EFFECTS OF INSTRUCTIONAL STRATEGIES ON ACADEMIC PERFORMANCE OF SENIOR SECONDARY SCHOOL GEOGRAPHY STUDENTS IN ZARIA EDUCATION ZONE, KADUNA STATE

BY

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JANUARY, 2018

DECLARATION

I here declare that the work in the dissertation entitled: ‘effects of instructional strategies on theacademic performance of senior secondary school geography students in Zaria Education Zone, Kaduna State was carried out by me in the Department of Educational Foundation and Curriculum under the supervision of Prof. A.K. Tukur and Dr. S.A. Zubairu. The information derived from the study was duly acknowledged in the text and of references provided. No part of this dissertation was previously presented for another degree or diploma at any institution.

Aminu Musa Signature: Date:

CERTIFICATION

This dissertation entitled the effects of instructional strategies on the academic performance of senior secondary school geography students in zaria education one,kaduna state byAminu musa meets the regulation governing the award of master degree of Ahmadu Bello University, Zaria and is approved for its contribution to knowledge and literary presentation.

Prof. A.K. Tukur Signature……. Date……..

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(Member, Supervisory Committee)

Dr. M.I. Harbau Signature…….. Date……..

Head of Department

Prof. S. Z. Abubakar Signature…….. Date……..

Dean, School of Postgraduate Studies

DEDICATION

This research work is dedicated to the entire Alhaji Musa Mai Zare family.

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ABSTRACT

This study investigated the effect of instructional strategies on the academic performanceof secondary school geography students in zaria educational zone, kaduna state-Nigeria. It was observed that many students at senior secondary school I perceives geography as a difficult subject and hence run away from it. The research work has three objectives is, to examine the effects of instructional strategies on academic performance of senior secondary school geography students in zaria educational zone.The study was delimited to only class one ofsenior secondary school students of public senior secondary schools in zaria. First term senior secondary school one scheme of work was used in the six weeks administration of the geographical models. The researcher investigated that instructional strategies could be effective techniques that improve teaching and learning geography at senior secondary school one.The research design adopted for this study was of the quasi experimental design non-randomise and non-equivalent. There are 24 public senior secondary school located in the zone. The focused on the 10 co-educational public senior secondary schools found in the area. The study selected 2 co-educational senior secondary schools in zaria education zone. The instruments (content and face validity) were ascertained by given geography performance test items to two experts. A pilot testing was conducted at government secondary school dakace zaria. It showed that performances' on the re-test are better.The mean and standard deviation was used to answer research questions while t-test used to answer all hypotheses at 0.05 alpha level of significant. From the findings it was confirmed that in teaching with geographical models; the mean academic performance of students was higher, because it has been compared with test and re-test scores. Male mean academic performance was higher than those of females' counterparts. In retention ability male had higher mean performance. Based on the findings of this study, it was recommended that, the developments of geographical models for teaching geography should be encouraged. The ministries of education and stake holders should encourage geography teachers to design and create geographical models, since they can be produced locally.

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CHAPTER ONE

INTRODUCTION

1.1 Background to the Study

Identifying the best teaching method remains a challenge for most teacherstoday.Teachers desire to seek out effective and efficient ways of teaching: this has continued to derive researchers towards finding techniques to facilitate teaching especially Geography because most of the concepts are complex and abstract in nature. These views suggest that the mastery of Geography might notbe fully achieved without the use of materials appeal to senses. Nsofor (2010) confirmed that as a complex subject with abstract concepts. Geography teaching and learning cannot be effective without the use of instructional materials. Ibrahim (2009) explains that models are things or devices which in themselves have educational values or context used to facilitate teaching and learning and culminate in the performance of educationalgoals and objectives. Models help students to learn better as researchers have shown Okwo and Iliya,(2004) Nsofor,(2010). This might explainwhy the National Policy on Education (FRN 2014) stated that all schools should be properly equipped with instructional materials for teaching to be very effective.

In teaching Geography, instructional materials play a vital role in making teaching and learning more effective in the classroom.Nsofor,(2010) pointed out that for effective instructional processes emphasis should be more on those materials that appeal to more senses of perception. The ability of human beings to interact with their immediate environment and harnesses the physical aspects such as vegetation, rivers, rocks, valleys and hills.Environmentbeing the means of human interaction with the

physical featuresis a vital tool at the disposal of humanity for the successful development of the earth surface.

The strength of Geography as a subject in the senior secondary school lies in the background training and opportunity it can provide to students who want to pursue different types of professions, among which are careers in self-employment, professional establishments, paid employment in government and industries and specialised professions. In spite of these benefits, attrition has been established in secondary school Geography among Nigerian students. Olanipekun, (2014) stressed that one of the reasons adduced for the general lukewarm attitude of students to the study of Geography at secondary school level which has been the acute shortage of Geography instructional materials thereby impeding the smooth transition of students from social studies in Junior Secondary School to Geography in Senior Secondary School. There isthe need therefore, for models in teaching and learning Geographical phenomena.

Adebimpe and Daramola, (2008)noted that modeling demands adventure, creativity, curiosity and perseverance onthe part of the teacher. Modeling could be copying the construction of an object or equipment to a high degree of accuracy (Lowe, 1999). Henry, (2009) stated that teaching at the secondary levels may not easily be achieved through the mere use of instructional materials. At such level, modeling becomes very necessary. Modeling is task-driven opportunities designed to stimulate spontaneous peer interaction in the instructional processes.Similarly, Eshiet,(1996) stated that modeling involves sourcing, selection and deployment of relevant instructional materials into the teaching-learning focus in the absence or shortage of standard materials for a meaningful realization of specified educational goals and objectives.

The teaching of Geography in schools has not been encouraging due to this abstract nature of the subject that is why the use of model materials is needed to facilitate students' learning of Geography. Oladejo and Isola, (2011) stressed that mastery of Geography concepts cannot be fully achieved without the use of instructional materials. Another problem confronting teaching and learning of Geography in Nigeria is the unavailability of these instructional materials in schools; therefore there is the need for modeling. This shares the same with researcher's idea and perception, and also makes learning more concrete and permanent.

Aina, (2012) said many of the Geographical materials used in teaching Geography can employ a model that is why Geography teacher should endeavour to utilize the use of available resources around them as teaching materials for Geography. Models helps teacher to meet individual differences of the learners in the class by using media that appeal to different senses.In a nut shell, models are teaching materials designed and produced from the available local materials in order to enhance effective teaching and learning in schools. Modeling has been defined by various authors. Obanya,(2011) viewed them as didactic materials thing which are supposed to make learning and teaching possible.

Abimbola (2013) stressed that the primary purpose of modeling is to make teaching effective and also facilitate learning it. He averred further that teachers would not be able to do much where these materials are not available; therefore modeling become necessary.Fakomogbon and Adegbija (2006) posited that modeling can be used by teachers to overcome noise factors, such as misconception, referent confusion and daydreaming.Meremikwu and Enukoha (2010) no meaningful learning can take placewithout the use of appropriate instructional materials. Apart fromenhancing the quality of teaching and learning (Ojeifo,2013), it is well known that instructional

models influence students' academic performance(Oguzor, (2011). Itsimportance is so remarkable that Onasote (2011)referred to it as a panacea for effective learning. Asimportant as modeling are, it is sadto note that they are not adequately provided particularlyin Nigerian secondary schools.

Gbenu,(2012) showed that instructional materials are not available to teachers toteach and for students to learn and poor funding byGovernment is the major factor ascribed to this problem.Although teachers have the privilege to use instructional strategies in teaching Geography. Teachers should endeavour construct models that are precisely and explicit in the instructional process. Ojeifo,(2013)even with these inadequacies, instructional materialsremain a basic requirement in the teaching of all secondaryschool subjects. Without exception, Geography is one ofthe subjects that these materials are used.

Geography is a subject offered at the senior secondary schoollevel in Nigerian. It is offered in all the public and privatesecondary schools in zaria kaduna state. Talabi, (2001) Said that models are designed to provide realistic images and substitute experience to reach curriculum experiences. The materials are considered the most efficient facilitators in the education set up. These materials are not a substitute for the teacher. Its utilization however, calls for an imaginative approach by the teacher who needs to constantly be on the alert for new ideas and techniques to make the lessons presented with different instructional materials achieve effective outcomes.

1.2 Statement of the Problem

There was a great deviation by the Geography teachers for using models in teaching Geography. Several factors are known to have negatively impacted on the effective teaching and learning of Geography in Schools. It was observed that many

students at this level perceives Geography as a difficult subject and hence run away from.Poor background of students in mathematical and some major Geographical concepts,Lack of appropriate instructional materials to illustrate and demonstrate the aspects being taught,Geography not given sufficient time on the school time - table to cover the wide topics andTeachers lack the instinct for modeling of materials, but often rely on textbooks illustrations, have been adduced as some of the reasons for poor performance of students.

Nkana in Ibe-Bassey (2004) believes that "strength in education" resides in the intelligent use of a variety of powerful innovative instructional materials, and that by matching them to different goals and adopting them to different goals and students' learning styles and characteristics, much of the ambiguities (i.e. Problems) and complexities of the teaching situation will be removed. In the study of geography, however, the provision of standard instructional materials and models are most often inadequate in schools. This is mainly due to their expensive, scanty supply and sophisticated nature.The researcher also intends to carry out the study on senior secondary schools students (SSS1) since because it is at this level that geographical knowledge are expected to be established and conversant with the concepts in order to acquire the permanents ideas of geography.

1.3 Objectives of the Study

The objectives of the study are to:

i. Examine theeffects of instructional strategies on academic performance of senior secondary school geography students (SSSI) in zaria educational zone.

ii. Determine the effects of instructional strategies on performance of male and female of senior secondary school geography students (SSSI) in zaria educational zone.

iii. Find out the effects of instructional strategieson retention ability of senior secondary school geography students (SSSI) in zaria educational zone.

1.4 Research Questions

The following research questions were raised to guide the study;

i. What is the effect of instructional strategies onacademicperformance scores of senior secondary school I geography students in zaria education zone?

ii. What is the effect of instructional strategies on academic performance of male and female senior secondary school I geography students in zaria education zone?

iii. What is the effect of instructional strategies on retention ability of senior secondary school I geography studentsin zaria education zone?

1.5 Null Hypotheses

The following hypotheses were tested in this study

i. There is no significant difference between the mean geography performance scores of students taught Geographical models using demonstration method and those taught using cooperative learning of senior secondary schools in zaria education zone.

ii. There is no significant difference between the mean geography performance scores of male and female students taught Geographical models using demonstration method and those taught using cooperative learning of senior secondary schools in zariaeducation zone.

iii. There is no significant difference between the mean retention scores of students taught geographical models.

1.6 Basic Assumptions

The following assumptions were made in this study.

i. The students would understand better when used these geographical models.
ii. Geographical models are expected to be used by the teachers in teaching geography
iii. The students are aware of models used for teaching Geography.

1.7 Significance of the Study

This study might be useful to students in enhancing the performance of students towards geographical imaginative thinking. They would also benefit from learning correct geographical concept through models materials with a view to enhancing their understanding effectively. This is because students need skills with appropriate media to enable them perform well in their receptive geographical concepts.

The result of this research would help to draw the attention of the stakeholders such as, the federal ministry of education, state ministry of education in the education sector on the need for efficient use of models or standard instructional materials in the teaching and learning process in the classroom. The findings could contribute to the improvement of the standard of education in the geography.

It would also help educational sectors and parastatal to supply adequate instructional materials regularly in the Nigerian secondary schools. More so Government through the educational sector would find this study useful because it would enable them to realize that mastery of geography physical features rests on the

ability to provide either models orstandard instructional materials for effective teaching and learning process.

By and large, it would help teachers to develop interest acquire the skills of modeling of geographical ideas. More so, teachers using models in the teaching a geographical concept enhances their mastery of the subject. Finally, teachers could be productive in models as they see these ones.

1.8 Scope of the Study

The research work focused on investigating effects of instructional strategies on the academic performance ofsenior secondary school geography students in geography inzaria education zone,kaduna state. The study covered six topics from the first term scheme of work. It was administered within six weeks using Geographical models. These topics are earth and other planets, earths' rotation and revolution, latitude and longitude, weather, climate and population of Nigeria. These topics were selected based on complexity and also amongst other physical aspects of geography which students usually failed. These selected topics demonstrated with geographical models for effective teaching and learning process. The study was delimited to public schools only the use of geographical models. zaria is one of the ancient towns where many people come in quest of knowledge. The study covered students from coeducational schools Based on these reasons,two schools were selected from zaria, One schools from zaria

city walls, and one outside the city walls respectively.The study was delimited to senior secondary school students of class one (SSSI).

CHAPTER TWO

REVIEW OF RELATED LITERATURE

2.1 Introduction

This chapter was reviewed base on the sub-headings; conceptual framework, theoretical framework, models in teaching geography, concept of geography as a subject in secondary school, students academic performance in geography, gender and academic performance, empirical studies, summary.

Geography is an exact and a core science subject in Nigerian secondary schools. Its teachingmethod often requires creativity and innovation. To make geography concepts comprehensible to students, geography teachers must employ creative teaching methods and be prepared to respond to queries and explain concepts in a typical manner (Nbina, 2012). The author further pointed out that the widespread low performance and the negative attitude towards geography from secondary school students have largely been ascribed to lack of proper teaching methods. Teachers who adapt appropriate models in teaching geography will likely be more successful in imparting knowledge to the novice geographer in their classes.

Samba and Eriba (2011) see modeling as the act of using alternative materials and resources to facilitate instructions whenever there is lack or shortage of specific first hand instructional materials. The authors see modeling as the choice of the best instructional material which enables the teacher to achieve some carefully specified educational objectives. Stiggins (2008) added that there are various methods used to increase class participation and performance among students. The researchers hope that modeling could be one of them. Recent models of teaching and learning view learning as a social activity in which children construct knowledge with the teacher and other children (Kerry, 2002).

Geography is a branch of physical science, and it is the study of the earth and the universe. Since it's a physical science, its teaching has to be physical and real (Bajah, 1998). The teaching of Geography is made interesting with the use of instructional materials which include graphics, maps, charts, computers, models and overhead projectors among others. The knowledge of this subject is control land surveying, urban and regional planning, Architecture, geology, teaching services and extractive industries, which is relevant for economic development. The teaching of this subject

should aim at developing in the students those manipulative skills necessary to make them competent and confident in the investigations of the environmental resources around them. However, as important as this subject is to all science related vocations, the performance of students in it at the senior secondary schools.

Related literatures were reviewed based on the following:

2.2 Conceptual Framework

Teaching resources are the different kinds of materials or resources that teachers use in the teaching-learning process in order to make it more effective and productive. Teaching resources are materials which the teacher can use to achieve his/her lesson objectives effectively (Maduabum, 1989).Ofoegbu (2009) defines teaching resources as those resources that facilitate the achievement of goals of education.

Balogun (2001) said that geographical models are the materials or objects which help the teacher to make a lesson explicit to learners. They transmit information and ideas to the learners and disseminate information in such a way that their aptitude, habits and practice will be modified in a simple task. In a general sense, models usually supplement rather than substitute in a lesson. Geographical models can be defined as materials employed by the teacher to facilitate learning and retention in the learners in order to achieve the stated objectives. Innovation in education is the act of producing new materials resources that are important and that will enhance teaching and learning effectively. The use of local resources is usually associated with modeling where the teachers devise a substitute when the original material is not available.

Kadzera (2006) gave an example of geographical model globe made from clay and articulated by a bamboo, which can be used to illustrate rotation of the earth, this result to enhance academic performance. If a teacher used well-constructedmodel,it is

expected to observe changes in theacademic performance of students respectively. geographical models here emphasize the ability to make the item look like and function in the same way as the original material. This helps students to have a true picture of the situation. Senior secondary school teachers need creativity and skills to enable them use available materials to produce models.Sometimes in a classroom teaching in which a teacher discovers that a particular piece of instructional media needed for effective delivery of a lesson is not available. If the teacher is able to devise or create a suitable substitute for it, the substitute is said to be models.

Geographical models as a concept can be defined as a technique of originating a totally new tool, instrument, material, devise or modifying existing ones for serving a particular function in teaching geography concepts. For the teacher to be able to come up with model, he must be innovative, resourceful and creative in both thinking and manipulative dexterity (John, 2009).Ajewole (2014) sees geographical models as devise and construction of alternative instructional media as substitute to the manufactured ones. This can result in the discovery of new thought patterns, practices, new structures or symbols, and new ways to act. The invention cycle is most effective when instructional designers and developers have a clear insight and manipulative skills needed for the development of any models.

Geographical models are applicable to almost all facet of knowledge like arts, science, education, medical sciences, engineering and non-academic spheres. The process of teaching and learning requires a good deal of modeling since it touches the cognitive, affective and psycho motive domains of learners'. When geographical model is fully utilised in a small group collaborative teaching and learning activities in a learner-cantered environment, it can be a powerful teaching tool. Research evidence demonstrated that it can promote spontaneity, intuition, interactivity, inductive

discovery, attentive listening, non-verbal communication, role-playing, team building, creativity and critical thinking (Sawyer, 2004).

Odili (1990) asserts that Geographical modelsmay be used as practice devices with which the students build accuracy, understanding and efficiency. Dada (2006) said that Geographical models involve the act of producing and using alternative resources aimed at facilitating instruction. Again, Ikwuas andOnwiodiket (2006) state that Geographical models involve selection and deployment of relevant instructional elements of the teaching and learning process in the absence or shortage of standard teaching and learning materials for meaningful realization of specified educational goals and objectives.

Abimbade, (2004) had earlier noted that the approach of using geographicalmodels in geography classroom assist in proper introduction of new skills, develop understanding as well as show the appropriate way of doing things. It was on this ground that Kurumeh, (2006) observed that the utilization of geographical models take adequate care of the three domains (cognitive, affective and psychomotor) thereby reducing the abstractness of the geography concepts.geographical models offer a substitute of the original which by their qualities are better adapted to the nature of human thinking than the original because students think better with the familiar modeling in the making of substitutes from local materials found in our immediate environment or school premises where the equipment is not available. The modeled usually convey special instructional messages just as the original materials (NTI, 2007). Models are especially important in science education because successful implementation of science curriculum depends to a large extent on available materials (Offorma, 1994).

Teachers use several approaches to influence effective teaching and learning. Among such approaches include the use of different instructional materials to motivate learning in different subjects. The instructional materials that are commonly available are the, textbooks, Charts, Models, Posters, Realia, and Graphs.(Awotua-Efebo, 2001). One of the effective approaches adopted by teachers to discharge their duty in the classroom is to select and use appropriate instructional charts, models, and realia materials to make the lesson more meaningful and understandable.

Thompson (2001) sees models asthe practices of creating instructional experience which make the acquisition of knowledge and skill more efficient, effective, and appealing. The process consists broadly of determining the current state and needs of the learner, defining the end goal of instruction, and creating some intervention to assist in the transition. The outcome of this instruction may be directly observable and scientifically measured students' academic performance. As applied here, modeled media are creating opportunities which aid easy acquisition of knowledge and skills effectively by students in schools especially geographical concepts. It facilitates effective teaching and learning, and ensures active involvement of the students in the learning process, purposively poster quality academic achievements, Onyeachu (2008) asserted that no matter how well a curriculum plan is, there must be planned and designed instructional materials and other inputs the aims may be achieved. Mkpa (2005) explained that instructional materials need to be made available and of high quality and can easily be modeled to meet the needs and aspirations of thelearners in the teaching learning process.

In whatever manner they are defined,models have the property of improving the teaching and learning process for both the students and the teachers. This applies to all instructional materials generally but each particular type is also unique in the type of

experience. It exposes the students to and skills it may develop in the students and improve academic performance. Students learn better and faster when they are taught with adequate visual aids especially models than when they are left to wallow in abstract imaginations. Models if properly manipulated andutilized create a situation or atmosphere in which curiosity is aroused, imagination stimulated, interest generated and view changed consequently enhance academic performance.Generally, modeling make teaching easy and productive because learners participate actively in the lesson and thisparticipation develops the learner interest, attention, and positive attitudes and finally motivates them.

Bekitu (2000) said modeling comprise theoretical, practical and skill oriented resources which facilitate the learning acquisition and evaluation of vocational/technical skills. Models are useful in the classroom because they minimise the use of theory and verbalisation. Gilbert (2003) said models in science education function as a bridge between scientific theory and the world as experienced and captured the reality. The idea of modeling may be likened to the use of analogical media which enhance investigation understanding and communication (Harrison &Treagust, 2000). Improving media in science are usually accompanied by specific activities that are relevant, meaningful and significant to the teaching at any given time. Hence, models encourage active participation of students in the learning process.

Kinschner(2007) opined that students develop abilities in communication, leadership ethical decision-making and critical thinking if they are actively engaged in the learning process. Even when dealing with printed text and illustrations, learners are actively engaged in the process of selecting, organising and integrating relevant information on the appropriate models (Mayer, 2003).Materials used by teachers to aid explanation and make learning of subject matter understandable to the students during

teaching-learning process are referred to as instructional media. Jekayinfa (2012) describes models as educationalinputs that are of vital importance in the successful implementation of any teaching and learning processes.Kochhar (2012) saidmodels are devices which present units of knowledge through auditory or visual stimuli or both with a view to help learning effectively. Diidol (2013) defined models as materials which the teacher uses to facilitate and assist in teachinglearning process. Effective classroom interaction requires the use of instructional media and resources. Effectiveness of teaching methods also depends on how they are complemented with materials.

Ajiboye and Adeosun (2002) attested to the effectiveness of different kinds of Geographicalmodels in teaching and learning. They concretise the knowledge to be presented and thus help in making learning experience appear real, living and vital. Students enjoy learning in the course of using psychomotor activities where touching, drawing, picture reading and performance of simple tasks with hand like project or construction works. Through the use of Geographical models, the student's intellect could be developed in such a way that structure of the subject can be understood as students remember what they see, touch and draw better than what they are shown or told.

2.3 Theoretical Framework

The teaching process can be analysed from various theoretical perspectives and focus on very different aspects of teaching materials with respect to classroom practice. The teacher's decisions are influenced not only by the particular context, but also, it was fundamentally, by teachers cognitions. With the aim of understanding what happens in the classroom, in terms of student's actions and their cognitions, in a particular relations

between the teacher's actions, cognitions and the type of instructional resource materials to be used in teaching and learning effectively. The teaching-learning process is far too complex to permit a single standard instructional materials, all-encompassing analysis, however, and hence recognise the need for developing a models which allows it to be simplified for a more fruitful analysis.

Cognitive Learning Theory: Application of psychological learning theory of relevance in science teaching is that of Jean Piaget. Piaget was interested in the theory of cognitive development of children from the ages of zero to a little above 11 years. Piaget (1970) in Onwioduokit and Akinbobola (2005) confirmed that children learn best through doing and actively exploring their environment.

By implication therefore, science should be taught in such a way that children are occupied by useful activities. The researchers then feel that one of the ways secondary students would explore and engage by useful activities in their natural environment is through participation in modeling of low technological tools and device in learning science

Constructivism Learning Theory: The theory posited the notion that learners create or construct new knowledge (Von-Glassersfeld, 1985). Nwike (2011) said that learning is therefore seen as an adaptive and experimental process rather than a knowledge transfers activity, Richardson (2003) opined that as learners access information through sense, the construction of new knowledge comes from an interaction of new knowledge between their existing knowledge and new experiences and ideas with which they come in contact in the natural world and their culture. This learning theory provides anchor to the present research since it involves creativity and construction of new knowledge.

The materials first-rational model and opportunity model of lesson plan developed by Belland (1981), revised by Ibe-Bassey (2004) which stipulates that the

teacher must organize resources which would facilitate learning among the learners. It encourages the use of events of instruction. The models states that the systematically designed and produced materials can teach on their own. It helps pupils develop the right habit of performing all learning activities in their logical sequences.

The constructivism learning theory has been used for this research, since it involves creativity and construction of new knowledge. Hence, Geographical model requires creativity, attractiveness, relevance, availability, explicitness, locally source materials. Because most of the Geography concepts need instructional resource materials to be utilise in the instructional process. The locally materials, when used judiciously to construct models, it help to concrete knowledge and also improve performance in learning Geographical concepts appropriately.

2.4 Models in Teaching Geography

A model in teaching Geography is applicable to almost all facets of knowledge academic and non-academic spheres. The process of teaching and learning requires a good deal of modeling since it touches the cognitive, affective and psychomotor domains of learners'. When modeling is utilised in a small group collaborative teaching and learning activities in a learner-centered environment, it can be a powerful teaching tool. Research evidence demonstrated that it can promote spontaneity, intuition, interactivity, inductive discovery, attentive listening, non-verbal communication, role-playing, risk-taking, team building, creativity and critical thinking (Sawyer, 2004).

Monteiro et'al(2008) asserted that the'cognitive model', has been a focus only on certain of the elements comprising the system on specified models, in aparticular case, the cognitions of the teacher with respect to their classroom practice. It should alsoconsider that teachers should possess a composite knowledge of teaching and specific content (KTC).This corresponds to the type of knowledge to which the teacher

resorts in situations that are related to the organisation of different ways the students explore Geographical contents, such as: determining the sequencing of tasks, choosing examples, and selecting the most appropriate model materials representations for each situation.

Park and Oliver (2008) also include the specific strategies for teaching the content in question.Regarding knowledge of content and students (KCS) and relate this to the need for the teacher to anticipate what the students think, their difficulties and motivations as well as listening to and interpreting their comments. Include here the knowledge of the possible wrong conceptions, motivations and interests of the students, as well as their needs.

To teach learners according to standards, teachers need to understand strategies deeply and flexibly so they can help learners create useful cognitive maps, relate one idea to another, and address misconceptions. Teachers need to see how models in teaching Geography connect across fields and to everyday life. This kind of understanding provides a foundation for modeling content knowledge that enables teachers to make ideas real to the learners' (Shulman, 1999). He introduced the phrase modeling content knowledge and sparked a whole new wave of scholarly articles on teachers' knowledge of their subject matter and the importance of this knowledge for successful teaching.

In Shulman's modeling framework, teachers need to master two types of knowledge:

i. Content, also known as deep knowledge of the subject itself, and
ii. Knowledge of the curricular development.

Content knowledge encompasses what Shulman, (1999) called structure of knowledge, theories, principles, and concepts of a particular discipline, while the knowledge of the curricular development is the awareness of the rudiments and wherewithal of the use

and administration of the curriculum for the designing and adequate planning of the contents of curriculum for teaching and learning processes.

Azzara (2002) stated that models in teaching Geography allows self-expression, develop many of higher order thinking skills, and inculcate a more comprehensive and intimate relationship with Geography concepts. It is important to develop models in teaching. It wasobserved that models can affect other basic Geographical skills, and incorporate a model to develop skills that will help teachers as well as students. In an attempt to find an answer on how teachers can acquire knowledge for modeling. Kenny and Gellrich (2002) suggested two strategies: transcendence and deliberate practice. Transcendence, as stated by these researchers is a state of consciousness that reaches beyond the knowledge accumulated within you, whereas the primary objective of deliberate practice is to stimulate the development of modeling skills through the bases of acquired knowledge. It is important that group activities complement individual practice. Although individual practice is beneficial to the development of technical and theoretical principles, modeling emphasizes more collective participation.

Lidia and Sara, (2010) opined that models in teaching Geography generally occur in a collective participatory atmosphere as opposed to an individualized teaching and learning context. The ability of teachers to react and create Geographical Models through unpredictable dynamics and variables is one of the most distinct aspects of modeling.Modeling can be described as making a substitute of an item from the materials that are available and can easily be found within the immediate environment at the time of use. It means to make do with whatever material is at hand to prepare suitable instructional materials to aid teaching-learning process. Modeling in the absence of institutionally provided instructional materials is supported by Akomolafeetal, (2012) and Fadeiye (2005) in their various works. Akomolafe (2001)

suggested that teachers should not just depend on sophisticated gadgets but be skillful, resourceful and know how to model in the absence of the ideal equipments or materials required for a given situation.

Oluwagbohunmi (2011) identifies criteria to be followed in selecting appropriate models in teaching Geography as attractiveness, relevance, availability, suitability, simplicity, explicitness, appropriateness, teacher's expertise and applicability of the materials to all the human senses. Geographical models are not likely to be different from institutional ones if well sourced and prepared from available materials in the environment and can purposely be utilized to achieve the same learning objectives. Mohammed (2012) found that students taught with models have significant effects of understanding and improve performances.

Tikon (2006) said that an effective teacher should be able to make learning an imaginatively vital experience and seeks to foster the creative engagement of both teacher and the learners. A model in teaching Geography is the act of using alternative resources to facilitate instructions for teaching wherever there are lack or specific first-hand instructional materials. Modeling reveals that there are possibilities of alternatives to teaching and learning media. It is said to be an act of designing a replica of standard equipment assigned to play some designated roles - meet specific teaching and learning situations. It is an element of creativity and resource-fullness, it is the use of local resources in our immediate environment to build, construct, mould or make instructional teaching-learning materials that can assist in the smooth dissemination and transfer of knowledge from teachers to students, or coaches to athletes.

Johnson (2005) said that, the result of models in teaching Geographymust be functional, must merit social and scientific recognition, operation and function. It also develops skills in the cognitive, affective and psychomotor domains. Hence, it has

become imperative in teaching and learning because the economic situation makes the cost of facilities and equipment very high amidst decreasing or near lack of purchasingpower. After decades of educational research, it has been discovered that modeling offersunique benefits for certain types of learning. In effective Geography teaching/learning, the topic and the flow of the class emerge from teacher and student together. Social constructivists have found that the unpredictability of multiple competing voices is what makes modeling a uniquely effective teaching tool (Bernard et' al, 1995) contrary to the traditional teachingmethod which makes Geography teaching so stressful for teachers, because the natural response to classroom anxiety is to impose even more structure on the class.

2.5 Development of Models in Teaching Process

The use of locally produced models in teaching and learning situation has many advantages. Some of them according to Abolade and Olumorin, (2004) include the fact that;They are cheaper to produce or buy because the raw materials are locally sourced, They can present objects and model in either 2 or 3 dimentional views through painting and crafts among others, They can be used to teach large classes, They encourage class participation since majority can be sourced by the students themselves, They motivate learners participatory activities during production, The also arouse interest of the learners because they are made from raw materials the see daily in their immediate environment.

The production of models had undergone several review and processes by experts from various field. These experts have developed and produced in line with the area of specialization and the resources available to them in their locality. In the area of Sciences and Humanities for instance problem encounter from the use of appropriate

instructional materials for teaching and learning had being usuallly as a result of high cost of factory produced imported materials, scarcity of such products in the country and above all irrelevancy of some of the materials to the social/cultural settings, which had always left students wandering in abstract.

Olumorin (2009) emphasised that it is when original materials are not available for use in teaching and learning modelscan be applied. Also, Abolade and Omulorin (2004) reported that most of the factory produced instructional materials for teaching science based courses are usually very scarce to come by and where they are within reach, they usually very expensive to buy.Some of the factory produced/imported instructional materials have also been discovered to be concept- based on foreing ideas and culture. For instance, in learning Alphabets at nursery/primary class, an imported will have; A for Apple, B for Ball, C for Cat and so on but a locally produced will reflect objects that can easily be seen in the child's environment for instance, A for Ant, B for Basket, C for Cutlass. It is against this background that the need to fashion out ways by which local resourses can be used for developing instructional materials should be underscored.

Salawu, in Abifiran(2004) said that,it is very necessary and imperative to state clearly here that media production skill is an integral part of teacher education. Although we have several commercially produced media, but local production ofmaterials is always encouraged. A locally produced material has three main characteristics thatcannot be ignored when compared with the commercially produced ones. Local production of media is best done when it is supervised and conducted by productionspecialist. However, with just a little skill, exposure and practice, the classroom teacher shouldbe able to produce some instructional materials that can be used to facilitate teaching-learningactivity. Time, equipment and resources are other

basic needs for a teacher to be acquainted withthe production techniques. A specialist would normally interpret scripts; plans short schedule,arrange sets, scenes and so on as he prepares for production.

2.6 Concept of Geography as a Subject in Secondary School

Egunyomi (2006) inferred that education has been universally recognized as the key to sustainable developmentand the enhancement of human welfare. Similarly and earlier, the World Bank (2003)as quoted by Egunyomi(2003) observed that:education is development; it creates choices and opportunities for people, reduces thetwin burden of poverty and diseases, and gives a stronger voice to the society. Fornations, it creates a dynamic workforce and well informed citizens able to compete andcooperate globally, opening doors to economic and social prosperity. Fellman et'al (2005) outline relevance of geography as a discipline of great repute

Major Geographic Fields and Employment Opportunities

- Cartography and Geographic Information System
- Physical Geography
- Environmental Studies
- Cultural Geography
- Economic Geography
- Urban and Regional Geography
- Regional Geography
- Geographic Education or GeneralGeography
- Cartographer for Federal Government (agencies such as Defence

Mapping Agency, US Geographical Survey or Environmental Protection

Agency or Private Sector (e.g. Environmental System Research Institute,

Integral or Bentley); Map Liberian, GIS specialist for Planners, land

Developers, estate agencies, local government, remote sensing analyst surveyor.

- Weather forecaster; outdoor guide; coastal zone manager; hydrologist;soil conservation/agricultural extension agent.
- Environmental manager; forestry technician; park ranger; hazardous

waste planner.

- Community developer; Peace corps volunteers; health care analyst.
- Site selection analyst for business and industry; market researchers;

traffic/route delivery manager; real estate agent/broker/appraisers;

economic development researcher

- Urban and Community Planner; transportation planner; housing, park

and recreational planner; infrastructure and services planner.

- Area specialist for Federal and State Government; International

business representative; travel agent; travel writer.

- Elementary/Secondary School teacher; College Professor, Overseas

teacher.

Source: Boehim, R. G. (1996) "Careers in Geography". Washington DC: National Geographic Society.

Locally in Nigeria, manyhave documented the relevance of Geography to the society: Ologe(1978) discussed very succinctly the roles of Geographers in the present day socio-economic dispensations inNigeria and the world at large. Similarly, Areola et al (2001)identified the professions and different areas of human endeavours that

Geographers can perform and excel.Abegunde (2014) worked on "Promotion of Career Opportunities through the Senior Secondary SchoolGeography

Geography as a school subject is one of the most important subjects in secondary school education. Geography is relevant for both the students who are likely to continue to tertiary level and those who will not proceed. It equips students with a body of knowledge to make them functional and socially relevant in the fast changing world. Geography is a distinct and dynamic science and or social science discipline that deals with the study of man and his physical environment. It therefore helps young people to appreciate the value of their environment and its vast natural resources. As a subject, it is versatile, expressive and intellectually stimulating. It exhibits a correlation with all other school subjects. It instills in the students the need to appreciate and develop a sense of responsibility towards their own society.

Geography is a very wide but interesting subject, which touches on most other subjects such as the social studies or the social environmental studies. It calls for a lot of hard work to master and enjoy it at the SSS level but with the right attitude and approach it is usually a pleasure to learn it. Despite this, there has been an observable sharp decline in the number of students that offer Geography at the Senior Secondary level in Ilorin. This was quite unlike Adeyemi (2010) who observed that more students opt for Geography from thelist of available optional subjects in Botswana. The various variables suspected to be responsible for this decline are explored in this paper: Teacher's attitude and relationship with pupils has a very significant impact on the student's attitude towards the subject.

Bajah, (1999) said, it is an educational truism that a teacher graduate or non-graduate can only teach what he or she knows. Therefore it is very important that a

secondary school teacher should be academically articulate in his area of specialization. The way he/she relates to the students and passes across his instructions goes a long way to affect the student's respondsand attitude towards the subject. Student's attitude and the peer group influence also have either positive or negative impacts on the subjects they offer. The student's personal attitude towards education and learning and that of their peers do affect their performance and interest and hence what they end up doing. Parental influence on the choice of subject as parents especially the educated ones are known to dictate which subjects their children shouldtake regardless of the student's interest or potentials. Previous studies have indicated that home backgrounds as well as the socio-economic status of parents are equally contributory factors that impact on the learners' choice on Geography as a school subject.

Bajah, (1999) said teaching science subjects in a developing country presupposes that students who study the subjects come in with some entry behaviour which to a large extent is dictated by the socio-economic and technological environment in which the students grew up.The job prospect of Geography related professions is closely related to why parents influence some of their children choices. This to a large extent may be due to the ignorance about how wide and how far Geography knowledge could facilitate academic performance in different fields and professions. The role of guidance and counselling in the choice of school subject cannot be over emphasized. And this, in most cases is found lacking or not properly done.In their twelfth year, students take the Senior School Certificate Examination (SSCE). They are required to register for a minimum of seven and a maximum of nine subjects including English Language and mathematics which are two mandatory school subjects.

. A decline in the yearly number of students' failure in Geography at the senior secondary certificate examination level as observed by the researcher and their lack of

keen interest in Geography as a school subject were the motivation for the study.The objectives of teaching Geography at this level of education are spelt out by West African Examination Council (WAEC, 2004) and National Examination Council (NECO, 2004). The WAEC has been reviewing its syllabi over the years to reflect contemporary issues, respond to public concerns and adjust to realities of time, (Akande, et al 2010). The NECO also fashioned its syllabus closely to the WAEC. The Geography syllabus as provided by the two national examination bodies and implemented by schools and colleges. This is broken into six parts that are taught over a period of nine terms of an average of thirteen weeks each, that is, three sessions. The relevance of the subject cannot be over emphasised. Boehim, (1996) in his "Careers in Geography" gave a comprehensive list of where geographers have and can be employed profitably and with job satisfaction.

Locally in Nigeria, many have documented the relevance of Geography to the society: Ologe (1999) and Akande (1982) discuss very succinctly the roles of Geographers in the present day socio-economic dispensations. Similarly, Areola and Aderogba (2010 and 2011) identified the professions and different areas of human endeavours that Geographers can be relevant. Aderogba (2010) particularly produced a list of disciplines and school subjects that combine with Geography to pursue a profession. The relevance and application of Geography concepts, information and tools are growing by the day Also, scholars have worked consistently on the problems associated with the teaching and learning about Geography, the most difficult aspects of Geography, why Students fail Geography, Dearth of Materials for Geography studies and others, Adetuberu (2012). Specifically, Akande (1982) like Ajaegbu (1971) dwelt on the "Pull" and "Push" factors in the study of Geography among students generally.

Over the years, syllabuses of most school subjects including Geography have undergone some radical modifications to meet the challenges of the time (Sada 1976). West African Examination Council (WAEC) and National Examination Council (NECO) respectively for Senior School Certificate Examinations (SSCE). The syllabuses especially of WAEChad metamorphosed from the ubiquitous and irrelevant stuff (content) to be more focused, purposeful and relevant to the needs of the children at that level. The aims and objectives of the content at this level are as specified by National Examinations Council, (2004):

(i) To understand the concepts of different characters and the spatial relationship of the features on the earth surface;

(ii) To understand the concepts of man-environment relations, that is, to examine and explain the interaction of man with his physical and cultural environments;

(iii) To acquire the basic knowledge of the native and functions of physical and human environments and understanding of their inter-relationships in the resulting issues;

(iv) To organize and formulate principles according to acquired geographical concepts and apply these principles to interpret and analyse spatial problems in the immediate and wider environment; and

(v) To develop skills and techniques for accurate orderly and objective geographical investigations to be carried out both in the classroom and in the environment.

These are the same for WAEC (WAEC 2004). The details in pursuance of these are rescheduled to span through a maximum period of nine terms of average of thirteen

weeks each, (three academic sessions). The breakdown of the content for each examination body is divided into six aspects:

(i) Elements of Practical Geography (Map Work);

(ii) Physical Geography;

(iii) Human Geography;

(iv) Regional Geography of West Africa with particular emphasis on Nigeria;

(v) Geography of Africa; and

(vi) Field Work.

2.7 Students' Academic Performance in Geography

Learning is defined as a knowledge or skill acquired through study or by being taught. Learning is reflected in the way a child responds to environmental, social emotional and physical stimuli and understands new information (Collins Concise Dictionary and Thesaurus of English Language, 2002). The keys to better learning and better Academic performance in schools are good teachers, good study learning resources, appropriate integrated models; highquality books are the most important, in the study of Geography(Robinson,2000).The broad purpose of education is to facilitate integration of a student's total personality and a process of change.

It has been pointed out by Bates and Holton, (1995) that academic performance is a multi-dimensional construct, the measurement of which varies depending on a variety of factors. They also state that it is important to determine whether the measurement objective is to assess performance outcomes or behaviour. There are different views on what performance is. It can be regarded as the record of outcomes achieved. On an individual basis, it is a record of the person's accomplishments. Kane (1996) argues that performance 'is something that the person leaves behind and that

exists apart from the purpose'. The category of learning applies only to students whose actual academic performance is significantly worse than their expected academic performance.

Performance could therefore be regarded as behaving in a way that will make organizations, teams and individuals get work done. Campbell (1990) believes that 'performance is behaviour and should be distinguished from the outcomes because they can be contaminated by systems factors. Adeniyi (1986), the reality on ground indicated that students' achievement has not shown any appreciable improvement over and above what it used to be prior to the 1970's. Thus, concern for students' low performance in science has become more evident as mass failure in the subject in public examinations has attained alarming proportions in recent times (Odili, 2004).

Academic performance is measurable and can be determined based on some preconceived objectives that form the standard as a benchmark. Academic achievement is by this paper seen as the summary gain-scores of individuals who must have gone through a pre-planned course of study for a given period of time. It is rather the cumulative effect of stepwise achievement of a learner that is measured or determined by the end of a programme (Ochonogor, 2000). Many research findings within the last half of the last Century have revealed that the achievement scores of students have persistently been on the decline (Aigbomian and Okonkwo, 1996). The causes of students' under-achievement in science in the senior secondary school in Nigeria are multifarious. Some of these causes are institutionally contextual (school context), socio-cultural as well as psychological.

Academic performance is complex student behaviour and underlies several abilities, e.g., memory, previous knowledge or aptitude as well as psychological factors

such as motivation,interests, temperaments or emotions, to name a few (Deary,et al 2004). Educational psychologists and researchers have argued that there are many determinants of academic performance (Chamorro et'al, 2003).The students' academic achievement remains at top priority for educators. It is meant for making a difference locally, regionally, nationally and globally. Educators, trainers, and researchers have long been interested in exploring variables contributing effectively for the performance of learners. These variables are inside and outside school that affect students' Academic performance. These factors may be termed as student factors, family factors, school factors and peer factors (Crosnoe et'al, 2004).

The social and economic development of the country is directly linked with student academic performance. The students' academic achievement plays an important role in producing the best quality students who will become great leader and manpower for the country thus responsible for the country's economic and social development (Ali et'al, 2009). Student academic achievement measurement has received considerable attention in previous research, it is challenging aspects of academic literature, and science student achievement are affected due to social, psychological, economic, environmental and personal factors. These factors strongly influence on the student achievement, but these factors vary from person to person and country to country.

Besides other factors, socioeconomic status is one of the most researched and debated factor among educational professionals that contribute towards the academic performance of students. The most prevalent argument is that the socioeconomic status of learners affects the quality of their academic achievement. Most of the experts argue that the low socioeconomic status has negative effect on the academic achievement of students because the basic needs of students remain unfulfilled and hence they do not perform better academically (Adams, 1996). The low socioeconomic status causes

environmental deficiencies which results in low self-esteem of students (US Department of Education, 2003). The environment and the personal characteristics of learners play an important role in their academic success. The school personnel, members of the families and communities provide help and support to students for the quality of their academic performance. This social assistance has a crucial role for the accomplishment of achievement goals of students at school (Goddard, 2003). Besides the social structure, parents' involvement in their child's education increases the rate of academic success of their child (Furstenberg & Hughes, 1995)

Karemera (2003) found that students' performance is significantly correlated with satisfactionwith academic environment and the learning facilities, computer lab and etc. in the institution. With regard tobackground variables, he found a positive effect of secondaryschool performance and school achievement he foundno statistical evidence of significant association betweenfamily income level and Academic performance of thestudent.Robert and Sampson (2011) found that themember of educational board will be educated and theirimpact on school is positive, for professionaldevelopment it is essential for student learning.The students who are actively engage in thelearning process are observed to have a positive correlation with the Academic performance. A study effort from studentand the proper use of the facilities provided by the school to the student, a good match betweenstudents' learning style and are positively affect thestudent's academic performance (Ali et al., 2009)Young (1999), held the view that studentperformances are linked with use of library and level oftheir parental education. The use of the library positivelyaffected the student performance.

The Academic environment is the effectivevariablefor students and has positive relationship withfathers' education and grade level (Kirmani

&Siddiquah,2008).Students' academicaccomplishments and activities, perceptions of theircoping strategies and positive attributions, andbackground characteristics (i.e., family income, parents'level of education, guidance from parents and numberof negative situations in the home) were indirectlyrelated to their composite scores, through academic performance in school.The students face a lot of problems indeveloping positive study attitudes and study habits.Guidance is of the factor through which a student canimprove his study attitudes and study habits and isdirectly proportional to academic achievement. Thestudents who are properly guided by their parents haveperformed well in the exams. The guidance from theteacher also affects the student performance. Theguidance from the parents and the teachers indirectlyaffect the performance of the students (Hussain, 2006).

There is a positive relationship betweenproper guidance and student performance.Family stresssocio-economic factors like attendance in theclass, family income, and mother's and father'seducation, teacher-student ratio, presence of trainedteacher in school, sex of student and distance of schoolare also affected the performance of the students.Raychaudury et al.(2010)found that numerous studies have been done to identifythose factors which are affecting student's Academic performance. The students' Academic performancedepends on a number of socio-economic factors likestudents' attendance in the class, family income,mother's and father's education, teacher-student ratio,presence of trained teacher in school, sex of thestudent, and distance of schools.Hijaz and Naqvi (2006) observed that there is anegative relationship between the family income andstudents' performance.

2.8 Gender and Academic Performance

Generally, many societies and cultures perceive sexual orientation and gender as major defining characteristics of an individual. According to Skeggs (2005), developmental psychologists in particular find sex and gender to be important and interesting aspects of human development and behaviour. Accordingly, a number of theories have been developed to explain how these aspects shape both children and adult lives. Sexual orientation and gender are characteristics not just of the individual, but also of the culture, and others perceive, behave and act in a way that depends on whether they believe they are male or female, gay or straight.

Buskist (2008) states that certain individuals are born while others are socialised to behave in the way they do, and each of us has stereotypes and beliefs about how males differ from females and how gays and lesbians differ from straight individuals. The critical question is 'are these differences important and how do these differences impact on individuals' conduct of themselves?' With reference to this study, the specific question is 'How do gender differences impact on individual student's Academic performancein Geography?'Myers (2002) defined gender as the characteristics, whether biological or socially influenced, by which people define male or female. Interest in the impact of gender on academic performance has attracted mixed reports. While some proposed that males perform better than females in Geography, others argue that the reverse is the case, and still others say that the difference in achievement between the two is insignificant. By and large, this research is targeted at gender in enhancing or debilitating academic performance.

However, as noted by Bornstein (2009), the terms 'sex' and 'gender' can have ambiguity and fluidity in meaning and implications. Sometimes it is hard to agree on exactly what sex and gender are, and more so, on how they differently impact on models and academic achievement in teaching Geography. Sex refers to the biological

characteristics between males and females, which are universal and do not change. These sets of biological characteristics are not mutually exclusive as there are individuals who have multi-faceted sexual orientation, but what is critical in that it is these characteristics which robustly tend to differentiate humans as males and females.

Jenks (2008) opined sexual orientation entails the biological components that define and differentiate males and females that are inherited from birth. Sex is, therefore, a biological term referring to ascribed genetic, anatomical, and hormonal differences between males and females. On the other hand, gender refers to the socially constructed attributes, roles, values, responsibilities and needs connected to being masculine or feminine. Henslin (2007) states that gender entails the sociocultural roles assigned to males and females, and are determined by society through its socialisation agents, such as the family, peers or school. Thus, boys and girls learn to behave and act in certain socially prescribed ways.

Henslin (2007) is of the view that gender is the result of socially constructed ideas about the behaviours, actions and roles of a particular sex. Consequently, males and females' gender identity determines how they are perceived and how they are expected to think and act as males and females. Consequently, differential gender socialisation of boys and girls tends to have a bearing on their behaviour, including academic achievement.There has always been unresolved debate regarding the relationship between sexual orientation and academic performance and its related aspect of gender orientation and academic performance. Fundamentally, it is important to note that sex difference is a basic psychological factor that is rarely considered as such when discussing children's behaviour, but it is essentially because of this factor that the psychological make-up of the child differs. Thus, sexual orientation as a variable

subsequently impacts on individual children's behaviour which may have a bearing on children's academic performance.

Kolawole (2008) noted that in some developing societies, the boy child is often socialised to be competitive and aggressive, and therefore, is expected by society to excel in the more challenging areas of school work such as science and mathematics. On the other hand, the girl child is taught to be passive and soft line, which consequently makes society to expect her not to excel in the more challenging school subjects and in some cases in academic performance in general.Gender differences on the other hand tend to have great bearing on the differential socialisation of boys and girls (Haralambos & Holborn, 2000). More often than not, boys and girls are treated differently by significant, others including their parents, siblings, peers and teachers. This consequently affects their behaviour which may as well have a bearing on their Academic performance.

Deasley (2005) said that, the impact of boys' and girls' differential treatment by teacher using appropriate modelsaffects several facets of their life including school performance and achievement. Based on differential gender socialisation, boys and girls are fostered to behave differently which subsequently bears on their differential academic performance in learning Geography. Frequently, this has had an effect on specific school subjects though a general trend may as well be discerned on how boys and girls differ in performance in the context of the entire school curriculum. For many people, sex and gender mean the same thing. A commonly held notion is that sex and gender are exchangeable terms, yet, conceptually, these two terms are not the same, as they carry different meanings and connotations.

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In most human societies, sex role differentiation which silently matures into differential genderisation of boys and girls begins with sex-oriented toys purchased by parents and is reinforced as boys and girls begin to express their interests. In traditional and patriarchal societies, the girl child is generally marginalised, often as a preserve for marriage. In such societies, when girls go to school, they are not expected to compete with boys. Deasley (2005) noted that this development, often described as 'sex typing', tends to affect child behaviour including achievement of both sexes throughout their school years and in life in general.

Davidoff (2007) contended that as early as seven years of age, girls show low self-esteem and confidence in schoolwork than boys, and more self-esteem in relation to their social abilities such as empathy. In the school system, teachers often chastise boys for non-intellectual aspects of performancesuch as kindness and empathy. The view that it is 'natural' for males and females to behave the way they do and differently is widespread, and is supported by a diversity of scientists and researchers (Henslin, 2007). The bottom line of the consensus is the appreciation that biological science has to some reasonable extent, managed to explain human behaviour on the basis of biological disposition.

Fundamentally, psycho-biologists believe that variations in behaviour and social roles of males and females can be explained in terms of hormones and brain differences. As purported by CERMI (2012), the activity of a wide range of sex hormones is closely integrated with the activity of the nervous system, and hence, hormones can influence human traits including Academic performance.The social world that children grow up in is comprehensively gendered. Gender differentiation is everywhere imposed by the social environment, through differential toys, clothes, hairstyles, socialisation practices and the media for boys and girls (Fagot, 2005). Consequently, children soon learn to

interpret their experiences through the same set of gender categories, including, more importantly, their own sense of self. Lips (1993) cited in spender (2000) reported that the moment a child is born, a midwife immediately starts that infant on a path, that is characteristic of a male orfemale by authoritatively declaring whether it is a boy or girl.

Numerous studies on sex differences incognitive performance can be found in the literature. In one of the oldest studies Morris(2009) referring to the psychic and social differences between sexes, claims that theeducation outcomes of male and female will, at least in part, be different at the secondary level. The debate on gender differences in cognitive abilities has actuallyevolved out of the debate on biological and social determinism. The biological perspectiveon sex differences and cognitive performance considers social factors to be trivial orsubordinate to biological factors like brain structure. Lynn in his studies (2004) asserted thatmales have larger average brain sizes than females and therefore, would be expected tohave higher average intelligent quotions (IQs1). Mackintosh (1998), on the other hand, claims that there is no sexdifference in general intelligence. Lao (1980) findsfemale students to obtain higher grade compared to males. Examining sex-relateddifference in classroom grades,

Kimball (1989) finds that in contrast to standardizedmeasures of mathematics performance tests like SAT-M3, female students outperformmales in math classes. Wilberg and Lynn (1990) arrived at a similar conclusion for historyclasses vs. history tests. The authors explain this pattern by stating that females tend towork more conscientiously and have a stronger work ethic than males. They also tend tohave better language abilities including essay writing skills, vocabulary and word fluencywhich contribute to better course work. Stage and Kloosterman (1995) note that althoughgenders differences in math performance continue to exist on cognitive level tasks atthe secondary school level, such differences appear to be declining. Young and

Fisler (2000)examined SAT-M scores of secondary school students, find males to score better than females.However, they noted that males generally come from households where the parents'socioeconomic status as measured by examinee reported educational levels and income, ishigher. In contrast, female test takers are more diverse and include more low-incomestudents than the boys group. Others have argued that the content of the test or of itsadministration favours males (Bridgeman and Wendler, 1991). Yet other researchers haveexplained the gap by adhering to such factors as differences in course taking behaviour,classroom experiences and cognitive processing (Byrnes et al, 2000).

The studies conducted outside of the US present differing outcomes. Younger,Warrington and Williams (1999) focus on the gender gap in English secondary schools.Their analysis is based on the performance of boys and girls in GCSE examinations in theUK and girls are found to get better grades than boys. This phenomenon is explained byboys' disregard for authority, academic work and formal achievement, differences instudents' attitudes to work and their goals and aspirations and girls' increased maturity andmore effective learning strategies.

Baker and Jones (1993) analyze sex differences in theeighth grade math performance of over 77,000 students in 19 developed and developingcountries. They find no evidence of a significant gender gap. Both cross-national variationin sex differences in mathematical achievement and the trend toward less of a differencebetween males and females question any innate male superiority in intelligence. Betts andMorell (1999) report that sex remains a significant predictor of CGPA after controlling forvarious individual attributes such as ethnic background SAT scores and the high schoolattended. Similarly, investigating about 60,000 students from 22 public researchuniversities, Kim, Rhoades and Woodard (2003) find that SAT scores

have a significantimpact on students' performance, although at the individual level gender is a more powerfulcorrelate of graduation than the SAT score.

Women are also found to obtain better gradesthan would be predicted from their SAT scores (Hyde et'al2001). Many researchersclaim that a large part of the under-prediction derives from the difference in course takingpatterns of male and female secondary students. Ruling out differential course selection as anexplanation for the under-prediction of female grades, Leonard and Jiang (1999) suggestthat females have better study skills than the male students. Other researchers have arguedthat women receive higher grades than men because they work harder and attend classmore frequently (Wainer and Steinberg, 1992).Investigating success in terms of course grades, Bridgeman and Wendler (1991)find that women typically had equal or higher grades in math classes. Wainer andSteinberg (1992) on a sample of 62,000 students conclude that although women had lowerSAT-M scores, they received similar grades from first-year math courses.

Cohn et al.(1998), on the other hand, find gender to an insignificant determinant of success in courseson macroeconomics.The literature survey on gender differences in scholastic performance at differentlevels indicate mixed results.In relation to gender research finding in this area has been mixed. Mednick and Thomas (1998) observed that performance motive is difficult to arouse in women and so their Academic performance is probably lower than that of men. However, other researchers found no sex differences or a higher score on success avoidance for men than for women (Elizux 1994). It has also been found that females score higher on average than males on test of verbal abilities (Halpern and Stumpt, 1992). On the other hand, males score higher on average than females on test of mathematical ability (Hyde and King, 2001). According to

Powell (1999), girls perform better at all grade levels including arithmetic than boys and that girls perform better than boys in the primary grade in all subjects.

2.9 Empirical Studies

Studies conducted by Abodelraheem et' al (2005) some creation of models on low technological materials and resource-centred learning can enlarge the limited knowledge base of any course of study and enrich instruction to a guaranteed quality. It can also promote strategies that ensure the integration of technology in the teaching and learning process of basic science education. Their findings are in agreement with the findings of Dodge (1997) who observed that using technologies like simulation devices open new horizons for individual learning tools, the environment resources and services.

Udosen (2011) studied three categories of science students, namely: (i) a group that learned science from textbooks, (ii) a group that used text books and laboratory materials, and (iii) an activity-centred group that dealt primarily with improvised instructional materials and laboratory equipment. They found out that all the groups with textbooks and laboratory materials were relatively behind the group, which was activity-centred, and this group developed the greatest positive attitudes toward learning. This may be as a result of being exposed to an area of new knowledge with greater student-to-technology model resources contact.

A study by Bernedetta (2009) showed that students in Nigeria secondary schools have difficulties in learning certain Geography concepts, such as physical aspect and mathematical concepts. Geography as a science is activity oriented and the suggested method for teaching it, which is guided-discovery method is resource based. There is inadequate utilization of learning resources within the learner's environment by science

teachers. This suggests that the mastery of Geography concepts cannot be fully achieved without the use of learning materials in teaching Geography. So the teaching of Geography without learning materials will certainly result to poor achievement and lack of interest on the course. There is deficiency in the development of Geography in Nigeria senior secondary schools, and could be traced to unavailability of effective teaching and learning resources in our science classrooms Nwosu (2001). Also teachers have not been able to utilize resources within our environment to enhance teaching and learning of science. .

On this ground the need to use locally model on freefall apparatus in teaching the concept of enthalpy is in support of Eshiet (2006) that the environment provides a situation that helps learners to acquire experience that enhance learning in the affective, psychomotor and cognitive domain.Inyang (2003) since science is better learned through the process approach it is important for science teachers to look for learning and teaching resources beyond the classroom. Freefall apparatus is designed from scrap of metals which are readily available in our local environment. Examples are iron rods, pipes and discarded metals springs.

A study by Ezeliora (2001) showed that locally modelmaterials showed superior effect on studentsachievement and interest, the more familiar the studentsare with the instructional environment of a science class,the more interest they are likely to develop and hencemore achievement in the concept.It is pertinent to emphasise that there is urgent need for Geography educators to re-examine the present method ofteaching Geography with a view to adopting an approachthat involves largely experimental methods in whicheffective utilization of available local material could beused. Though some works have started, it is not yetexhausted since (57.1%) of senior secondary Geographytopics can be taught using models.

This work sought therefore, to provide an insight ofdeploying local materials like model on freefallapparatus in teaching the abstract concepts in Geography.

2.10 Summary

The chapter has reviewed literature related to this study. It has specifically focuses on Geographical models on Academic performance of senior secondary school students. The literature review covered the following sub-headings;

Introduction: It has been confirmed that Geography as a complex subject with abstract concepts, to make comprehensible to students, Geography teachers must employ creative teaching method. Since Geography teaching and learning cannot be effective without the use of relevant and appropriate materials.

- Conceptual Framework: Teaching resources are materials that make effective teaching and also facilitate retention in order to achieve the stated objectives.
- Theoretical Framework: The teaching process can be considered from various theoretical perspectives.The teaching process have been analysed from various theoretical perspectives and centred on very different aspects of teaching materials with respect to integration instructional media in the lesson plan for effective teaching classroom practice. The teaching-learning process is far too complex to permit a single media, all-encompassing analysis, however, and hence recognise the need for developing models which allows it to be simplified for a more fruitful analysis.
- The Application of Models in Teaching Geography: Modeling could be applicable to almost spheres of knowledge. Geographical skills and incorporate a models to develop modeling skills that will help teachers and students.

- Development of Models in Teaching Process:It is necessary and imperative to state clearly here that media production skill is an integral part of teacher education.
- Concept of Geography as a Subject in Secondary School: Geography is in indeed a mother subject to many professions in environmental sciences, social sciences, natural sciences and agricultural sciences. Everything and every activity require a space; and without space everything is nothing. Geography is the science of space. It is therefore considering one of the most imperative subjects to be taught to all, particularly children at the secondary school level. I dare to say that geography should be made a compulsory subject in the senior secondary curriculum in Nigeria.
- Students' Academic Performance in Geography:The essential aspect to better learning and better academic performance in schools are good teachers, good study learning resources, appropriate integrated models; high quality books are the most important in the study of Geography. The Academic performance in Geography could be assessing when structured instructional media were use in teaching process. The impacts usually manifest in the students attitudes. A well appropriate instructional media, like models, maps, charts, graphs, diagrams must be integrated in teaching Geographical concepts.
- Gender and Academic performance: Gender usually differs in Academic performance, though it depends on instructional media used in teaching and learning process. Since most of the Geography concepts requires materials that are appeals to senses for the effective teaching and learning process.
- Empirical Studies: It is pertinent to emphasise that there is urgent need for Geography educators to re-examine the present method of teaching Geography

with a view to adopting an approach that involves largely experimental methods in which effective utilization of available local material could be used.

From the literature review, it was revealed that secondary school teachers of Geography need to know how to create models. Otherwise, many students will leave secondary school without understanding many Geographical concepts.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

This chapter focuses on the research design employed in carrying out the study population, sample and techniques, research instrument, validity, reliability, procedure for data collection and procedure for data analysis procedure.

3.2 Research Design

The research design adopted for this study was of the pre-test, post-test and retention-test quasi experimental design non- randomise and equivalent.

Finally, pre-test, post-test and retention-test wereused to find out effects of instructional strategies on the academic performance of senior secondary school Geography students in Geography in Zaria educational Zone, Kaduna State. The researcher used intact classes of SSS1B in each of these two experimental schools for the study purposely.The

two methods were used during six weeks treatments. Experimental school I demonstration method was used. Subsequently, the experimental school II cooperative learning was used. These two methods were administered for the purpose of comparison respectively.

3.2.1 Schematic representation research Design

The detailed of the design represented as shown below:

EG1	Q1	X1	Q2	Q3
EG2Q1	X1	Q2	Q3	

The figure above shows how the schematic representation of quasi – experimental design.

Legend:

EG	-	Experimental group
Q1	-	Pre – test
X1	-	Treatment
Q2	-	Post – test
Q3	-	Retention - test

3.3 Populationfor the Study

Thepopulation of the study is all the senior secondary schools (SSSI) in Zaria Education Zone, Kaduna State. There are 24 public secondary schools located in this Zone and in all there are 19,972 senior secondary students includes males and females. However, 14 schools are single sex, while 10 schools are co-educational systems. By and large, the study focused on the co-educational senior secondary schools (SSSI) in Zaria education Zone. There are 10 co-educational public senior secondary schools found in the area and in all there are 6,616 students comprises of males and females. The details of the target population distribution are given in Table 3.1

Table 3.1 Population for the Study

S/N	Name of Schools	No. of Males	No. offemales	Total
1.	GSS Yakasai	149	22	171
2.	GSS Tudun- Saibu	409	89	527
3.	GSS Aminu	679	169	848
4.	GSS Dinya	152	09	161
5.	GSS Dakace	278	119	397
6.	GSS Tudun-Jukun	449	509	958
7.	SIASS Karau-Karau	395	468	868
8.	GSS Kaura	466	369	835
9.	GSS Kofan Kuyambana	589	412	958
10.	GSS Muchia	509	384	893
	Total	**4075**	**2541**	**6,616**

Source: Ministry of Education, Kaduna State, Zonal Inspectorate Division Zaria (2014)

3.4 Sample and Sampling Techiques

A purposive simplerandom sampling technique was used to select 2 co-educational systems. The simple random sampling has been used in this study. These are 10 co-educational senior secondary schools in zaria education zone, kaduna state. Since these 2 selected schools had many arms, but intact classes were used from the population of 6,616 in 10 co-educational public senior secondary schools. It consisted of SSSIB of males and females of school I and school II.

Table 3.2 Sample of the Study

Schools	Groups	Group of Students		Total
Males	**Females**			
School I	Experimental	24	14	38
School II	Experimental	29	51	80
Total		**53**	**65**	**118**

3.5 Instrumentation

This section presents the instruments used in teaching and data collection.

3.5.1 Geography Performance Test

The research instruments for this studyare Geographical models were administered test and te-test to SSS1 Geography performance test (GPT).Thirty (30)multiple choice tests developed by the researcher and adopted from the West African Examination council (WAEC) past question papers. The test items contained six topics and the options for the multiple choice test were four that is, A B C D and (40mins) was allowed for the duration of the test and each question attract 1marks which gives a total of 30marks.

3.5.2 Models

The instruments were models for the six different topics. The researcher used local materials and constructs these models as teaching materials and also adopted the

standard of the original ones of the following topics: The earth and other planets, Globe, Latitudes and Longitudes, Weather, Climate, andPopulation of Nigeria. The demonstration methods were used in the teaching and learning processes.

The Blooms' Taxanomy comprises of six perspectives, these are knowledge, understanding, application, analysis, synthesis and evaluation. The table below deployed three perspectives as follows knowledge, understanding and application. These three domains were said to be lower order thinking (LOT) while the remaining three are higher order thinking (HOT). In this regard appropriate perspectives were used to allocate questions base on the three domains for each topic that is lower order thinking (LOT).

Table of Specification: Cognitive Perspective and Knowledge Dimension

Table 3.3 Cognitive and Knowledge Dimension using Blooms' Taxanomy

Topics	Knowledge	Understanding	Application	Total
Earth and other planets	2	2	1	5
Rotation and Revolution	2	2	1	5
Latitude and Longitude	1	1	3	5
Weather	2	2	1	5
Climate	2	2	1	5
Population	2	1	2	5
Total	11	11	8	30

Fig. 1 The table shows the cognitive perspective and knowledge dimension.

3.6.1 Validity of the Instruments

Validity of the instrument (content and face validity) were ascertained by given test items to two experts senior lecturer from the Department of Science Education and the other a Geography subject head from Government Secondary School Kofan Kuyambana Zaria. There was 50 items in the initial draft. The assessments were made which helped to determine the test items accurately cover the area of the study. Corrections and observations resulted in the items being reduced to 30.

3.6.2 Pilot Testing

A pilot testing was conducted at Government Secondary School Dakace Zaria which is some kilometres away from the sampled schools. Since because no interaction could be made but there was common features like, age, and geographical location. The pilot study was also aimed to determine the effectiveness of the research instruments, validity and reliability of the test items and also meant to test the students' performance.Intact class SSS Iwas used for pilot test. The test has been administered for pre-test, post-testmethods were employed.The test contains 30 objectives questions for Geography performance test.

The test was administered for pre – test and post – test sessions within an interval of six weeks;each week a topic was treated under same condition. On each occasion of test administration, it took the respondents 40 minutes to answer the questions. The scores of the samples were recorded in terms of their overall performanceon the test, re– test administered respectively. It showed that the performance on the re-test was better.

3.6.3 Reliability of the Instruments

Reliability refers to the consistency of instrument which is expressed as correlation coefficient. It indicates the degree to which an instrument is consistent in measuring whatever it measures (Kerlinger, 2001). To establish reliability of the instruments in this study test re-test reliability methods have been used for reporting.

The reliability of instrument usingpearson product moment correlation(PPMC)test re -tests is 0.84.This was a confirmation of test of reliability by Spiegel et'al (2010).To them an instrument is considered reliable if it lies between 0 and 1, and that the closer the calculated reliability coefficient is to zero, the less reliable is

the instrument, and the closer the calculated reliability co-efficient is to 1, the more reliable is the instrument. This therefore confirms the reliability of the data collection instrument used as fit for the main work.

3.7 Procedure for Data Collection

The researcher collected an introduction letter from Head of Department Educational Foundation and Curriculum Ahmadu Bello University, Zaria to make and facilitate administration of the test items in the respective study area. During the process of administration, pre-test was conducted then treatment spent six weeks with school I and school II since both are experimental.Before the commencement of the use of geographical models (GM) for the experiments, the study sampled was of pre-tested to find out their performance for the purpose of comparison. The study samples were two experimental schools. Experimental school I consisted of 24 male and 14 female students while experimental II consisted of 29 male and 51 female students respectively. Immediately after six weeks' period of Geographical models administration, the Geography Performance Test (GPT) was administered in the sampledschools, in the usual paper-test. The administration of the GPTto the schools lasted for 40 minutes.Fourresearch assistantshelped in the administration of the test items to the students who ascertained that the items were duly returned successfully. The two schools have two assistants each and were trained on how to conduct the test and re- test respectively. The researcher usually displayed the Geographical models for the experimental school I, and used demonstration method in the teaching and learning. Consequently used cooperative learning method to taught experimental school II. The Geographical models were used throughout during the six weeks administration respectively. The following are the topics covered:Week (i) topicis; the earth and other planets, model of thesun and nine planets have been used to deliver the lesson, Week

(ii) topic is; Earths' rotation and revolution, model of the Globe have been used to deliver the lesson.Week (iii)topic is; Latitudes and Longitudes model of the Globe showing the lines latitudes and longitudes has been used to teach the students. Week (iv) topic is; Weather, model of the weather station has been used in the teaching and learning processes. Week (v) topic is; Climate, model of the weather station hasbeen used during the lesson. Week six topic is; Population of Nigeria, model of the map of Nigeria showing densely, medium and sparsely populated areas has been used during instructional processes.

3.8 Procedure for Data Analysis

In analysing the data from the scoresof the students, the mean and standard deviation were used to answer research questions while in dependent t-test used to testhypotheses at $p< 0.05$ using the statistical package for the social sciences (SPSS)

CHAPTER FOUR

DATA ANALYSIS, PRESENTATION AND DISCUSSIONS OF RESULTS

4.1 Introduction

The data analysis in this chapter are presented infour sections: first, the bio data of the subjects including theirsex and schools; second, answers to the research questions using descriptive statistics of mean and standard deviations; third,the result of the null hypotheses tests; and forth, summary of findings.

4.2 Presentation in Bio Data

Table 4.1: Distribution of sample students by School

Schools	**Number of Students**	**Percentage**
Experimental School I	80	67.8
Experimental School II	38	32.2
Total	**118**	**100**

Outcome of the frequency table showed that two schools were used. The first school is School I had 38 students representing 32.2% of the total sample and the rest 80 students representing 67.8% were drawn from School II.

Table 4.2:Distribution of Students According to Gender

Gender	Number of Students	Percentage
Male	53	44.92
Female	65	55.08
Total	**118**	**100**

The frequency table above showed that male students in this study were 53 representing 44.9% and the rest 65 students were female students representing 55.1%.

4.3 Pre-test, post-test and retention scores of the respondents

This section presented test and re-test scores of the students. The scores are presented for the initial and final samples of the students in frequencies and percentages.

4.3.1 Pre-test, post-test and retention scores of the initial sample

The test and re-test scores of the initial sample were presented in the form of total scores and percentages. There were 118 students who participated in the study, out of which 80 were taught using demonstration method and 38 were taught using cooperative learning strategy.

Table 4.3:Pre-test, post-test and retention scores of the initial sample

Treatment	Number	Sex	pre-test	%	post-test	%	Retention test	%

Demonstration	80	66	867	68.59	976	68.3	910	69.41
Cooperative	38	52	397	31.41	453	31.7	401	30.59
Total	**118**	**118**	**1264**	**100**	**1429**	**100**	**1311**	**100**

In Table 4.3, the pre-test, post-test and retention scores of the two schools were presented. Due to the difference in the number of students in the two schools (80-38=42), the experimental school I mean scores in the three tests was higher than that of the experimental school II. As the number of students in the experimental school I doubled that of experimental school II, the total scores and percentages also doubled.

4.3.2 Pre-test, post-test and retention scores of the final sample

The pre-test, post-test and retention scores of the final sample were presented in the form of total scores and percentages for school I and II (48.2 & 51.8). There were 76 students who were selected as final sampled in the study, out of which 38 were in the experimental school I and the other 38 were randomly selected from the experimental school II. The random selection was to equalize the number of participants in each group in order to make a perfect comparison between the two groups.

Table 4.4:Pre-test, post-test and retention scores of the final sample

Treatment	Number	Sex	pre-test	%	post-test	%	Retention test	%
Demonstration	38	38	397	49.87	453	49.73	401	48.2
Cooperative	38	38	399	50.13	458	50.27	431	51.8
Total	**76**	**76**	**796**	**100**	**911**	**100**	**832**	**100**

Table 4.4 presented the total scores obtained by the students taught using demonstration method and those taught using cooperative learning strategy. At the pre-test, the total scores for the experimental school II (total score=399, 50.13%) was slightly higher than that of the experimental group 1 (total score=397, 49.87%). In the post-test, the total scores obtained by the students in the experimental school II was a little bit higher (total score=458, 50.27%) than that of the experimental school I (total score=453, 49.73%). For the retention scores, the margin increases, where the experimental school II retained more (total scores=431, 51.8%) Geography concepts than (total score=401, 48.2%) for the experimental school I.

4.4 Answering the Research Questions

The descriptive statistics of means and standard deviations were used to answer the research questions. The following research questions were answered to guide the study.

Research Question 1

What is the effect of instructional strategies on academic performance scores of senior secondary schoolsI geography in zaria education zone? This research question was answered using means and standard deviations. The results of the computations are presented in Table 4.5.

Table 4.5: Mean Geography performance scores of students taught Geographical Models using Cooperative learning and those taught using Demonstration method

Treatment	N	Mean	SD	Std. Error Mean	Mean Difference
Demonstration	38	11.92	3.858	.626	
					-.132
Cooperative	38	12.05	4.242	.688	
Total	**76**				

Table 4.5 presented the mean Geography performance scores of students taught Geographical models using cooperative learning and those taught using demonstration method. The mean Geography performance scores (M=11.92, SD=3.858) of experimental school I was lower than (M=12.05, SD=4.242) of the experimental school II. The mean Geography performance scores difference was -0.132 in favour of the experimental school II. Therefore, there is a difference between the mean Geography performance scores of experimental school I and experimental school II.

Research Question 2

What is the effect of instructional strategies on academic performanceof male and female senior secondary schools I geography students in zaria education zone?This research question was answered using means and standard deviations. The results of the computations are presented in Table 4.6.

Table 4.6: Mean Geography performance scores of male and female students taught Geographical Models using Cooperative learning

Sex	N	Mean	SD	Std. Error Mean	Mean Difference
Male	38	13.21	3.520	.571	2.447
Female	38	10.76	4.175	.677	
Total	**76**				

Table 4.6 presented the mean Geography performance scores of male and female students taught Geographical Models using Cooperative learning and those taught using demonstration method. The mean Geography performance scores (M=13.21, SD=3.520) of male students was higher than (M=10.76, SD=4.175) of the female students. The mean Geography performance scores difference was 2.477 in favour of the male students. Therefore, there is a difference between the mean Geography performance scores of male and female students taught Geography models using demonstration method and cooperative learning.

Research Question 3

What is the effect of instructional strategies on retention ability of senior secondary schoolsIgeography students in zaria education zone? This research question was answered using means and standard deviations. The results of the computations are presented in Table 4.07.

Table 4.7: Mean Geography retention scores of students taught Geographical Models using Cooperative learning and those taught using demonstration method

Treatment	N	Mean	Std. Deviation	Std. Error Mean	Mean Difference
Demonstration	38	10.55	3.211	.521	-.789
Cooperative	38	11.34	3.780	.613	
Total	**76**				

Table 4.7 presented the mean Geography retention scores of students taught Geographical Models using Cooperative learning and those taught using demonstration method. The mean Geography retention scores (M=10.55, SD=3.211) of experimental school I was lower than (M=11.34, SD=3.780) of the experimental school II. The mean Geography retention scores difference was -0.789 in favour of the experimental school II. Therefore, there is a difference between the mean Geography retention scores of experimental school I and experimental school II.

4.5 Null Hypotheses Testing

Inferential statistics were used to test the null hypotheses. The following hypotheses were tested in this study at $p \leq 0.5$ level of significance.

Null Hypothesis 1

There is no significant difference between the mean Geography performance scores of students'taught Geographical Models using demonstration methodand those taught usingcooperative learning amongst senior secondary schools in Zaria Education Zone. This null hypothesis was tested using independent samples t-test. The statistical computations are presented in Table 4.08.

Table 4.8 Summary of independent samples t-test on Geography performance scores of experimental school I and II

Treatment	N	Mean	SD	T	df	p	Std. Error Difference	95% CI of the Difference

									Lower	Upper
Demonstration	38	11.92	3.858	-.141	74	.888	.930		-1.985	1.722
Cooperative	38	12.05	4.242							
Total	**76**									

Table 4.8 presented the mean Geography performance scores of students taught Geographical models using cooperative learning and those taught using demonstration method. The mean Geography performance scores (M=11.92, SD=3.858) of experimental school I was lower than (M=12.05, SD=4.242) of the experimental school II. The mean Geography performance scores difference was -0.132 in favour of the experimental school II. This is supported by t(74)= -0.141, p=0.888; the null hypothesis which stated no significant difference was retained. Therefore, there is no significant difference between the mean Geography performance scores of experimental school I and experimental school II.

Null Hypothesis 2

There is no significant difference between the mean Geography performance scores of male and female students taught Geographical models using demonstration methodand those taught usingcooperative learning amongst senior secondary schools in Zaria Education Zone. This null hypothesis was tested using independent samples t-test. The statistical computations are presented in Table 4.09.

Table 4.9: Summary of independent samples t-test Geography performance scores of male and female in experimental school I and II

								95% CI of the Difference	
Sex	**N**	**Mean**	**SD**	**T**	**Df**	**p**	**Std. Error Difference**	**Lower**	**Upper**
Male	38	13.21	3.520	2.763	74	.007	.886	.682	4.212

Female	38	10.76	4.175
Total	**76**		

Table 4.9 presented the mean Geography performance scores of male and female students taught Geographical models using cooperative learning and those taught using demonstration method. The mean Geography performance scores (M=13.21, SD=3.520) of male students was higher than (M=10.76, SD=4.175) of the female students. The mean Geography performance scores difference was 2.477 in favour of the male students. This is supported by t(74)=2.763, p=0.007; the null hypothesis which stated no significant difference was retained. Therefore, there is a significant difference between the mean Geography performance scores of male and female students taught Geography models using demonstration method and cooperative learning.

Null Hypothesis 3

There is no significant difference between the mean Geography retention scores of students taught Geographical Models using demonstration methodand those taught usingcooperative learning amongst senior secondary schools in Zaria Education Zone.This null hypothesis was tested using independent samples t-test. The statistical computations are presented in Table 4.10.

Table 4.10: Summary of independent samples t-test Geography retention scores of experimental school I and II

Treatment	**N**	**Mean**	**SD**	**T**	**Df**	**p**	**Std. Error Difference**	**95% CI of the Difference**	
								Lower	**Upper**
Demonstration	38	10.55	3.211	-.981	74	.330	.804	-2.392	.813
Cooperative	38	11.34	3.780						

Total	**76**

Table 4.10 presented the mean Geography retention scores of students taught Geographical models using Cooperative learning and those taught using demonstration method. The mean Geography retention scores (M=10.55, SD=3.211) of experimental school I was lower than (M=11.34, SD=3.780) of the experimental school II. The mean Geography retention scores difference was -0.789 in favour of the experimental school II. This is supported by t(74)= -0.981, p=0.330; the null hypothesis which stated no significant difference was retained. Therefore, there is no significant difference between the mean Geography retention scores of experimental school I and experimental school II.

4.6 Summary of the major findings

The followings is the summary of the major findings of the study

1. The study found that there is slightly significant difference between the performance of students taught geography models using demonstration method and those taught using cooperative learning. That is to say method favour of the students taught using cooperative learning.

2. Significant differences existbetween theperformance of male and female students taught geography models using demonstration method and those taught cooperative learning that is cooperative learning favour female students.

3, Significant differences slightly exist between the retention ability of students taught geography models using demonstration method and those taught using cooperative learning. The retention ability was in favour of the experimental school II.

4.7 Discussions of Findings

The objectiveof this study was to find out the effects of instructional strategies on the academic performance of senior secondary school (SSSI) geography students. However, the study finds out differences of using two instructional strategies of the two selected schools in zaria education zone. The study was also interested in finding out whether academic performance enhance, if geographical models were used in teaching geographical concepts. This study also found out whether the geography performance test (GPT) of senior secondary school geography students was influenced by the geographical models in the instructional strategies during teaching and learning process.

From related literatures reviewed on the effect of models objects.Abodelraheem (2012), Ezeliora (2001) and Inyang (2003). Therefore, it seems to have been any such research conducted with respect to present study to the best knowledge of the researcher. Hence, the findings of this research on the effect of Geographical models on Academic performance in senior secondary school students in Zaria Educational Zone, Kaduna state cannot be comparedwith earlier studies. However, the effect of Geographical models on students' academic performance in Geography cannot be over emphasised.The Geographical models used in teaching the students Geographical concepts in senior secondary schools enhance their Academic performance. This has been revealed in their mean performance.

The instructional strategy used in teaching geographical models in senior secondary schools enhances their academic performance. This has been revealed in their academic performancebecause differences exist in the pre - test and post – test scores of students.At the pre-test, the total scores for the experimental school II was slightly higher than that of the experimental school I. In the post-test, the total scores obtained

by the students in the experimental school IIwere a little bit higher than that of the experimental school I. This implies that the students post – test scores is slightly higher than their pre – test scores. The mean geography performance scores of male students were higher than of the female students. The mean geography performance scores difference was in favour of the male students. Therefore, there is a difference between the mean geography performance scores of male and female students taught geography models using demonstration method and cooperative learning. The mean geography retention scores of experimental school I was lower than of the experimental school II. The mean Geography retention scores difference was in favour of the experimental school II. Therefore, there is a difference between the mean Geography retention scores of experimental school I and experimental school II.

CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1 Introduction

This chapter presents the summary of the research work. It includes the conclusion drawn from the findings of the study, the recommendations for the use of geographical models in teaching and learning Geography concepts and suggestions for further studies.

5.2 Summary

The study finds out the effects of instructional strategies on the academic performance of senior secondary school geography students in geography. The improvement in the academic performance of students due to the uses of instructional strategies with geography was also found.

The research design used for the study schematic representation of quasi – experimental design using pre – test, post – test and retention – test. A sample of (76)students were purposely selected for the study from the population of (6,616) in ten coeducational senior secondary schools in Zaria Education Zone, Kaduna State. The instruments used for generating data were geography performance test (GPT) test, re-test and retention test.

The data analysis was done using descriptive statistics, mean, and standard deviationused to answer research questions and paired sample t – test statistical tools to answer the research questions andtest the postulated null hypotheses using the statistical package for social science (SPSS). Null hypothesisone has been accepted, hypothesis two has been rejected, and hypothesis three has been accepted and retained. The uses of instructional strategies in geography in two selected experimental schools were found to be effective to enhance students' academic performance.

5.3 Conclusions

Based on the results of the findings from this study, the, the following conclusions are made;

Instructional strategies are encouraging determinant in the enhancementof students' academic performance. This study found the effects of instructional strategies in teaching and learning of Geographical concepts have improved students' assimilation. The study also confirmed that lack of effective and efficient use of instructional strategies in teaching and learning Geography concepts lower students' performance. The excitements and motivations the students got from the Geographical models used in learning Geographical concepts enhance their academic performance. The findings and conclusion of this study can therefore, be said to have emphasis the relevance of instructional strategies with geographical models in the instructional process.

5.4 Recommendations

The followings are the recommendations of the study

1. The geography students should develop geographical imaginative thinking; since geographical models was designed, developed and integrated in the teaching and learning process.
2. The stake holders should encourage geography teachers to deploy appropriate teaching techniques in the instructional process; especially demonstration method and cooperative learning.
3. Geography teachers should have the instinct of diverse methods in teaching and learning situation respectively.

5.5 Suggestions for further studies

The studies is by no means exhaustive further studies be carried out on the following areas

1. Impact of teaching methods on the academic performance and retention ability of secondary school students in Sabon Gari local government.

2. Effect of socio cultural variables on the academic performance and retention abilities of the secondary school student in Kaduna state

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APPENDICES

APPENDIX 1

Week One

Date **12/07/2016**

Class **SSS 1**

Gender **Males and Females**

Average Age **15-16 years**

Subject **Geography**

Topic **The earth and other planets**

Duration **40 Minutes**

Instructional Materials: **Modeled Sun and nine Planets**

Objectives: By the end of the lesson students should be able to;

i. Identify the components of solar system
ii. Describe the positon of the earth in relation to the sun and other planets
iii. Proof the shape of the earth

Teacher Activity: The researcher is to inform the students that our topic today is, the earth and other planets.

Presentation Step 1: The teacher is to explain the earth as magnetic field of the sun, the earth kinds of radiation and earth upper atmosphere are stars.

Step 11: The teacher is to describe the components of solar system as it comprises the sun and its nine planets. These planets are believed to have been developed from the condensation of gases.

Step 111: The teacher is to state and explain the proof the shape of the earth; Circumnavigation of the earth, Sunrise and Sunset, The circular horizon, Ship Visibility,

Planetary bodies. Circumnavigation of the earth; There is possibility to go round the earth by air, and sea and return to the starting point. Sunrise and Sunset; as the earth rotate from west to east. The circular horizons; when one view a distant horizon from any point of the earth. Ship Visibility; When a ship approaching a point viewer. Planetary bodies; when the sun, moon, stars and other planetary are circular.

Evaluation: The teacher is to ask questions, such as Name the components of solar system, describe the earth by shape and size, and explain the position of the earth.

Conclusion: The teacher would summarise the lesson by saying some of the important points discussed in the lesson.

Week	**Two**
Date	**19/07/2016**
Class	**SSS 1**
Gender	**Males and Females**
Average Age	**15-16 years**
Subject	**Geography**
Topic	**Earth's rotation and revolution**
Duration	**40 Minutes**
Instructional Materials	**Modeled Globe**
Previous Knowledge	**The earth and other planets**

Objectives: By the end of the lesson students should be able to;

i. Describe the phenomena of earth's rotation and revolution

ii. Explain the effects of the earth's rotation and revolution

Teacher Activity: The teacher is to introduce the topic by asking students questions base on the previous lesson such as; what is solar system? What are the components of solar system? Mention the proof shape of the earth, after their attempt, and then the researcher is to inform the students that our topic today is earth's rotation and revolution.

Presentation Step 1: The teacher is to explain the movement of the earth, earth moves in two distinctive ways which are said to be rotation and revolution. Rotation is the movement of the earth on its axis from west to east. Revolution is the movement of the earth on its orbit round the sun in 366 days.

Step 11: The teacher is to explain the causes of rotation and revolution as a year one complete revolution takes 366 days. Season revolution brings about seasonal changes, change in altitude of the mid-day sun, varying length of day and night.

Step 111: The teacher is to precisely demonstrate the two combine processes which are rotation and revolution occurred at the same time using modelled Globe.

Evaluation: The teacher is to ask questions such as differentiates between rotation and revolution, what are the causes of rotation and revolution.

Conclusion: The teacher is to summarise the lesson by saying some of the important points discussed during the lesson.

Week **Three**

Date **26/07/2016**

Class **SSS 1**

Gender **Males and Females**

Average Age	**15-16 years**
Subject	**Geography**
Topic	**Latitudes and Longitudes**
Duration	**40 Minutes**
Instructional Materials	**Modeled Globe**
Previous Knowledge	**The earth's rotation and revolution**

Objectives: By the end of the lesson students should be able to:

i. Define latitudes and longitudes
ii. Differentiates between latitudes and longitudes
iii. Describe the relationship between latitude and major regions of the world
iv. Use latitude and longitude to locate positions of towns and countries.

Teacher Activity: The teacher is to introduce the lesson with questions on the previous class such as, what are the earth's combine processes. Distinguish between rotation and revolution, what are their causes? After students might have attempted, then the researcher inform them that our topic today is latitudes and longitudes.

Presentation Step 1: The teacher is to explain latitudes and longitudes are the angular distance of points on the earth's surface measured in degrees from the centre of the earth.

Step 11: The researcher is to mention the important lines of latitudes these are; equator, tropic of cancer, tropic of capricorn, Arctic Circle, Antarctic Circle, north and south poles

Step 111: The teacher is to described the similarities of latitude and longitude

Evaluation: The teacher is to ask students questions such as what is the meaning of latitude and longitude. State five important lines of latitude? What are their similarities?

Conclusion: The teacher is to summarise the lesson by emphasis on the important points discussed.

Week	**Four**
Date	**02/08/2016**
Class	**SSS 1**
Gender	**Males and Females**
Average Age	**15-16years**
Subject	**Geography**
Topic	**Weather**
Duration	**40 Minutes**
Instructional Materials	**Modeled Weather Station**
Previous Knowledge	**Latitudes and Longitudes**

Objectives: By the end of the lesson students should be able to;

i. Explain the concept of weather
ii. Identify weather elements
iii. List the instruments for measuring weather
iv. Describe the attributes of weather

Teacher Activity: The teacher is to introduce the lesson with questions on the previous class such as what is the meaning of latitude and longitudes. State five important lines of latitudes, what are the similarities between latitude and longitude?And then the teacher is to inform students that our topic today is weather.

Presentation Step 1: The teacher is to explain meaning of weather as the daily condition of the atmosphere of a given place for a short of times.

Step 11: The teacher is to state the elements of weather and their instruments

Step 111: The teacher is to mention and explain factors affecting weather; latitude, continentality, altitude, ocean currents, planetary winds and pressure belts, slope and aspect, cloud cover, natural vegetation and soil.

Evaluation: The teacher is to ask questions such as, what is weather. Mention the elements and instruments of weather.

Conclusion: The teacher is to summarise the lesson emphasis on important points.

Week **Five**

Date **09/08/2016**

Class **SSS 1**

Gender **Males and Females**

Average Age **15-16 years**

Subject	**Geography**
Topic	**Climate**
Duration	**40 Minutes**
Instructional Materials	**Modeled Weather Station**
Previous Knowledge	**Weather**

Objectives: By the end of the lesson students should be to;

i. Explain the meaning of climate
ii. List major elements of climate
iii. Describe the attributes of climate
iv. Distinguish between climate and weather

Teacher Activity: The teacher is to introduce the lesson with questions on the previous class such as what is weather. What are the elements of weather? Mention the instruments of weather, and then the teacher is to inform the students that our topic today is climate.

Presentation Step 1: The teacher is to explain the meaning of climate as the average condition of the atmosphere of a place over a long period of time.

Step 11: The teacher is to mention the elements of weather and their instruments

Step 111: The teacher is to differentiates between weather and climate

Evaluation: The teacher is to ask questions such as, what is climate. What are the elements of weather and their instruments?

Conclusion: The teacher is to summarise the lesson by saying some of the important point discussed in the lesson.

Week	**Six**
Date	**16/08/2016**
Class	**SSS 1**
Gender	**Males and Females**
Average Age	**15-16 years**
Subject	**Geography**
Topic	**Population of Nigeria**
Duration	**40 Minutes**
Instructional Materials	**Modeled Map of Nigeria Population**
Previous Knowledge	**Climate**

Objectives: By the end of the lesson students should be able;

i. Explain the increase in growth of Nigeria's population

ii. Account for the structure and distribution pattern of the population

iii. Explain population movement patterns and associated problems

Teacher Activity: The teacher is to introduce the lesson with questions such as, define climate, what are the climatic elements and their instruments, then the researcher is to inform the students that our topic today is population of Nigeria.

Presentation Step 1: The teacher is to explain Nigeria's population as the number of people living within one geographical area.

Step 11: The teacher is to state the distribution of population in Nigeria; Areas of high population density, Areas of moderate population density, Areas of low population density.

Step 111: The teacher is to itemise reasons why some areas in Nigeria are densely populated, fertile soil, mineral resources, industries, climatic factor, social amenities, and seaports.

Evaluation: The teacher is to evaluate the students by asking the students questions such as what is the term population, Explain three distribution of population in Nigeria, mention why some areas are densely populated.

Conclusion: The teacher is to summarise the lesson by emphasis on some of the important points discussed in the lesson.

APPENDIX II

OBJECTIVES QUESTIONS FOR GEOGRAPHY ACHIVEMENT TEST

1. The shape of the earth is better described as; A. Circle B. GeoidC Sphere D.Flat

2. Which of the following is one of the components of solar systems? A. Mars B. Planets C. Shape D. Visibility.

3. The closest planet to the sun is;A. Earth B. Pluto C. Neptune D. Mercury

4. The farthest planet is; A. Saturn B. Jupiter C. PlutoD. Mars

5. The distance between the sun and the earth is;A. 148,800,000 km B. 141, 200,000 km C. 140, 200,000 km D. 139, 100, 000 km

6. The distance between the earth and the moon is;A. 379,229 km B. 384,629 km C. 381,629 km D. 384, 529 km

7. The earth on which we stand is constantly in;A. Portion B. Slow C. Motion D. Straight

8. An eclipse of the moon occurs when the earth; A. Revolves round the moon B. Comes between moon and sun C. Rotates on its axis. D. Revolves round the sun

9. The planet often considered as the earths' twin because of their close similarity in size, mass and density is;A. Mercury B. Saturn C. Jupiter D. Venus

10. The equinoxes occurs on; A. March 20th and September 19th B. March 21th and September 23rd C. March 15th and September 18th D. March 10th and September 12th

11. Which of the following period refers as solstice; A. June 21st and December 22nd B. June 22nd and December 23rd C. 20th June and December 21st D. June 15th and December 18?

12. Earth moves in two distinctive ways as; A. Space and Motion B. Portion C. movement D. Rotation and Revolution

13. The earth moves on its axis from; A. West to East B. North to South C. South and West D. North to East

14. The earth revolve round the sun in; A. 365 ¼ days B. 364 ¼ days C. 367 ¼ days D. 366 days

15. The angular distance of a point on the earths' surface measured in degrees from the centre of the earth is known as; A. Latitude B. Orbit C. Longitude D. International Date Line

16. Line of longitude can be best described as; A. The angular distance of a place north or south B. Imaginary lines on the earths' surface joining north and South Poles. C. Great circle D.The distance of a place east or west.

17. Which of the following is not a proof earth is spherical? A. The earth horizon as seen from a ship B. Planetary bodies observed from telescopes C. The earth shadow D. The four seasons

18. The instrument for measuring temperature is; A. Thermometer B. Rain gauge C. Hygrometer D. Barometer

19. Which of the following instrument used to measure wind speed; A. Oktas B. Wind vane C. Anemometer D. Solarimeter

20. Temperature is the degree of; A. Heat and Cold B. Haze and Visibility C. Freezing D. Boiling

21. Which of the following States is associated with high population? A. Oyo and Lagos B. Sokoto and Kebbi C. Zamfara and Jigawa D. Bauchi and Gombe

22. The population of Nigeria divided in to; A. 2 B. 3 C. 4 D. 5

23. Some areas in Nigeria where the climate is mild tend to be; A. Densely population B. Low population C. Under population D. Moderate population

24. Densely populated areas associated with; A. Climatic Factor B. High forest C. Low factor D. Thick forest

25. Longitude 0^0 marks the; A. Arctic circle B. Equator C. Prime meridians D. Tropic of cancer.

26. Which of the factor affect weather and climate A. Continentality B. Coastal C Temperature D. Breeze

27. Vegetation is one of the important factor of; A Climate B. Seasons C. Summer D. Winter

28. The Centigrade degrees are divided in to divisions; A.$1^0 - 101^0$CB.$0^0 - 100^0$C C. $2^0 - 99^0$CD.1^0 - 100^0C

29. Change 59^0 F to ^{0}C A. 15^0 C B.16^0 C C.14^0 C D.13^0 C

30. Stevenson Screen is kept in A.Garden B.LaboratoryCWeather Station D. Geography Class

APPENDIX III

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

17. D

18. A

19. C

20. A

21. A

22. B

23. A

APPENDIX IV

ANSWER SHEET FOR GEOGRAPHY ACHIEVEMENT TEST (GAT)

BIODATA

Name……

School……

Class……..Identification No….....

Gender: **Male ( )** **Female ( )**

1.=A= =B= =C= =D=

2. =A= =B= =C= =D=

3. =A= =B= =C= =D=

4. =A= =B= =C= =D=

5. =A= =B= =C= =D=

6. =A= =B= =C= =D=

7.=A= =B= =C= =D=

8. =A= =B= =C= =D=

9. =A= =B= =C= =D=

10. =A= =B= =C= =D=

11. **=A= =**B= =C= =D=

12. =A= =B= =C= =D=

19. =A= =B= =C= =D

20. =A= =B= =C= =D=

21. =A= =B= =C= =D=

22. =A= =B= =C= =D=

23. =A= =B= =C= =D=

24. =A= =B= =C= =D=

25. =A= =B= =C= =D=

26. =A= =B= =C= =D=

27. =A= =B= =C= =D=

28. =A= =B= =C= =D=

,

29. =A= =B= =C= =D=

30. =A= =B= =C= =D=

13. =A= =B= =C= =D=

14. =A= =B= =C= =D=

15. =A= =B= =C= =D=

16. =A= =B= =C= =D=

17. =A= =B= =C= =D=

18. =A= =B= =C= =D=

APPENDIX V

WEEK ONE

THE EARTH AND OTHER PLANETS

The solar system comprises the sun and its nine planets. These planets are believed to have been developed from the condensation of gases. The science that studies planets

and other heavenly bodies is known as ‘Astronomy’All the planets revolves round the sun in an elliptical orbit, that is sun is at the centre. This path followed by each planet around the sun is known as its orbit. The shape of the earth is better called ‘Geoid’ and its distance between the sun and the earth is 148,800,000 km while earth and the moon is 384,629 km. The nine planets include;

i. Mercury
ii. Venus
iii. Earth
iv. Mars
v. Jupiter
vi. Saturn
vii. Uranus
viiiNeptune
xi. Pluto

THE SUN: It is the centre of the planets which does not in itself move. It is the largest star and has a surface temperature of 6000^0 c. It is the source of light and energy to all the planets. The planets shine only by the reflectedlight of the sun.

MERCURY: This is the smallest, hottest and nearest planet. It has the shortest orbit round the sun. It takes eighty-eight days for mercury to go round the sun once. It has the strongest gravitational pull of the sun. It contains no living things and has no satellite.

VENUS: Venus is the second closest planet to the sun. It is similar to the earth in terms of size weight and density. It is termed as the ‘Earth Twin’.

EARTH: This is the third planet. It is the only planet that contains and support life or living things. It has one natural satellite called the moon.

MARS: The fourth planet is the mars. It has dark spots on its surface. It is suspected to have some plants life. It has two moons.

JUPITER: It is the largest planet in the solar system. Its surface is very cold. The surface contains gases such as hydrogen and methane. The planet has twelve moons.

SATURN: This is the second largest planet in the solar system. The planet three rings round it and it has nine moons.

URANUS: It is the seventh planet. It is atimes 50 times larger than the earth and about 15 times heavier.

NEPTUNE: It closely resemble Uranus, but it has two satellites and much colder.

PLUTO: This is the farthest planet. It is also the coldest planet in the solar system.

WEEK TWO

EARTH'S ROTATION AND REVOLUTION

The earth moves in space in two clear ways:

i. Rotation

ii. Revolution

Rotation: This is the movement of the earth on its axis from west to east once in every 24 hour. When the earth rotates on its own axis only one portion of the earths' surfaced comes in to the rays of the sun and see day light, the other portion which is away from the sun's rays will be in darkness or night. Some of the changes that take place on the earth's surface, when it rotates on its axis include:

i. Sunrise and Sunset

ii. Causes day and night

iii. Deflection or changes of wind direction

iv. Dailyrising and falling of the tides

v. Different of 1hour between two meridians in 15^0 apart

Revolution: This is the movement of the earth on its axis orbit round the sun in $365^{1/4}$ days. The earth revolves round the sun on an elliptical orbit causing:

i. A year

ii. Seasons

iii. Change in altitude of the mid-day sun

iv. Varying length of day and night

A year: One complete revolution takes 365 days. As it is not possible to show a quarter (1/4) of aday in a calendrer, a normal year is taken to be 365 days and an extra day is added four years having 366 days called a leap year.

The altitude of the mid-day sun: The earth's axis is inclined to the plane of the earth elliptic orbit at $66^{1/2}$ given change of the altitude of the mid-day sun as;

i. The sun is vertically overhead at the equator on two days each year, 21st march and 23rd September the two days are termed the equinoxes i.e. having equal days and nights.
ii. The sun is vertically overhead at the tropical cancer on 31stJuneeach year known as summer solstice where the northern hemisphere will bring or having longer days and shorter nights.
iii. The sun is vertically overhead at the tropic of capricorn on 22nd December each year known as winter solstice; when the southern hemisphere will be having its longer days and shorter nights.

Varying length of day and night: The movement of the earth round the sun at an angle of$66^{1/2}$give rise to different length of day and night in the northern hemisphere around December 22nd the hours of darkness increase. At the Arctic circle $66^{1/2}$N, the sun never rises giving total darkness for the whole day on 22nd December. Beyond the Arctic Circle to the North Polethere will be six months total darkness. In summer i.e. June there will be having continuous day light for six months.The same process takes place in the southern hemisphere.

The Seasons: The revolutions of the earth bring about seasonal changes. In temperate regions. Four seasons are experienced as summer, winter, spring, Autumn. In tropical areas like Nigeria experiences summer and winter.

WEEK THREE

LATITUDE AND LONGITUDE

The earth's surface is so large that a mathematical approach is used so as to locate places easily on it. Therefore imaginary lines were drawn or provided on the globe. These imaginary lines are of two sets; Latitude and Longitude

LATITUDE: Latitude is the angular distance of a pointon the earth's surface measured in degrees from the centre of the earth. The also imaginary lines running west-east direction, measured to degrees from the centre of the earth. Latitude are called the parallel lines. They become shorter towards the pole. The most important lines of latitude the;

i. Equator - 0^0

ii. Tropic of cancer - $23^{1/20}$ N

iii. Tropic of capricorn - $23^{1/20}$ S

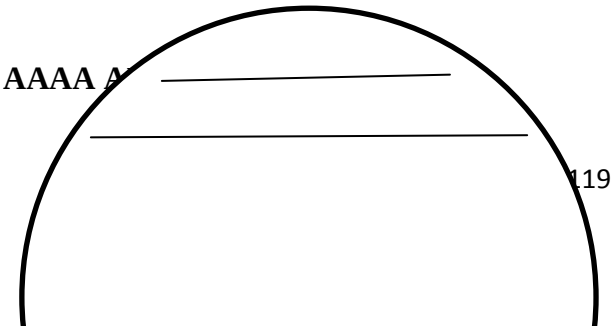
iv. Arctic circle - $66^{1/20}$ N

v. Antarctic circle - $66^{1/20}$ S

vi. North &South Poles - 90^0 N& 90^0 S

NORTH POLE----------90^0 N

AAAA A



TROPIC OF CANCER $23^{1/2\,0}$ N

EQUATOR 0^0

TROPIC OF CAPRICORN $23^{1/2\,0}$ N

ANTARCTIC CIRCLE $66^{1/2\,0}$ N

S0UTH POLE ----------90^0 S

The equator is the only great circle among the latitude, which divide the globe in to two equal parts, the northern and the southern hemisphere. Latitude are used to locate places on two world map and calculate distances .E.g. between one degree and another, the distance is estimated to be 111 kilometre or 1^0 = 111 km. To calculate the distance therefore the following formulae can be use:

i. North and North ----------> Subtraction
ii. South and South ----------> Subtraction
iii. North and South ----------> Addition
iv. Equator and North or South ----------> Addition or Subtraction

EXAMPLES

Q.1. Calculate the distance between the distance between the equator latitude 0^0 and Cairo 40^0 N.

Cairo 40^0 N111

Equator 0^0 +40 ×

_____ _____

40^0 0 0 0

_____ 4 4 4 +

_____

4 4 4 0 Km

_____

Q.2. Calculate the distance between Lesotho 25^0 S and Libya 35^0 N

Libya 35^0 111

Lesotho 25^0 +60×

_____ _____

60^0 0 0 0

_____ 6 6 6 +

_____

6 6 6 0 km

_____

Q.3. Calculate the distance between Calabar 4^0 N and Jordan 40^0 N

Jordan $40^0$111

Calabar 4^0 _ 36 ×

_____ _____

36 6 6 6

_____ 3 3 3 +

_____

3 9 9 6 km

_____

Q.4. While, if the distance between Borno 14^0 N and Tunis is 3330 km north. What latitude is Tunis?

$30^0$30

111 3330 14 +

3330 _____

0000 44^0 Tunis 44^0

_____ _____

CHARACTERISTICS OF LATITUDE

i. They are imaginary lines
ii. They run from west to east
iii. They get shorter towards the poles
iv. They are called parallel lines

v. They are recorded in degrees

vi. They have equator as the only great circle

vii. They have 180^0 altogether, 90^0 N and 90^0 S

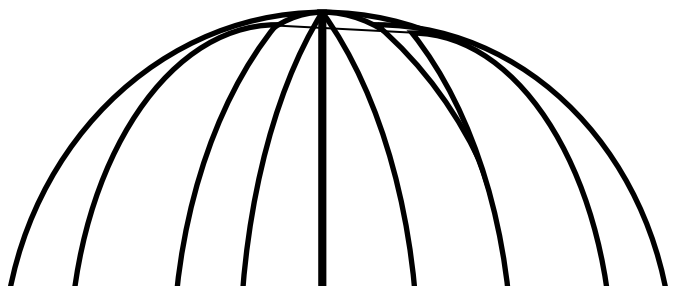
viiiThey are used for calculating distances

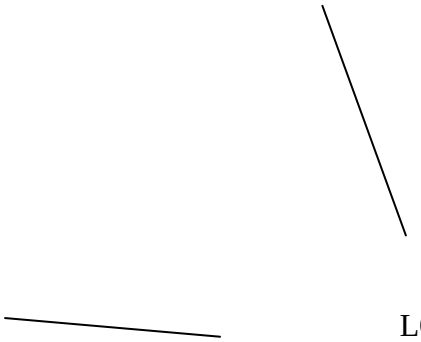
ix.They are used for locating places

x. They are measured north and south of the equation

xi. The equator is its reference or starting point.

LONGITUDE: This is the angular distance of a point on the earth's surface. They are also the imaginary lines running north-south direction passing through the poles. Lines of longitude are called meridians. The most important lines of longitude are the Greenwich Meridians 0^0 and International Date Line 180^0. There are 180^0 west and 180^0 east of Greenwich Meridian gives 360^0. As the parallel lines of latitude become shorter polawards, longitude become narrower polewards. Longitude is used to locate place on the world map and most important he calculation of local time in relation to Greenwich mean time.





LONGITUDE

LONGITUDE AND TIME: The earth's rotation determine the time of day or night at any place on the earth's surface. We have seen that the earth rotates from west to east moving through 360^0 of longitude in 24 hours or 15^0 in 1hour or 1^0 in 4 minutes. Each longitude has its own local time which is reckoned with reference to Greenwich Mean Time (G.M.T).

To the east of Greenwich Meridians, the time increases by 4 minutes for every degree of longitude. To the west of Greenwich Meridian the time decreases by 4 minutes for every degree of Greenwich Mean Time then, it is 11:56 am local time on longitude 1^0 w and 12: 04 pm on longitude 1^0 E. In other words, local time is 4 minutes behind Greenwich Mean Time longitude 1^0 w and 4 minutes ahead of the Greenwich Mean Time longitude 1^0 E.

EXAMPLES

Q1. What will be the time in Eritrea 60^0 E when it is 2:00 pm in Cameroun longitude 30^0E?

Eritrea 60^0 2hrs 2: 00 +

Cameroun 30^0 -- 15 $\overline{)30}$ 2: 00

---------- 30 ----------

30 4: 00 p.m. Ans

---------- ----------

Q2. What will be the time in Argentina longitude 70^0 W when it is 10am in Ghana 0^0?

Argentina $70^0$4hrs 40mins

Ghana 0^0-1570 10:00

---------- 60 - 4:40

70 ---------- ----------

---------- 10 × 4 5:20 am

---------- ----------

Q3. A football match between Liberia 20^0 W and Indonesia 150^0 E was played in Liberia on Thursday 15th October, 2005 at 7p.m. Calculate the (i) Time (ii) Day listen to the commentary of the match.

Indonesia 150 11hrs 20mins 7:00

Liberia 20 + 15 170 + 11:20

---------- 165 _____

170 _____ 18:20

---------- 5×4

Q4. What is the longitude of a town x where time is 5 am when longitude 45^0 E is 1 am

5 15 60

1 -- × 4 45 +

-----_____

$4^0$60 105^0 E

___ _____ _____

CHARACTERISTICS OF LONGITUDE

i. They are imaginary lines
ii. They are recorded in degrees
iii. They run north – south direction
iv. They pass through the poles

v. They are called meridians

vi. They are great circle paired together

vii. They are narrower towards the poles

viii. They have Greenwich as their starting point.

ix They are 360^0 altogether (180^0 W and 180^0E)

SIMILARITIES LATITUDE AND LONGITUDE

i. Both are imaginary lines drawn on the globe

ii. Both are recorded in degrees, minutes

iii. Both have starting points

iv. Both are for locating places on the map

v. Both are measured from centre of the earth

vi. Both have great circle..

WEEK FOUR AND FIVE

WEATHER AND CLIMATE 1

Weather is the daily condition of the atmosphere of a given place for a short period of time. In the same town, the weather can change greatly. The sun may be shining in one part of the town, but raining heavily a few metres or kilometres away. The science that studies weather is known as 'Meteorology'.

Climate on the other hand is the average condition of the atmosphere of a place over a long period of time (35 – 40 years). The science that studies climate is known as

climatology. To get correct and accurate climate of a place, there must be systematic observation and accurate recording of the various elements of weather and climate. Each climatic element has an instrument for the collection of data and record purposes, these are:

ELEMENTS	INSTRUMENTS
i. Temperature	Thermometer
ii. Precipitation	Rain gauge
iii. Humidity	Hygrometer
iv. Air pressure	Barometer
v. Suns Shine	Solarimeter
vi. Cloud Cover	Oktas
vii. Wind Direction	Wind Vane
viii. Wind Speed	Anemometer

FACTORS AFFECTING WEATHER AND CLIMATE

Climate differs from one area of the earth to another due to the following factors:

a. LATITUDE: Tropical latitudes where the sun is always high have hotter temperature than polar latitudes where the sun is generally low. These differences in temperature affect the climate in relation to the latitude.

b. CONTINENTALITY: The distance away from the sea affects the climate greatly. Land surface heats up and cool faster than sea surfaces. Therefore the sea warms coastal regions in winter but cools them in summer. The warming and cooling effects of the sea are felt in areas closer to the coast than the hinterland. More so, rain bearing winds drop more water in the coastal areas than in the interior or land.

c. ALTITUDE: This is the height of a place above sea level. The temperature reduces by 6.5^0 c for every 1000m of ascent. It is called normal lapse rate. High mountains have lower temperature than its bottom.

d. OCEAN CURRENTS: Warm currents keep surrounding lowlands warm. Cold ocean currents reduce summer make the coastal land dry.

e. PLANETARY WINDS AND PRESSURE BELTS: Tropical climates the winds have a cooling effect on night temperature. Pressure belts also have direct effect on wind because wind blows from areas of high pressure belts to areas of low pressure.

f. SLOPE AND ASPECT: Steep slope experiences more rapid change in temperature than a gentle slope.

g. CLOUD COVER: Cloud reduces the amount of solar radiation reaching the earth's surface and the amount of solar radiation escaping from the earth surface in to space.

h. NATURAL VEGETATION AND SOIL: The thick leaves of heavy forest cuts off much of the incoming sunlight energy. As a result, the forest temperature is cool and lower than that of the open ground. Light soils reflect more heat than darker soils which are better absorbers of heat.

TEMPERATURE

Temperature is the degree of heat and cold usually shown in degrees centigrade and Fahrenheit. Thermometer is the instrument used for measuring temperature. There are different types of thermometers as:

i. Minimum thermometer
ii. Maximum thermometer
iii. Dry bulb thermometer
iv. Wet bulb thermometer
v. Six's thermometer
vi. Clinical thermometer

A thermometer is made up of glass tube bulb, alcohol, mercury and an index metal. Alcohol and mercury are used because they can easily expand when hot and contract when cold. Temperature is commonly recorded in degrees centigrade (^{0}C) and degrees Fahrenheit (^{0}F). The centigrade degrees are divided in to 100 divisions, beginning with a 0^0 as its freezing point to 100^0 C as its boiling point. While the Fahrenheit has 180 divisions beginning with 32^0 F as its freezing point to 212^0 F as boiling point. It is possible to convert one scale to another. To convert degrees Fahrenheit to degrees centigrade, there are formulae as:

Change^0 F to ^{0} C

Formula = (^{0}F – 32^0) ÷ 9/5

OR (^{0}F – 32^0) ÷ 1.8

E.g. Change 59^0 F to ^{0} C

(^{0}F – 32^0) ÷ 9/5 = 27/1 × 5/9 = 15^0 C

(59^0 – 32^0) ÷ 9/5

$27^0 \div 9/5 = 27$

Change ^{0}C to ^{0}F

Formula = $(^0\text{C} \times 9/5) + 32^0$

OR $(^0\text{C} \times 1.8) + 32^0$

Change 25^0 C to ^{0}F

$(^0\text{C} \times 9/5) + 32^0$

$(25/1 \times 9/5) + 32^0$

$45 + 32^0 = 77^0$ F

WEEK SIX

THE POPULATION OF NIGERIA

Population refers to the number of people living within one geographical area at a particular time. In recent years, the population of Nigeria has been growing rapidly. Some areas are highly populated others are either moderately or sparsely populated.

THE DISTRIBUTION OF POPULATION IN NIGERIA

The distribution could be high, moderate or low

AREAS OF HIGH POPULATION DENSITY: Population densities are about 100 persons or more per square km. The major areas include:

i. The yaruba high areas of the south west part of Nigeria which include Ibadan (Oyo) Akure (Ondo) Abeakuta (Ogun) and Lagos State.
ii. The South East Region Calabar, Onisha, Enugu Owerri and Aba.
iii. In the northern States areas of high population dendities are Kano and Kaduna.

REASONS WHY SOME AREAS IN NIGERIA ARE DENSELY POPULATED

i. FERTILE SOIL: Farming as a major occupation of the people majority of them settles in areas where the soil is fertile.
ii. AVAILABILITY OF MINERAL RESOURCES: The presence of mineral resources has contributed to high population.
iii. COMMERCIAL ACTIVITIES: Many people settle in commercial centres in Nigeria.

iv. AVAILABILITY OF INDUSTRIES: Industries in places like Lagos, Warri, Port Harcourt, Ibadan, Kano and Jos, provide job for people.

v. PRESENCE OF SOCIAL AMENITIES: The existence of social amenities attracts many people.

vi. SEAPORTS: High concentration of population around seaports.

AREAS OF MODERATE POPULATION

The areas of moderate population density in Nigeria include the following states.

i. Most of Edo and Delta State

ii. Parts of Cross River and Rivers State

iii. Kaduna, Plateau and Benue State

iv. Kwara and parts of Benue State

The factors responsible for the moderate population densities include

i. Traditional/Cultural Factors

ii. Historical Factors

iii. Climatic Factors

iv. Soil Fertility

v. Agricultural Production

vi. Mineral Resources

vii. Commerce and Industry

vii..Relief

xi Transportation

AREAS OF LOW POPULATION DENSITY

The following are areas of low population density in the Northern part, places around Adamawa, Bauchi, Borno, Sokoto and Yobe State. The Middle belt areas of Niger, Abuja, Kogi, Benue, Kwara, and Plateau State.The Niger Delta areas of Delta, Edo and Rivers State, including the eastern part of Cross River State.

THE REASONS FOR THE LOW POPULATION DENSITIES IN THE ABOVE AREAS

i. SOIL TEXTURE: An area that has bad soil texture for agriculture will scare people away
ii. LACK OF SOCIAL AMENITIES: People do not like to settle in areas that have no social amenities.
iii. SLAVE TRADE: During the period of slavery many people deserted their communities.
iv. INTER- TRIBAL WARS: This type of war reduced the population of many areas.
v. NON – COMMERCIAL AREAS: Areas with little or no commercial prospects have sparse population.
vi. LACK OF INDUSTRIES: Many people move away from areas where there are no industries.
vii. TOPOGRAPHY: Bad topography is one of the factor scares people away from an area.

APPEDIX VI

STATISTICS FOR FINDING REABILITY

Pre- test and post -test reliability using PPMC Pearson Product Moment Correlation computed for the Reliability index for the instrument used in the pilot study of the research.

The formula for Pearson Product Moment Correlation is given below:

$$R = \frac{N(\sum xy) - (x)\sum Y}{((N(X^2) - (NY^2) - (Y)^2)}$$

N=Number of respondents

X is test scores at pre-test

Y is test scores at post- test

$\sum x$ is scores at pre-test is summed

$\sum y$ is scores at Post-test is summed

$\sum x^2$ is scores at pre-test is squared and summed

$\sum Y^2$ is scores at post-test is squared and summed

$(\sum x)^2)$ is scores at pre - test is summed and squared

$(\sum Y)^2)$ is scores at post test is summed and squared

Where:

N=30	**∑X=**347	**∑Y=416**	**∑X2=4321**	**∑Y2=6272**	**∑XY =5036**

Pearson Product Moment Correlation Formula is:

$$r=\frac{N(\sum xy) - \sum (x) \sum Y}{((N(\sum X^2) - (N*\sum Y^2)-(\sum Y)^2}$$

$$= \frac{30*5030 - 347*416}{30*(4321)^2 - 30*6727-(416)^2}$$

=.839

r=.84

Retention Pre - test and post - test reliability using PPMC

Pearson Product Moment Correlation computed for the Reliability index for the instrument used in the pilot study of the research.

The formula for Pearson Product Moment Correlation is given below:

$$R = \frac{N(\sum xy) - (x)\sum Y}{((N(X^2) - (NY^2) - (Y)^2)}$$

N=Number of respondents

X is test scores at pre-test

Y is test scores at post-test

$\sum x$ is scores at pre-test is summed

$\sum y$ is scores at Post-test is summed

$\sum x^2$ is scores at pre - test is squared and summed

$\sum Y^2$ is scores at post-test is squared and summed

$(\sum x)^2$ is scores at pre - test is summed and squared

$(\sum Y)^2$ is scores at post-test is summed and squared

Where:

N=30	**∑X=**427	**∑Y=441**	**∑X2=6685**	**∑Y2=6981**	**∑XY =6767**

Pearson Product Moment Correlation Formula is:

$$r=\frac{N(\sum xy) - \sum (x) \sum Y}{((N(\sum X^2) - (N*\sum Y^2)-(\sum Y)^2}$$

$$= \frac{30*6767 - 427*441}{30*(6685)^2 - 30*6981-(441)^2}$$

=.785

r=.79

APPENDIX VII

```
T-TEST GROUPS=treatment(1 2)
/MISSING=ANALYSIS
/VARIABLES=posttest
/CRITERIA=CI(.95).
```

T-Test

[DataSet0] C:\Users\umar\Documents\Aminu Musa's Data.sav

Group Statistics

	treatment	N	Mean	Std. Deviation	Std. Error Mean
posttest	1	38	11.92	3.858	.626
	2	38	12.05	4.242	.688

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
posttest	Equal variances assumed	.496	.483	-.141	74	.888	-.132	.930	-1.985	1.722
	Equal variances not assumed			-.141	73.343	.888	-.132	.930	-1.985	1.722

```
T-TEST GROUPS=sex(1 2)
/MISSING=ANALYSIS
/VARIABLES=posttest
/CRITERIA=CI(.95).
```

T-Test

```
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Group Statistics

	Sex	N	Mean	Std. Deviation	Std. Error Mean
posttest	1	38	13.21	3.520	.571
	2	38	10.76	4.175	.677

Independent Samples Test

	Levene's Test for Equality of	t-test for Equality of Means

		Variances								
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
posttest	Equal variances assumed	1.256	.266	2.763	74	.007	2.447	.886	.682	4.212
	Equal variances not assumed			2.763	71.943	.007	2.447	.886	.682	4.213

```
T-TEST GROUPS=treatment(1 2)
/MISSING=ANALYSIS
/VARIABLES=retention
/CRITERIA=CI(.95).
```

T-Test

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```

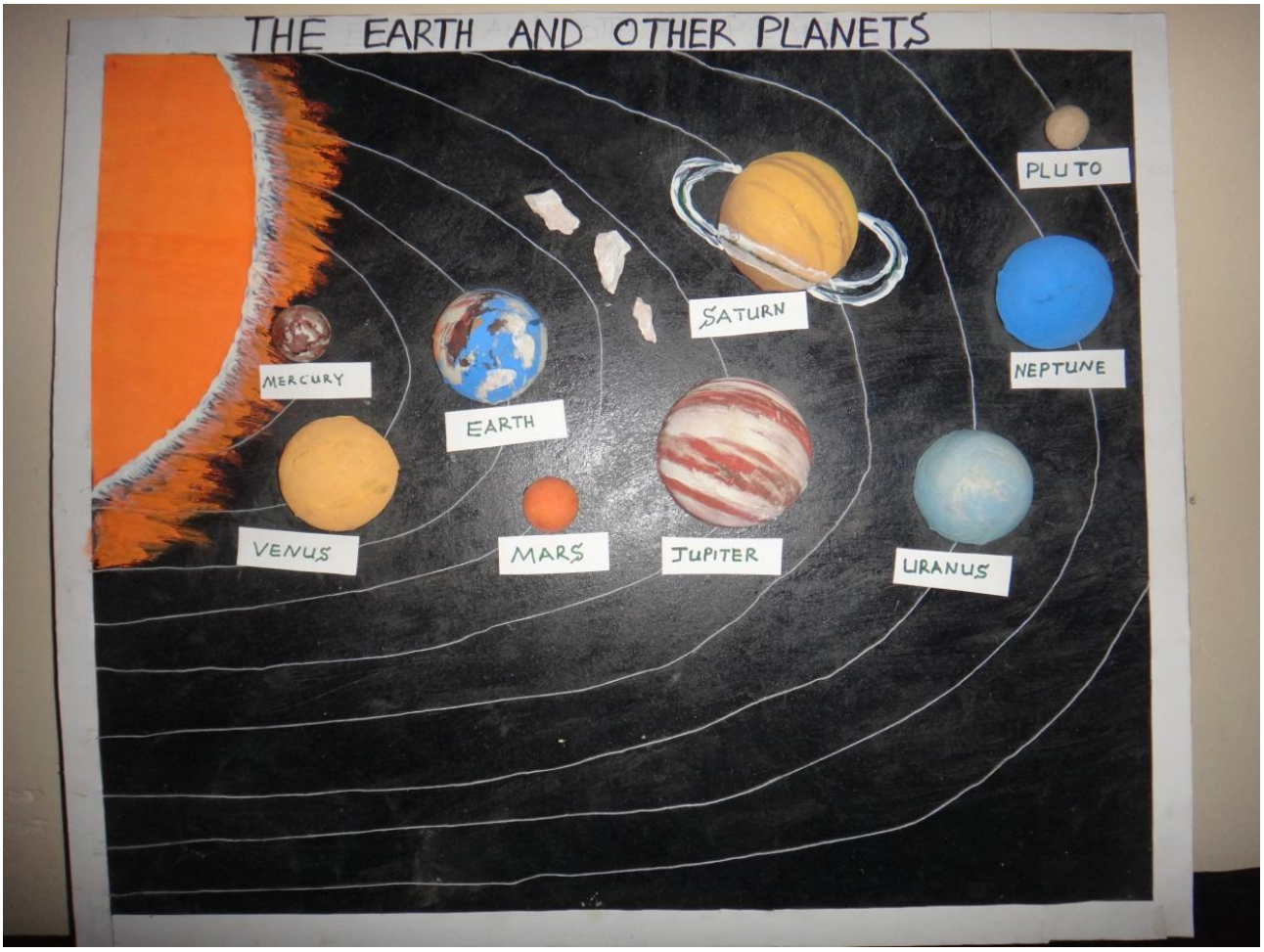
Group Statistics

	treatment	N	Mean	Std. Deviation	Std. Error Mean
retention	1	38	10.55	3.211	.521
	2	38	11.34	3.780	.613

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Retention	Equal variances assumed	1.867	.176	-.981	74	.330	-.789	.804	-2.392	.813
	Equal variances not assumed			-.981	72.114	.330	-.789	.804	-2.393	.814

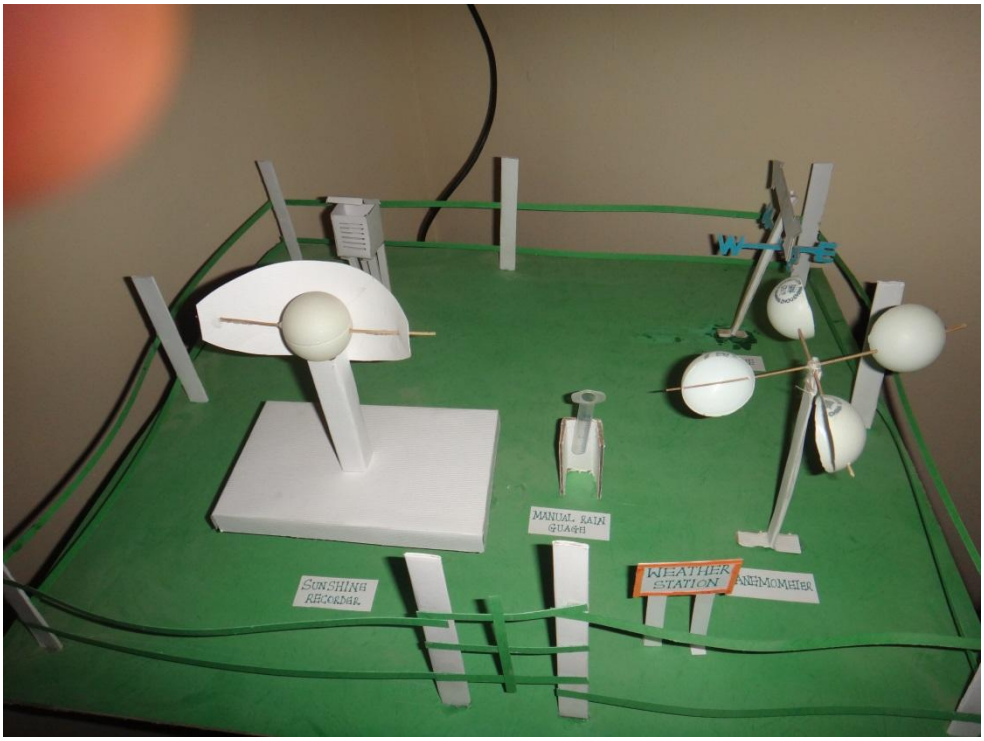
MODEL OF THE EARTH AND OTHER PLANETS



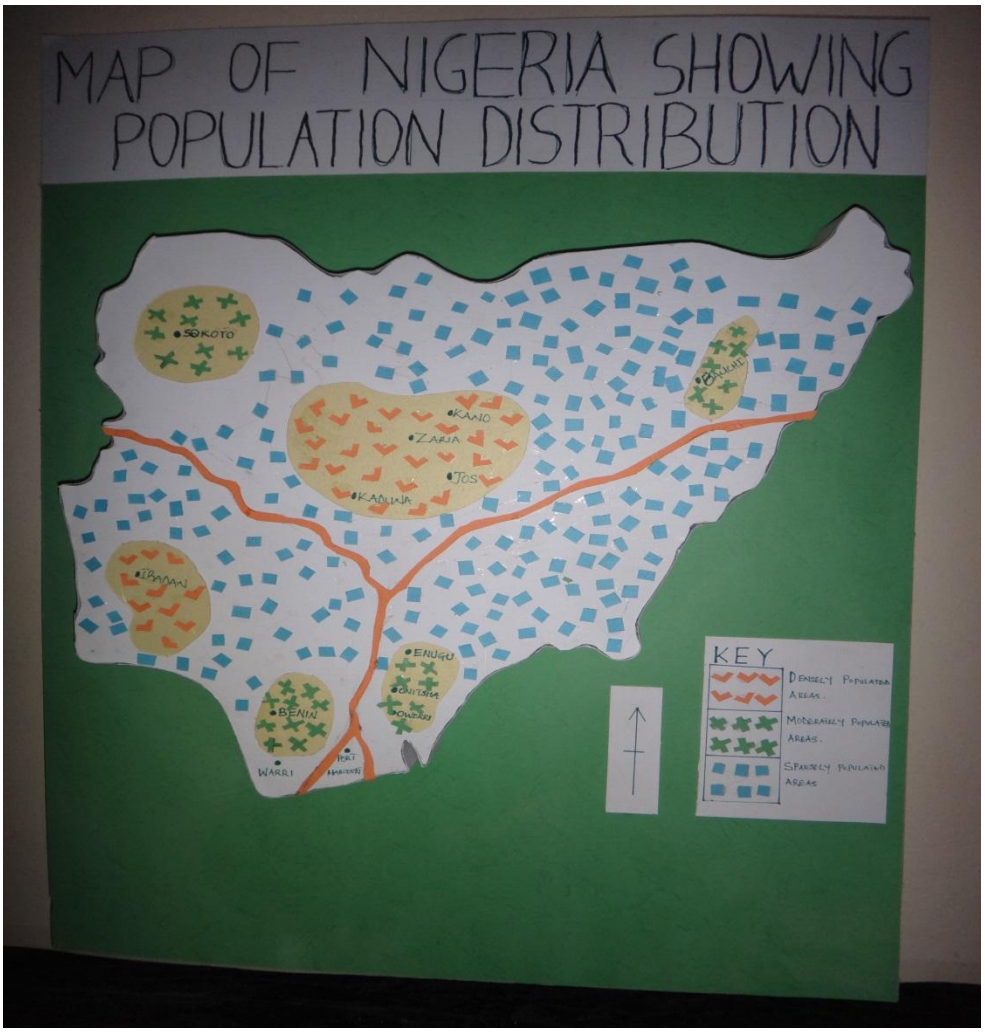
MODEL OF GLOBE



MODELS OF WEATHER STATION



MODEL OF MAP OF NIGERA SHOWING POPULATION DISTRIBUTION


MAP OF NIGERIA SHOWING POPULATION DISTRIBUTION
SOKOTO
KANO
ZARIA
JOS
KADUNA
BORNO
IBADAN
ENUGU
ONITSHA
OWERRI
BENIN
WARRI
PORT HARCOURT
KEY
DENSELY POPULATED AREAS.
MODERATELY POPULATED AREAS.
SPARSELY POPULATED AREAS