2.** students will collect different sample of mesophyte plants from their habitats

**Step3.** Student will now observe characteristics feature of mesophyte plants

**Step4.** Teacher will discuss with the students about the mesophytes plant in the classroom.

**Evaluation:** Lesson will be evaluated by asking students question based on the activity done. eg Define mesophytes plant. ii. List four characteristics feature of mesophyte plant

**Conclusion:** Lesson will be conclude by summarizing the topic learnt

## LESSON PLAN III

Experimental Group (Field-Trip Teaching Strategy)

Subject: Biology

Topic: Plant Adaptation (xerophytes plant)

Class: SS II

Duration: 40 minutes

**Instructional material:** charts, essential biology textbook

**Objective:** At the end of the lesson students should be able to:

- i. Identify xerophyte plants by their name
- ii. List 5 adaptive features of xerophyte plants
- iii. Draw and label of a named xerophyte plant

**Previous knowledge:** Students have been taught about mesophyte plants

**Introduction:** lesson will be introduced by asking students some question from the previous knowledge. Example what is mesophyte plant?

**Presentation:** lesson starts by given every student a copy of checklist as a guide

**Step 1.** Students will visit an area with relatively low amount of moisture where they can find xerophytes plant

**Step 2.** students will collect different sample of of xerophyte plants from their habitat

**Step 3.** Students will now observe characteristics feature of xerophyte plants

**Step 4.** Teacher will discuss with the students about the xerophytes plant in the classroom.

**Evaluation:** Lesson will be evaluated by asking students question based on the activity done. eg Define xerophytes plant. ii. List four characteristics feature of xerophyte plant

**Conclusion:** Lesson will be conclude by summarizing the topic learnt

## LESSON PLAN IV

Experimental Group (Field-Trip Teaching Strategy)

Subject: Biology

Topic: Plant Adaptation (halophyte plant)

Class: SS II

Duration: 40 minutes

**Instructional material:** charts, essential biology textbook

**Objective:** At the end of the lesson students should be able to:

- i. Identify halophyte plants by their name
- ii. List 5 adaptive features of halophytes plants
- iii. Mention where halophyte plants can be found

**Previous knowledge:** Students have been taught about xerophyte plants

**Introduction:** Lesson will be introduced by asking students some question from the previous knowledge. What is xerophytes plants? What are the adaptive features of xerophytes plant?

**Presentation:** lesson starts by given every student a copy of checklist as a guide

**Step 1.** Students will visit an area with relatively salt where they find halophyte plants

**Step 2.** students will collect different sample of of halophytes plant from their habitat

**Step 3.** Students will now observe characteristics feature of halophyte plants

**Step 4.** Teacher will discuss with the students about the halophyte plants.

**Evaluation:** Lesson will be evaluated by asking students question based on the activity done. eg Define halophytes plant. ii. List four characteristics feature of halophyte plant

**Conclusion:** Lesson will be conclude by summarizing the topic learnt

## LESSON PLANV

Experimental Group (Field-Trip Teaching Strategy)

Subject: Biology

Topic: presentation of group work

Class: SS II

Duration: 40 minutes

### **Instructional material:**

**Objective:** At the end of the lesson students should be able to:

- i. Share ideas
- ii. Ask themselves question
- iii. Find out relavent solution to problem raised.

**Previous knowledge:** Students have been taught about plants adptation

### **Introduction:**

**Presentation:** lesson starts by given every student a copy of checklist as a guide

**Step1.** Group one will present their finding on hydrophyte plants

**Step 2.** Group two will present their finding on mesophyte plants

**Step3.** Group three will present their finding on xerophyte plants

**Step4.** Group four will present their finding on halophyte plants

**Evaluation:** Lesson will be evaluated by making comment, observation and constructive criticism on the presentation made

**Conclusion:** Lesson will be conclude by summarizing all the topic learnt

## APPENDIX G

### LESSON PLAN I USING LECTURE METHOD

Control Group (Lecture Method)

Subject: Biology

Topic: Plant Adaptation (hydrophytes plant)

Class: SS II

Duration: 40 minutes

Instructional material: textbook

**Objective:** At the end of the lesson students should be able to:

- i. Define hydrophytes plants by their name
- ii. List 5 adaptive features of hydrophytes plants
- iii. Mention where hydrophytes plants can be found

**Previous knowledge:** Students have been taught about plants succession

**Introduction:** Lesson will be introduced by asking students some question from the previous knowledge. What is plant succession? Mention the types of plant succession.

**Presentation:** lesson will be presented in following steps

**Step 1.**Teacher will define what are hydrophytes plant i.e. hydrophytes are plants that are found in an area with little moisture content.

**Step2.** Teacher will mention the name and example of hydrophytes plants.

**Step3.** Teacher will mention the adaptive features of hydrophytes plant as follows

- i. They have waxy on their leave
- ii. They can float on water body
- iii. They have broad and flat leaves

**Evaluation:** Lesson will be evaluated by asking students some question .e.g.

- i. What are hydrophytes plants?
- ii. Mention adaptive features of hydrophytes plant
- iii. Give example of hydrophytes plants

**Conclusion:** Lesson will be conclude by summarizing a topic learnt e.g. brief explanation about hydrophytes plant, their adaptive features and where they can be found.

## LESSON PLAN II

Control Group (Lecture Method)

Subject: Biology

Topic: Plant Adaptation (mesophytes plant)

Class: SS II

Duration: 40 minutes

Instructional material: textbook

**Objective:** At the end of the lesson students should be able to:

- i. Define mesophytes plants by their name
- ii. List 5 adaptive features of mesophytes plants
- iii. Mention where mesophytes plants can be found

**Previous knowledge:** Students have been taught about hydrophytes plants

**Introduction:** Lesson will be introduced by asking students some question from the previous knowledge. What are the hydrophytes plants? What are the adaptive features of hydrophytes plant?

**Presentation:** lesson will be presented in following steps

**Step 1.**Teacher will define what are mesophytes plant i.e. mesophytes are plants that can be found in an area with moderate moisture content.

**Step2.** Teacher will mention the name and example of mesophytes plants e.g. spinach, beans, groundnut etc

**Step3.** Teacher will mention the adaptive features of mesophytes plant as follows

- i. They have waxy on their leave
- ii. They can float on water body

**Evaluation:** Lesson will be evaluated by asking students some question .e.g.

- i. What are mesophytes plants?
- ii. Mention adaptive features of mesophytes plant
- iii. Give example of mesophytes plants

**Conclusion:** Lesson will be conclude by summarizing a topic learnt e.g. brief explanation about mesophytes plant, their adaptive features and where they can be found.

## LESSON PLAN III

Control Group (Lecture Method)

Subject: Biology

Topic: Plant Adaptation (xerophytes plant)

Class: SS II

Duration: 40 minutes

Instructional material: textbook

**Objective:** At the end of the lesson students should be able to:

- i. Define xerophytes plants by their name
- ii. List 5 adaptive features of xerophytes plants
- iii. Mention where xerophytes plants can be found

**Previous knowledge:** Students have been taught about mesophytes plants

**Introduction:** Lesson will be introduced by asking students some question from the previous knowledge. What are the mesophytes plants? What are the adaptive features of mesophytes plant?

**Presentation:** lesson will be presented in following steps

**Step 1.**Teacher will define what are xerophytes plant i.e. xerophytes are plants that are found in an area with little moisture content.

**Step2.** Teacher will mention the name and example of xerophytes plants.

**Step3.** Teacher will mention the adaptive features of xerophytes plant as follows

- i. The leave have been modified into thorns and spine
- ii. Some have small and needle like structure leaves e.g. acacia
- iii. They have succulent stems and leaves for storing.

**Evaluation:** Lesson will be evaluated by asking students some question .e.g.

- i. What are xerophytes plants?
- ii. Mention adaptive features of xerophytes plant
- iii. Give example of xerophytes plants

**Conclusion:** Lesson will be conclude by summarizing a topic learnt e.g. brief explanation about xerophytes plant, their adaptive features and where they can be found.

## LESSON PLANIV

Control Group (Lecture Method)

Subject: Biology

Topic: Plant Adaptation (halophyte plant)

Class: SS II

Duration: 40 minutes

Instructional material: textbook

**Objective:** At the end of the lesson students should be able to:

- i. Define halophyte plants by their name
- ii. List 5 adaptive features of halophytes plants
- iii. Mention where halophyte plants can be found

**Previous knowledge:** Students have been taught about hydrophytes plants

**Introduction:** Lesson will be introduced by asking students some question from the previous knowledge. What are the xerophytes plants? What are the adaptive features of xerophytes plant?

**Presentation:** lesson will be presented in following steps

**Step 1.**Teacher will define what are hydrophytes plant i.e. halophytes are plants that are found in an area where soil has high salt content.

**Step2.** Teacher will mention the name and example of halophytes plants.

**Step3.** Teacher will mention the adaptive features of halophytes plant as follows:

- i. Presence of thick epidermis
- ii. Presence of salt excreting gland
- iii. High osmotic concentration of the cell sap

**Evaluation:** Lesson will be evaluated by asking students questions based on the activity done

e.g.

- i. What are halophytes plants?
- ii. Mention adaptive features of halophytes plant
- iii. Give example of halophytes plants

**Conclusion:** Lesson will be concluded by summarizing a topic learnt e.g. brief explanation about halophytes plant, their adaptive features and where they can be found.

## LESSON PLAN IV

Control Group (Lecture Method)

Subject: Biology

Topic: General revision

Class: SS II

Duration: 40 minutes

**Instructional material:** textbook, pictures, chart

**Objective:** At the end of the lesson students should be able to:

- i. Define hydrophyte, mesophyte, xerophyte and halophyte plants
- ii. Differentiate between hydrophyte, mesophyte, xerophyte and halophyte plants
- iii. Mention characteristics feature of the above mentioned plants

**Previous knowledge:** Students have been taught about plant adaptation

**Introduction:** Lesson will be introduced by asking students some question from the previous knowledge.

**Presentation:** lesson will be presented in following steps

**Step 1.**Teacher will define what are hydrophyte plants and their characteristic features

**Step2.** Teacher will define what are mesophyte plants and their characteristic features

**Step3.** Teacher will define what are xerophyte plants and their characteristic features

**Step4.**Teacher will define what are halophyte plants and their characteristic features

**Evaluation:** Lesson will be evaluated y asking students question based on the activity done.

- i. What are hydrophyte, mesophyte, xerophyte and halophyte plants?
- ii. Mention adaptive features of hydrophyte, mesophyte, xerophyte and halophytes plant
- iii. Give example of hydrphyte, mesophyte, xerophyte and halophyte plants

**Conclusion:** Lesson will be conclude by summarizing the entire topic learnt

## APPENDIX H

### SOME SALECTED PICTURES OF FIELD-TRIP



Experimental group at Masara Pond collecting and observing hydrophyte plant  
(water lettuce)



Experimental group at Masara Pond collecting and observing hydrophyte plant  
(water lettuce)



Experimental group observing mesophyte plant (baobab tree)



Experimental group at Masara Pond collecting and observing hydrophyte plant  
(water lilly)



Experimental group at Masara Pond collecting and observing hydrophyte plant  
(water lettuce)



Here is the experimental group observing xerophyte plant (acacia sp)

## APPENDIX I

Scores of pretest, posttest and post posttest of both experiment and control groups for PAPT

Note: PAPT contained 30 items, so it is marked over 30  
pretest

S/no.	Experiment group	Control group
1.	06	07
2.	07	10
3.	07	05
4.	04	11
5.	02	06
6.	09	02
7.	09	08
8.	02	05
9.	11	12
10.	07	07
11.	05	07
12.	05	07
13.	05	04
14.	08	07
15.	05	07
16.	07	02
17.	06	05
18.	07	07
19.	04	08
20.	06	06
21.	07	06
22.	06	07
23.	08	05
24.	09	02
25.	06	06
26.	07	13
27.	08	13
28.	10	06
29.	07	07
30.	11	07
31.	05	04
32.	02	04
33.	06	02
34.	05	09
35.	08	09
36.	07	02
37.	12	11
38.	07	07

39.	07	05
40.	04	05
41.	05	05
42.	07	08
43.	07	05
44.	05	06
45.	02	07
46.	08	04
47.	07	07
48.	06	06
49.	06	08
50.	05	06
51.	07	06
52.	06	09
53.	02	08
54.	13	07
55.	11	07
56.	10	08
57.	13	05
58.	05	10
59.	06	11
60.	07	08
61.	10	07
62.	-	06
63.	-	05

Scores of posttest of both experiment and control groups for PAPT

S/no.	Experiment group	Control group
1.	21	13
2.	21	13
3.	27	14
4.	26	15
5.	14	13
6.	25	14
7.	24	10
8.	27	10
9.	27	19
10.	26	14
11.	25	14
12.	24	13
13.	23	11
14.	23	11
15.	23	13
16.	29	12
17.	21	10
18.	22	15
19.	26	11
20.	26	10
21.	26	13
22.	26	13
23.	13	13
24.	28	14
25.	24	12
26.	25	12
27.	25	12
28.	27	13
29.	26	21
30.	26	10
31.	26	11
32.	25	11
33.	27	14
34.	27	13
35.	28	13
36.	21	13
37.	14	13
38.	17	13
39.	20	10
40.	29	11
41.	29	13
42.	24	14

43.	25	12
44.	25	11
45.	25	13
46.	27	10
47.	27	13
48.	27	14
49.	27	14
50.	26	13
51.	27	14
52.	25	13
53.	24	09
54.	26	11
55.	12	12
56.	11	10
57.	27	13
58.	28	13
59.	29	08
60.	25	08
61.	25	13
62.	-	13
63.	-	14

Scores of postpost-test of both experiment and control groups for PAPT

S/no.	Experiment group	Control group
1.	22	09
2.	21	08
3.	27	11
4.	26	12
5.	13	10
6.	15	11
7.	24	08
8.	27	09
9.	27	15
10.	25	10
11.	25	11
12.	23	09
13.	23	08
14.	23	10
15.	23	10
16.	29	10
17.	20	09
18.	22	12
19.	26	09
20.	25	09
21.	25	11
22.	36	11
23.	12	11
24.	27	10
25.	24	10
26.	25	10
27.	24	10
28.	25	19
29.	26	05
30.	25	07
31.	26	10
32.	26	10
33.	25	11
34.	27	12
35.	27	13
36.	27	12
37.	20	12
38.	13	11
39.	17	09
40.	20	09
41.	28	09
42.	28	10

43.	24	10
44.	24	11
45.	24	11
46.	25	09
47.	26	10
48.	27	10
49.	27	10
50.	20	10
51.	25	10
52.	25	11
53.	25	05
54.	23	09
55.	26	11
56.	11	09
57.	10	11
58.	27	12
59.	28	05
60.	28	04
61.	24	11
62.	-	11
63.	-	12