THE EFFECTS OF PROBLEM-SOLVING STRATEGY AND LECTURE METHOD ON SOCIO-CULTURAL BELIEFS HINDERING SCIENCE LEARNING AT THE JUNIOR SECONDARY SCHOOL IN FCT ABUJA

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DECLRARATION

I hereby declare this work in the thesis entitled “The Effects of Problems-Solving Strategy and Lecture Method on Socio-Cultural Beliefs Hindering Science Learning at the Junior Secondary School in FCT Abuja” has been written by me in the Department of Education under the supervision of Dr. (Mrs) S.B. Olorukooba and Dr. S.S. Bichi. The information derived from the literature has been duly acknowledged in the text and a list of references provided. No part of this thesis was previously presented for another degree at any university.

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CERTIFICATION

This thesis entitled "THE EFFECTS OF PROBLEM-SOLVING STRATEGY AND LECTURE METHOD ON SOCIO-CULTURAL BELIEFS HINDERING SCIENCE LEARNING AT THE JUNIOR SECONDARY SCHOOL IN FCT ABUJA by Dike Basilia Chidiebere meets the regulation governing the award of degree of Masters in Science Education Ahmadu Bello University, and is approved for contribution to knowledge and literary presentation.

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DEDICATION

This thesis is dedicated to Almighty God who granted me this rare opportunity to be in this institution and saw me through the programme. May His name be highly exalted and glorified. Amen.

ACKNOWLEDGMENT

I wish to express my profound gratitude to Almighty God for his un -quantified care, provision, protection and preservation of my life and that of my family members, and also to all those who have in one way or the other contributed to the successful completion of this venture.

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ABSTRACT

This study investigated the effects of problem solving strategy and lecture method on socio-cultural beliefs hindering science learning in some selected Junior Secondary schools in Gwagwalada Federal Capital Territory Abuja. It also investigated the extent the socio-cultural beliefs of students affected their academic achievement in integrated science. The sample was made up of one hundred Junior Secondary School one (JSS 1) students randomly selected from two co-educational public secondary schools. Six Null Hypotheses were tested in this study. The pretest posttest quasi experimental design was used for data collection. Two instruments were used for collection of the data the Social Cultural Beliefs Scale (SCBS) and Integrated Science Achievement Test (ISAT). The SCBS was a 40 – item questionnaire and ISAT a 40-item achievement test. The data were analyzed using Wilcoxon signed ranking statistics, t-test and spearman rank statistics at $P \leq 0.05$ level of significance. The major findings obtained from the study were.

- There was significant difference in pre and post test mean scores of the students in socio-cultural belief scales when taught integrated science using problem solving strategy.
- There was significant difference in the mean scores of students in Socio-Cultural Beliefs of those taught using problem solving strategy and those taught using lecture method.
- There was significant difference in the mean scores of male and female students in their academic achievement when taught using problem-solving strategy.
- There was significant relationship between students academic achievement in science and their performance on SCBS after exposure to problems solving strategy. The result indicated that experimental group students had their socio-cultural beliefs reduced by the use of problem – solving strategy.

Based on these findings; the following recommendations were made:

- Problem of solving strategy should be encouraged in the teaching and learning integrated science.
- Science teachers should be aware of socio-cultural beliefs of students and relate to students preconception before teaching science concept.
- Science curriculum planners should include courses that will provide scientific explanations to natural phenomena observed in Africa society.

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OPERATIONAL DEFINITIONS OF TERMS

Socio-Cultural beliefs: refers to social behaviors, beliefs, customs norms and values that guide the affairs of a particular society.

ABBREVIATIONS USED

AAAS	-	American Association for the Advancement of Science
F.C.T.	-	Federal Capital Territory
GIST	-	Girls In Science and Technology
ISAT	-	Integrated Science Achievement Test
NISP	-	Nigerian Integrated Science Project
SAPA	-	Science A Process Approach
SCBS	-	Socio Cultural Belief Scale
STAN	-	Science Teachers' Association of Nigeria
U.S.A.	-	United States of America
WAEC	-	West Africa Examination Council
WISE	-	Women In Science Education

CHAPTER ONE

THE PROBLEM:

1.1 Introduction

The relevance of science to humanity in giving mankind the ability to explain everyday phenomena and develop technologically cannot be overemphasized. In this 21st century when the whole world is fast becoming a global village, the study of science and technology becomes mandatory. This is because the growth of any nation economically, socially and politically is determined to a great extent by its advancement in science and technology (Okafor, 2002). In the field of science education, there has been a great concern globally and especially in developing countries about the role and effectiveness of the teaching of science in schools at all levels. In the last few decades, this concern has resulted in a number of significant developments both in methods of teaching and in content and structure of the curriculum (Gbodi, 1998). The world really is growing scientifically and technologically at a very fast rate, yet the failure rate in science examination in our schools continues to be on the increase (Samba 1998, Gbodi and Laleye 2006).

Science educators therefore advocate for changes in instructional practices that would take cognizance of students pre conceptions (Cleminson, 1990). These preconceptions denote the ideas students bring into the classroom before teaching is done (Oyedokun, 1998). The pre conceptions held by students often times are the social-cultural beliefs of the society the students are exposed to. This

implied that their prior knowledge with its cultural basis would be a 'handicap' in their learning of science Cameron (2007), since western science presents scientific explanations which clash with the previously held beliefs of these students. This is in support of Wasagu's observation that for several years now, scientific knowledge has not been an integral part of African social life because the minds of many Africans are loaded with power of witchcraft and superstitious beliefs in providing explanations to natural phenomena (Wasagu, 1999). Nigeria like any other society that is scientifically illiterate has some unscientific explanations to natural occurrences (preconceptions) that are in conflict with the learning of modern science by students. (Aikenhead 1997, Jegede, 1997).

There are so many socio-cultural beliefs (preconception) in Nigeria that run contrary to what science teaches. An example of this is the appearance of rainbow, which the socio cultural beliefs explains it to mean that python is giving birth to a new baby, while science explained it to be refraction of light rays by the droplets of water. This is in contrast to traditional cultures, which are said to have anthropomorphic world view that is holistic and links the spiritual and the physical Ogunnyi (2002). Modern science is also regarded as having a mechanistic world view associated with dualism (Ogunniyi, 2002). The dominance of either of these worldviews in any society is dependent on the socio-cultural structure of such a society. The fact is that every human tends to resolve puzzles in terms of the meanings available in a particular society (environment). This baseline meaning

is firmly rooted or implanted in the cognitive structure and manifest habitually and may act as templates, anchors or inhibition to new learning. (Ogunniyi, 1988).

Jegede and Aikenhead (1999) in their studies on altering socio-cultural beliefs hindering the learning of science, found that authoritarianism, African world view, societal expectation and sacredness of science had negative effects on the learning of science in Nigerian classrooms. It has also been observed that an African child is practically operating in mental dualism theory. The African traditional culture and western science culture (Ogunniyi, 2002). Since western science presents scientific explanations that is different with preconceived beliefs of these students "collateral learning and cultural border crossing becomes necessary (Cameron, 2007).

Therefore, the concept of "cultural background" and 'social groups' cannot be divorced from environmental education (Fujita, Kaiser, Shimizu, Yoshioka, 1999). Culture has a great influence on learner's cosmology as well as differences in achievement in school work. This is so because every society educates its younger generation as a way of passing down, the socio-cultural attributes of its people. The socio-cultural factors within that society now becomes a composite part of that environment (Okebukola and Jegede, 1990). Ogbu, (1992) supported this view when he stated that school learning and performance are influenced by complex social, economic, historical and cultural factors.

Researches by Jegede, Fraser and Okebukola (1994) have shown that students socio-cultural beliefs (preconceptions) can be tackled if appropriate teaching method is used. In Nigeria, the kind of science taught in schools as at 1950's was that which emphasized the acquisition of factual knowledge, the curriculum, which was not redesigned to take into considerations socio-cultural and cosmological background of African learner. However over the last few decades as people understand that "science has become an international currency for national and global technological, development', there is now shift of focus in science education to cognition (Cameron, 2007). Again the Science Teachers' Association of Nigeria (STAN) by the successful introduction of integrated science project into Junior Secondary Schools was concerned with teaching of science through inquiry and discovery. This is an approach in which students come to understand and develop concepts by investigating and experimenting on their own (Omolewa, 1977).

Tobin, (1986) and Ivowi (1994) observed that there is need to adopt activities based instructional method so that student would be able to learn more, retain more and apply what is learnt by engaging in significant activities. Bichi (2006) noted that instructional methods that make the learner active (activity based) tend to yield more positive learning experiences while those methods in which the learner is passive tend to promote rote learning. In his study of different methods of teaching science in secondary schools in Nigeria, Ajewole (1991) observed that rote learning is one of the major factor preventing

effective science learning in Nigeria. Science is an inquiry oriented subject which requires the use of various instructional strategies to effectively teach it. Problem-solving method is one of the methods found to be effective in science teaching (Awodi 1984; Bichi 2002). This is because problem-solving instructional strategy combines the advantages of several other teaching methods (activities based) since it encourages inquiry, gives room for discovery, facilitates process skills, leads to acquisition of knowledge and science learning. etc.

Another conspicuous phenomenon for reform in science instruction and learning is the issue of gender-related differences and socio-cultural beliefs. This simply means that science educators should embark on a science programme that will enable every child to participate actively and learn maximally irrespective of gender, social background and ability. Samba (1998) observed that gender-related differences could be related to three areas namely social, educational and personal social factors includes gender-role model, orientation and gender-stereotyping. Balogun (1994), identified psychological, biological and cultural factors as sources of gender differences in Science Technology and Mathematics (STM) advancement and possible decline in performance of girls. Mari (2005) in his studies revealed differences in gender related differences in acquisition of science process skills. In his study, female subjects performed significantly better than their male counterparts in science process-based tasks, which is an indication that female subjects may learn

science better if process-based instructional strategy is adopted in teaching/learning of science.

Many studies have been carried out on socio-cultural influences on the learning of science at senior secondary school level. Some of such studies are; Scientific Knowledge and Cultural practice, Implication for non-science culture (Biamba, 1993). The Relationship between science students cultural belief and their academic achievement at the secondary school level (Wasagu 1999).

This study was used to find out how problem-solving strategy can be used to determined the effects of socio-cultural beliefs (preconceptions) that have been found to hinder the learning of integrated science at junior secondary schools level.

1.2 Statement of the Problem

How to improve students' performance in sciences has been one of the problems confronting science educators and science teachers alike. The rate of failure of students in the sciences is still very high hence most students prefer studying social sciences and art subjects. But a developing country like Nigeria needs more trained man power in the sciences in order to improve its technological base. It has been said that science is the bedrock for the development of technology. Yet most students dread the subject, perceiving it as something foreign and difficult to understand. Thus science taught in the classroom usually appear to them as western magic. This could be due to socio-cultural beliefs they are holding prior to coming to school. These

socio-cultural beliefs according to Novak (1988) Jegede and Okebukola (1994) hinders the learning of science which eventually leads to students poor performance in science.

In an effort to find solution to the causes of failure rate of students in science subjects, the study investigated the following questions.

- Can elimination of students socio-cultural beliefs improve their academic performance in science?
- Can using problem-solving strategy that involves practical activity to teach student science concept enhance their academic performance?

More so, it was an attempt to bridge the gap between the students' everyday life-world (socio-cultural beliefs) and school science world. It was also to make students see meaning in the learning of science which they perceive as foreign magic or culture. All these, prompted the researcher to use this problem-solving strategy on socio-cultural beliefs of students to see if meaningful learning of science will prevail, thereby improve the students academic performance in science subjects. So this study seeks to compare the effect of problem-solving strategy and lecture method on socio-cultural beliefs hindering the learning of integrated science at Junior Secondary Schools.

1.3 Research Questions

This research is set out to find answers to the following questions:

1. What is the effect of problem-solving strategy on students' Socio Cultural Beliefs?
2. What is the effect of problem-solving strategy and lecture method on the performance of students in Socio-Cultural Belief Scale?
3. What is the effect of problem-solving strategy and lecture method on the academic performance in the Integrated Science Achievement Test (ISAT)?
4. What is the effect of gender on Socio-Cultural Belief Scale (SBCS) of student taught using problem-solving strategy?
5. What is the effect of gender on the academic performance in ISAT of student taught using problem-solving strategy?
6. What is the relationship between students academic achievement in science and their performance on Socio-Cultural Beliefs scale after exposure to problem solving strategy?

1.4 Null Hypotheses

From the research questions the following null hypothesis are formulated for testing.

Ho_1 There is no significant difference in pre and post test mean scores of students in Socio-Cultural Belief Scale when taught integrated science using problem solving strategy.

Ho_2 There is no significant difference in the mean scores of students in Socio-Cultural Belief when they are taught using problem-solving strategy and lecture method.

H_{03} there is no significant difference in the mean scores of students in ISAT when taught integrated science using problem solving strategy and lecture method.

Ho_4 There is no significant difference in the mean scores of male and female students in their Socio-Cultural Beliefs Scale (SCBS) when taught integrated science using problem-solving strategy.

Ho_5 There is no significant difference in the mean scores of male and female students in their academic performances in ISAT when exposed to problem-solving strategy.

Ho_6 There is no significant relationship between students academic achievement in integrated science and their performance in socio-cultural beliefs after exposure to problem-solving strategy.

1.5 Objectives of The Study

The purpose of this study is to investigate the effects of problem-solving on the socio-cultural beliefs hindering the learning of science. Specifically, the study intends to:

- To find out the effect of problem-solving strategy and lecture method on the socio-cultural beliefs of junior secondary students in the learning of science.

- Find out if there is any difference between the socio-cultural beliefs of male and female students when taught using problem-solving strategy.
- Find out if there is any relationship between the academic achievement and Socio Cultural beliefs of students in integrated science after using the problem-solving strategy to teach them.

1.6 Significance of the Study

Despite the out cry of Nigerians towards scientific and technological advancement over many decades and with implementation of series of policies targeting science for all, the minds of many Nigerians are still dominated by socio-cultural beliefs (Jegede and Okebukola, 1993).

The findings of this study will hopefully be beneficial to the upliftment of science education in general as follows:

- It will expose the science teachers to effective use of activities based instructional strategies especially problem-solving strategy, in science teaching in solving problems on socio-cultural beliefs.
- It will expose some preconceived socio-cultural beliefs of the students to the teachers thereby helping them to provide reasonable scientific explanations to these beliefs which will enhance students effective learning of science.
- It will provide to the students scientific explanations to their preconceived ideas and erase from their minds all those

hindrances or inhibitors to science learning and lead them into excellent academic performance.

- It will provide researchers in science education empirical evidence on effects of problem-solving strategy in relation to socio-cultural beliefs.

1.7 Basic Assumptions

In Nigeria as well as Africa in general, science learning/teaching has been affected by socio-cultural beliefs. This is as a result of conflict between school science and socio-cultural belief ways of giving explanations to natural occurrences. All students in various schools in Nigeria come from this type of background with these socio-cultural beliefs. Therefore the basic assumption is that Socio-cultural beliefs (preconceptions) exist among students and this may negatively affect their learning of science effectively.

1.8 Delimitation of the Study

This study is limited to J.S.S. 1 Students of the Junior Secondary Schools owned by the government in Gwagwalada Area Council of Abuja FCT. These schools are staffed, maintained, managed and funded by the Ministry of Education, so educational facilities available to the schools are similar.

The reason for using JSS 1 is that these students are fresh in the secondary school system and their minds are still loaded with many socio-cultural beliefs. It is an effort to debase from the students

mind these socio-cultural beliefs early enough before it becomes/forms an inhibitor for their futures learning of science.

CHAPTER TWO

REVIEW OF LITERATURE

2.0 Introduction

The purpose of the study is to determine the effect of problem-solving strategy and lecture method on socio-cultural beliefs hindering science learning at Junior Secondary School level. In this chapter, the literature review will be presented under the following subheadings:

- **The Concept of Science**: Its Meaning, Importance of Science and Technology in Global Development.
- Socio-Cultural Beliefs (Preconceptions) and Science Learning.
- Conflicts Between Socio-Cultural Beliefs and Science Learning.
- Socio-Cultural Beliefs (Preconceptions) and Students' Performance in Science.
- Integrated Science Programmes
- Problem Solving Strategy
- Lecture Method
- Some Instructional Strategies Available For Science Teaching.
- Gender and Socio-Cultural Beliefs
- The Effect of Instruction on Adaptation of Science Culture.
- Review of Related Literature.
- The Implications of Literature Review to the Present Study.

2.1 The Concept of Science: Its Meaning, Importance of Science and Technology in Global Development

The concept "science" has been defined by several people in various ways, notably Tgusi (1992), Gbodi and Laleye (2006). Thus the definitions vary according to individual perspectives. Primarily, all definitions of science must include the three components, of science i.e.

i. the product content made up of facts, principles and laws of science.

ii. Process of science: Methods of Gathering the (facts), data analysis, synthesis and disseminating information.

iii. Ethics – Attitude of science: Curiosity, open mindedness, honest, creativity e.t.c.

Tguisi (1992) defined science as the knowledge based on classified facts, knowledge devoid of superstition, emotion and sentiments, it is a rational procedure for arriving at the truth. Science refers to a system of acquiring knowledge. This system uses observation and experimentation to describe and explain natural phenomena. The term science also refers to the organized body of knowledge people have gained using that system. Less formally, the word science often describes any systematic field of study or the knowledge gained from it.

Science in whatever way one looks at it, involves the training of mind to understand nature which also leads the individual to the

acquisition of skills and some degrees of competence to live effectively in the modern society.

Science has two main divisions; pure science and applied science. Pure science are the changing body of facts and principles of science while applied science is the application of scientific knowledge to the service and longevity of human existence otherwise known as technology (Gilbraith, 1977). Technology is the application of scientific knowledge to provide solution to human problems.

The importance of science to individual in particular and to the society cannot be overemphasized. It is the foundation upon which the bulk of present technological breakthrough is built. According to Abdullahi (1982) technology has no legitimate purpose but to serve man and to lead to better easier living conditions. What this means is that science has contributed to the high standard of living and also in making mankind dominant and controller of his environment.

Scientific discoveries and their application in industry, medicine, communications, agriculture and war has brought great changes in the lives and culture of individual in various societies. In the field of Agriculture, science has tremendously increased crop production. With the advent of science and technology a farmer can combat all adverse conditions, leading to higher yield such as effective soil management by farmers, ploughing machines, tractors and harvesters which has increased crop production, development of hybrids crops, genetic engineering, through selection of disease – resistant crop, use of fertilizer which provide essential nutrients to

crops, irrigation, pesticides, herbicides, fungicides and insecticides, etc. All these agrarian reformation was brought about by scientific revolution. (Ango 1981).

The present age has rightly been referred to as the age of science and technology. In the realm of communication, the use of telephone, Global System for Mobile telecommunication (GSM) that is mobile phones, satellites and others have improved the living conditions of man. Traveling at supersonic speed has become universal. Man has learnt to transport himself from the earth against gravitation force towards other planets. Remarkable progress has been recorded in the medical realm. It has been possible to rejuvenate man by the process of tissue transplantation and the substitution of weak organs with artificial organs. Certain manipulation of operations in industries has been revolutionized through computerization and the use of robots e.t.c (Gbodi and Laleye 2006).

From all these importance of science, one can say that science and its applications technology is a reliable tool for future development of any nation.

The numerous benefits of science can be summarized as follows:

- Increase in food production through the application of machinery power: tractors, harvesters, use of fertilizers, pesticides and herbicides, hybridization and modern processing techniques.

- Increase in life span: brought about by good medical care, sufficient food supply, pharmaceutical and sanitation vaccine and other revolutions.
- Reduction in the cost of manufacturing commodities through the use of machines.
- Great improvement in literacy and educational level.
- Increase in conveniences and global communication.
- Changes in the structure of social class (Martins 2001).

The question that comes to peoples' mind is "Is science amoral?"

Powerful countries, in terms of accumulation of massive weapons of destructions are a threat to others for example, America's invasion of Iraq. Nuclear weapons apart from massive destruction have long term effect of causing diseases like cancer and deformities in children. Environmental pollutions due to pollutants from weapons industries factories, etc. can lead to diseases. The use of stem cell from the foetus to regenerate new organs in adult thereby terminating the life of unborn babies. This means restoring of life of an adult through destruction of life of unborn babies. ultra-violet ray from frequent exposure to radiation in medical therapy have side effects of causing burns to the skin, damaging of living tissues in some skin cells and skin are also destroyed (Pauling 1991).

Despite all these shortcoming of science and technology, science is not amoral. It has done more good than harm in the sense that science and technology have greatly improved health care, reduced mortality rate and increased life expectancy. We are living in a world

where science and technology have become integral part of the world's culture and any country that overlooks this significant truism does so at his own peril (Fafunwa, 1974).

2.2 Socio-Cultural Beliefs (Preconceptions) and Science Learning

According to http://www.sciencemadesimple.com/(2007) culture is the accumulated habits, attitudes and beliefs of a group of people that define for them their general behaviour and way of life. It is also the total set of learned activities of a people. Similarly the cultural beliefs are the sum total of the people's way of life, their skills, experience, value, desires and degree of fulfillment over the years in their effort to conquer their environment to the best of their abilities and to their greatest advantages (Okon 1984).

The concept of "cultural background" and "social groups" therefore cannot be divorced from environmental education (Fujita, Kaiser, Shimizu, and Yoshioka, 1999). Culture has a great influence on learners cosmology. This is because every society educates the younger generation to pass down socio-cultural attributes (preconceptions) of its people. The socio-cultural factors within that society become a composite of the environment. These factors control, to very large extent, what a child in such environment learns and what he/she becomes in later life (Jegede 1997). Jegede and Okebukola (1993) also noted that the values of a youth is influenced by the cultural systems in which they are reared as a result the

individuals begin to value and appreciate the socio-cultural beliefs, customs myths e.t.c within that traditional society which regulate their every day life and consequently govern their view of natural phenomena.

The prevalence of illiteracy and ignorance in our society particularly in rural areas, has created a situation favourable to the maintenance of their mode of thinking. The issue of philosophical and religious beliefs is rooted in the African community Nigeria inclusive. The role of deity and the existence of socio-cultural beliefs, taboos and superstitions are planted in the mind of African child before formal schooling begins. (Ogunnniyi 1988; Jegede and Okebukola 1988, 1989; Jegede 1989). These values and beliefs system strongly influence attitudes, thoughts and behaviour and consequently the desire to study and learn science by students, their understanding of science and their ability to apply it to both within and outside school Jegede and Okebukola, (1993). Life in most rural communities are characterized by different types of diseases, penury and ignorance which are attributed to unscientific explanations. For example, thunder and lightening rainbow and rain, the sun, the stars and the moon, the rivers and the land the trees of forest are all believed to have supernatural powers. Rainbow is believed to be a sign of torrential rainfall by Nupe people. Among Igbos Rainbow is 'Ahajioku', god of crop yield, which when provoked brings crop failure. The Langtang tribe in Plateau worship god of water that brings rain. Abimbola (1977).

A look at African traditional beliefs will reveal the extent to which Africans subjected themselves to the forces around them. Indigenous African religion is described as monotheism because there exist other powers deity and authority which are regarded for practical purposes. For instance Stone (1965) observed that some communities hold the pervasive view that all events in nature from the growth of a seedling to the harvest of crops are strictly controlled by gods, a god being specific for an event. To such traditionalists, the poor performance of a child in school, lack of rain, attack of small pox, malaria and diarrhea express the mood of some gods. To them any other explanation is scornful. It is also the belief in some circles that improved productivity in plants does not depend solely on the use of fertilizer and other artificial agents but on the activities of some agents of supreme god (symbolized by animate and inanimates like trees, mammals and birds, rocks, stones, water, etc.). These agents are consulted and appeased by way of sacrifices. These factors, stone suggested can affect students learning of biology / science in so far as they are related to difficulties in understanding of science concepts.

There also exist the issue of witchcraft in Nigeria and African world view. According to Mbiti (1969) “witchcraft is a term used more popularly and broadly to describe all sort of evil employment of mystical power generally done in a secret fashion. African societies (Nigeria) do not draw academic distinction between witchcraft, sorcery, evil magic and others in employing mystical powers to do harm to someone or his belongings”. So among Africans death of children,

crop failure, ruined fortune and sickness especially epidemic, all are attributes to witchcrafts.

On the other hand the issue of magical thinking, which assumes symbols can be manipulated to produce an effect on things they symbolize. Mbiti (1969) define this magic as an attempt on the part of man to tap and control the supernatural resources of the universe for his own benefit. According to him two types of magic exist, 'good and evil' magic. Good magic is used for protection against unseen forces while evil magic is the believe and practice of tapping and using the power of magic to do harm to human being or his properties. The general implications of these to life are the need for man to seek for succour, deliverance and mastery over circumstance surrounding him from power greater than himself. Religion and magic becomes the course through which human beings seek to attend his achievement goal of his effort and ambition in life. So traditional medicine which concerns with restoration and preservation of health has magical influence in it. These magic elements or influence in traditional medicine is shown from the procedure the priest doctors follow when administering the traditional medicine with strict rule over which depends its effectiveness. These traditional priest doctors also claim that they are taught medicine by divinities during illness, in trance or dreams, etc. (Abimbola 1977).

It is this tendency in African world views to give explanations in terms of supernatural powers and the actions of such powers that marks them distinctly off from what is known as scientific or western

world views which gives explanation of events from scientific principles, laws and theories. Children from this type of background are found in most of our schools in varying numbers with these preconceived ideas stamped in their minds.

Other predictors of socio-cultural beliefs (preconceptions) on the learning / teaching of science in Nigeria are Authoritarianism goal structure, societal expectation, and sacredness of science and traditional world view (Jegede and Okebukola 1989; 1990; 1991; 1993).

Authoritarianism – The traditional (African) society has the belief that the older person have been exposed to more life experiences, and so should be in a better position to appraise a situation and pass 'correct judgment'. The society frowns at a situation where the elder's point of view is challenged or questioned by the younger. The elders asserts authority in decision-making while the younger individuals will accept without questioning the directives passed down to them by the elders. This locus of authority of knowledge is transferred into the science classroom where science teacher is seen as the elder by the students as someone who 'knows all in matters relating to scientific facts, processes, principles, and laws. Based on this view students / learners hardly display the urge to ask questions in science class. When forced to say their opinions, some believe science has very little or no relationship with their own real life. Others think the study of science is weird. It is a special activity that require some magical and supernatural explanations.

More so traditional society is marked with cooperative goal structure that is, there is the existence of a high interdependence among the individuals working toward the same set goal. This is contrast with the individualistic competition orientation that school portrays to learners of science. Societal expectations play a pivoted role in the learning of science. This is because the success of individuals within a community is developed and interpreted through the nature of their interaction within a communal society. The behaviour of members in the community is governed by the behaviour of the larger community. Hence, a school child always reviews his or her achievement in school as a reflection on home, friends and community. Therefore knowledge learnt through school science and traditional environment is compartmentalized and drawn upon to explain any phenomenon, depending on the particular situation. Rarely does a science student attempt to use school science knowledge to explain a phenomenon within a traditional environment. There appears to be a harmonious co-existence of this two different knowledge in the long term memory (part) of a learner's cognitive structure. The result of this is that any western science curriculum in a non-western classroom environment which does not take particular consideration of the traditional world view (preconceptions) risks destroying the framework through which concepts are likely to be interpreted. Moreso a student might perform excellently well in a western science classroom without imbibing or being enthusiastic about displaying the associated values and attitudes. This 'good'

scientist at school can at home be a 'traditionalist' without any feeling of cognitive perturbation or dissonance (Okebukola and Jegede 1990).

2.3 Conflicts Between Socio-Cultural Beliefs (Preconceptions) And Science Learning

Introduction

Cultural heritage exist in African countries as a whole which conflicts with school science/western science. This western science originates from the western countries. As a result student from non-western culture perceive school science as foreign culture, different from African culture, therefore difficult to understand.

Wasagu (1999) defines that "In Africa the various conceptions of knowledge are strongly tied to the culture and traditions of the people. Explanations of natural phenomena (scientific knowledge) often conflicts with accepted knowledge in science. Much of these preconceived or erroneous explanations and views have their roots in family held beliefs of the African world".

Preconception refers to the ideas students hold of the scientific concepts to be taught. One of the major influences of science education identified by students in developing countries is their feeling that school science is like a foreign culture to them (Maddock 1981). Their feelings stems from fundamental differences between the culture of western science and their indigenous culture (Jegede 1995, Aikenhead 1997). The fortunate thing is that many students from industrialized countries share this foreignness too (Costa 1995,

Aikenhead 1996). This cultural clash between students life world and the world of western science posses challenges to science educations who postulates science for all. The clash also define an emerging priority for 21st century to develop culturally sensitive curricula and teaching methods that will reduce the foreignness felt by students / learners.

Learning leads to a change in behaviour and attitudes. A learner who is not positively disposed to or has socio-cultural background that is indifferent to learning science in the classroom would find it difficult, if not impossible to learn science effectively. Science, as a way of knowing, is contextual and are based on a western world view which mechanically looks at the world from an inductive methodology and ascribes ontological status of reality to ideas. This world views contrast the African world-view in which the world is perceived as holistic with no epistemological separation between a cognizing person and the object to be learned. The indigenous world view professes a strong and intimate link of people to the natural world in which theories and myths are based on an anthropomorphic model. A very serious implication of this is that students bring to science classroom knowledge derived from their world-view as the basis for understanding the science taught in the classroom (Jegede 1994). The epistemological framework based on the anthropomorphism African students bring into the classroom, creates cognitive problems which need to be addressed for them through meaningful learning of science. From all these presentation

one dictates that what the students learn in science classroom is governed by the particular world-view (preconception) held by the learner. It becomes necessary to provide empirically based information on the influence of specifically tailored instruction on socio-cultural attitudes (beliefs) (preconceptions) of learners (Jegede and Okebukola 1990). Hence this research which deals with the effect of problem-solving strategy on socio-cultural beliefs hindering the learning of science fit in.

2.4 Socio-Cultural Beliefs (Preconceptions) and Students' Performance in Science.

Despite all emphasis given by the government to science teaching in the last few decades, there is still a growing concern and a lot of criticisms against mass failures and low achievement in science subjects among students in our various school levels. (Samba 1998). This shows Nigeria as a country is still far from achieving its desired educational goals of being a scientifically literate society and science for all by 21st century. Aikenhead (1997) attributed this deficiency in science achievement and attainment of excellence to the mediating effect of socio-cultural factors.

Several studies in Nigeria and other African countries have attributed poor performance in science by students to socio-cultural beliefs (Jegede and Okebukola 1990). Glasser (1991) asserts that cognitive activity (in school and outside) is inseparable from its cultural milieu. This also has been supported by anthropologist like

Ogbu, (1992), who stated that school learning and performance are influenced by complex social economic, historical and cultured factors. Wasagu (1999) in his studies observed a growing concern and a lot of criticisms against mass failures and low levels of achievement in science in spite of the emphasis given to science teaching in recent years. Others such as Bajah and Okebukola (1984) and Akpan (1994) have drawn attention to the misfit between science taught in schools in Nigeria and African culture as one of the reasons for poor performance in science among African students. (Wasagu 1999) reported in a position paper by STAN, in which they further confirmed that cultural beliefs are actually among some of the major causes of poor performances in science, technology and Mathematics education in Nigeria.

More so, in recent time, it has become an acknowledged factor among science educators in Nigeria and in other African countries that conflict between African tradition and western science is an important factor that determine the achievement of African students in Accra Ghana (Bajah, 1981: Ogunniyi, 1981, Jegede and Okebukola, 1991, Jahoda, 1970: Akpam, 1991; Anamuah and Akpan, 1992). They further stress that the way students perceive science and the associated conflicts between science and students cultural beliefs during learning seem to affect their performances to a large extent.

These preconceptions have been found to affect pupils interpretations of their science activities, inhibiting learning, and determining how any new information is systematically selected,

interpreted and finally incorporated into the learner's existing cognitive structure. They can also be resistant to changes on account of traditional instructional approaches Luin and Burbulas, 1988, if these pre-conceptions of the students are ignored, little can the learners be helped to learn and if conceptual understanding is desired, then, issues of pre-conceptions need to be addressed since they are always operative in any meaningful learning (Smith, 1994).

2.5 Integrated Science Programmes

Integrated science also called combined science or unified science comprises of all science subjects Biology, Chemistry, Physics and Agricultural Sciences. School Science is offered as primary science or integrated science in primary and junior secondary school level and as Biology, Chemistry, Physics, and Agricultural Science in Senior Secondary School levels. Gbodi and Laleye (2006).

The Nigerian integrated science project (NISP) was the first in the series of science curriculum projects to be developed by the science Teachers Association of Nigeria (STAN) in 1970. it was written in conformity with build lines as specified in STAN's curriculum Development News letter No. 1 which contained the philosophy, methodology, content and evaluation of integrated science. The newsletter acquire after having been exposed to a course in integrated science. These skills include observing, measuring, classifying, reporting, organizing, generalizing, predicting and experimenting.

STAN commission its members to write pupils Textbooks and teachers guide for the Nigerian integrated science project (NISP).

The philosophy of the integration was designed to help child to;

1. Gain the concept of the fundamental unity of science.
2. Gain the commonality of approach to problems of a scientific nature.
3. Gain an understanding of the role and function of science in everyday life,

The approach recommended by NISP was the learner or child centred approach which was basically activity oriented teaching method.

This means involving the students actively in open-ended field or laboratory activities just like being a scientist.

The content of NISP revolved around six themes.

These were as follows

Unit 1 - You as a living thing

Unit 2 - You and your home

Unit 3 - Living components of the environment.

Unit 4 - Non-living components of the environment

Unit 5 - Saving your energy

Unity 6 - Controlling the environment.

Use of discovery teaching method inclusion of problem solving activities.

However there are four aspects of science that are reflected during the teaching of the integrated science curriculum. These are;

1. Developments of cognitive skills, which include ability to recall knowledge, comprehend basic concepts and then application to novel situations.
2. Development of process skills which include ability to observe, measure, classify organize, interpret, predict and report.
3. Development of scientific attitudes such as honesty, precision, open mindedness, critical thinking curiosity e.t.c
4. Development of manipulative skills such as ability to manipulate apparatus, construct and interpret tables, charts, graph e.t.c Ogunleye (2002) in STAN Journal.

Thus success or failure of integrated science instruction at this introductory stage is therefore of crucial importance, since integrated science represents the foundation stone for subsequent instruction in the sciences in later life for students who may wish to pursue science related career in life: A solid foundation in integrated science will also equip millions of secondary school students for successful science career thereby contributing indirectly to the much needed scientific and technological advancement of the Nigeria Society (Daramola 1983). A poor foundation may have negative consequences of mass failure (Daramola, 1983). In the light of this, the science educators now advocate for change in science instructional practices in the

search for ways of making the teaching and learning of science more meaningful and productive. Okoafo (2002).

But most of the teachers confessed to have problem in the teaching of practical, this made most of these teachers to relent to the use of lecture method. This method characterized by verbalism now becomes the common method of instruction employed in the teaching of integrated science in most of our schools. In this method teacher dominates the scene as the authority in the field while the learners are inactive, with little or no room for challenging learners ingenuity and development of cognitive skills through experiments. Gbodi and Laleye (2006). Hence the need for this study.

2.6 Problem-Solving Method:

Atadoga (2000) described problem-solving as the steps taken to search for solution(s) to problem(s). In other words, it is an approach where by students learn to use their knowledge to build on skills and concepts for themselves. It is a method concerned with the creative thinking and "know-how" of every day life. It is used in developing learner's problem-solving ability which is the major objective of science instruction (Shaibu and Mari 2001). It is so because science has been in the business of finding solution to problems of mankind be it social or scientific. Onwuka, (1994) identified the role of science education as that of giving a systematic to the individual to enable him/her lead a productive life through day to day solving of his/her problems.

The aim of problem-solving strategy is to build up confidence and ability of learners to solve the kinds of problems that are characteristics of rapidly changing society (Permida, 2004). Therefore, problem-solving processes occupy prominent position in the education training of the learners so as to equip him/her with "weapons" that is necessary for meeting up with future challenges.

Permida (2004) identified some benefits the learner may derive when taught using problem-solving method as:

i. the problem catches the child's attention and that is an effective way of starting a lesson.
ii. problem-solving exercise can easily be related to the real world.
iii. problem solving emphasizes process skills rather than facts.

Similarly in support of problem solving method as an effective way of learning Bichi (2002) listed the following reasons:

i. It is an active process.
ii. It takes account of learner's interest.
iii. The process can be related to children's knowledge and experiences.
iv. The process is enjoyable, challenging and motivating.
v. Problem-solving is an important activity of scientists and that learners need to engage in it if they want to understand science.
vi. Skills and attributes acquired through problem-solving are relevant and transferable to the world of work.

vii. Problem-solving can develop social skills by pupils organizing themselves in small co-operative group.

However, for effective use of problem-solving method, it requires the teacher's initiative and capability to formulate challenging problems that will captivate and sustain learners attention or interest from the beginning of the lesson to the end. (Mari, 2001). Considered the following guideline as essential and helpful when deciding problem for learners.

- The teacher is to examine the syllabus or scheme of work to find out the theme / concept to be treated.
- Create a problem situation central to the theme / concept identified in them, then the problem should satisfy the following criteria as follows:
    - Have potentials for capturing learners' interest and capitalize on it.
    - Have few variables as much as possible so as to be within the learners' capabilities.
    - Relate to real life situations as much as possible especially those that affect the learners' life e.g. survival problems centered on food, shelter and play tend to attract more attention. Then think of the materials and apparatus the learners' will need in the pursuit of the problem, and get them handy before the lesson, cross-check before hand to see whether they are functional.

There has been an increasingly emphasize on problem-solving method of instruction in recent years due to its several advantages over other science teaching methods as follows:

- It encourages inquiry, gives room for discovery, facilitates process skills acquisition and knowledge. When problem are related to real life situation, learners see the relevance and applicability of the science they learn.
- Through problem-solving science will no more be regarded as 'white man's lies' or foreign magic for the activities makes the learner to get involved in inquiry, discovery, exploration and to perform various processes of science. Therefore, problem-solving method of instruction will be employed in this study for the experimental group because it combined several merits of other science instructional approaches, like inquiry/discovery, discussion and process approach to mention a few. Problem solving method strategy was fully used for experimental group in this research while lecture method was used for the control group.

2.6.1 Lecture Method:

The lecture method of instruction is also referred to as the expository method, the traditional method or talk and chalk method of instruction (Olorukooba 2001). This method is teacher centred and is characterized by verbal presentation of ideas, concepts generalization of facts by the teacher to the class of students who are passive

learners (Olurokooba 2001). Teachers does much of activity while students are slightly involved in notes taking or passively listening to the teacher. This has been the prevailing science teaching method in most Nigeria secondary schools. Balogun (1982), Watts et. al. (1989); Hodu (1993). Students taught using this method to assume science process skills to be skills posed by the scientists or foreign skills. More so what makes learning of science with this method difficult is because it leads students to passive acceptance of information and rote memorization of facts and principles. Several studies have revealed ineffectiveness of lecture method to meet the current modern science teaching needs (Abdullahi 1982) as it does not involve all the five senses, it does not promote meaningful learning of science. However, this study will make use of lecture method during introduction of experimental group of this research and also use it fully in the control group.

2.6.2 Some Instructional Strategies available for Science Teaching:

There are several modern approaches to the effective teaching and learning of science in an organized way to reflect the processes of science. To learn science is to do science, doing science by students entails more of providing opportunities for them to interact with the environment using techniques and tools of science than memorization of scientific concepts (Akpan 1992). However, some teaching methods

are known to be more effective for learning of science than others (Ali 1982; James 1992; Martins 1994 and Nworgu 1995). Some examples of these teaching methods which are used in teaching / learning science in secondary school are listed as follows. Project approach, process approach, discussion approach, inquiry/discovery lecture method, problem solving.

2.7 Gender and Socio-cultural Beliefs

Gender from cultural, political and economic as well as social context, is a determined terminology that goes a long way to interpret those characteristics exhibited by individual (Attributes) which makes them either males or females (Dantata, 2004). Gender simply refers to those characteristics and functions society ascribes to male or female. For example, society expects male to be aggressive, independent rational, assertive while females are to be gentle, submissive dependent passive, emotional etc. as a child grows, he is socialized to fit into these societal expectations. These behaviours are meant for him/her to be learned and internalized during the socialization process and these attributes are to be passed from one generation to the other.

Although school enrolments in Africa have increased in recent decades, girls education still lag far behind compared to the male child education because of their gender in terms of access, enrollment rate are evidence (Dantata, 2001). This means that equal academic opportunity in male and female enrolment in schools is yet to be

realized. Preference is still shown to boys in matter of science education in schools than girls, even though more girls have been sent to schools after the introduction of Universal Basic Education in Nigerian (Duru, 1997). For example certain careers such as engineering are said to be for boys while catering, Home Economics and Arts subjects are believed to be appropriate for girls. This is derived from the general beliefs that woman's education ends in kitchen'

According to Nwideeduh, (1994) most cultures in Nigeria (northern culture) permit the erroneous belief that any attempt to send girls to school would interfere with their early marriage which is considered to be their primary mission on earth. Parents therefore force their female child to early marriage because they considered their daughters virginity before marriage more important than education. Furthermore, according to Nwideeduuh (1994) male child education is given preference because the pertinent system confers right of inheritance on boys. So the gap in enrolment and achievement at all levels of education is largely due to gender role expectations and gender stereotype.

The culture, tradition, religious, societal values and gender-stereotypes are also among the factors hindering female access to science education. In science and technology disciplines most girls have been found to under-estimate their academic ability and believe boys to be superior and more intelligent than them. As research finding pointed out that lack of self esteem, poor self image and non

assertive behaviour are among the social factors that make girls shy away in schools especially in mathematics and other science subjects. Bejide, (2006).

In most culture in Nigerian society parents especially the illiterate ones prefer to educate their male child than female child. One attitude that has greatly been affecting the girl child retention and academic achievement within the educational system. These parents find it easier to enroll boys than girls in the event of financial difficulties in the household; this girls have been prepared right from birth/young age for marriage and to many discriminations. Reports shows that some parents in Northern Nigeria fear that by taking their daughters to school they will get “spoilt or prostitutes” and become less competent wives (Bakari1998).

2.8 The Effect of science Instruction on Students acquisition of Science Culture

To learn science is to acquire the culture of science (Maddock 1981; Walcott. 1991: Pickering 1992). School science develop its own culture, scientific culture represented by professionals with a commonality of purpose, views, visions and practice. The acquisition of science culture becomes mandatory for science students in the sense that they must travel from their everyday world to the world of science found in the classroom to enable them have mastery.

The cross-cultural context of science taught in school has been a controversial issue and has accepted suggestions from prominent

writers, most of them believed that science curricular can easily be transferred irrespective of the culture of the environment.

The content of modern science conveys a western world view due the fact that science is from western sub culture and is different from African culture. Thus student with much different world view (African) experience cross-cultural difficulty in learning modern science Aikenhead (1997). Cobern (1994) observed that west is the historic home of modern science in the sense that hypothetical deductive, experimental approach to modern science originated from there.

Consequently, some students reject science because they term it to be foreign culture that conflict with what in their life-world (preconceptions) was known to be the truth. This poses difficulty to them in their effort to study science, as some call it “white man’s lies” Abimbola (1977); Cobern (1996).

Through western education, science is brought into developing countries where it can replace non-scientific explanation of events. So there has been a great emphasis on substituting scientific explanation of daily occurrences such as epidemic diseases and disasters drought, rain and rainbow through instruction for supernatural, non-scientific explanations which prevail in developing countries Cobern. (1996).

However the acquisition of science culture involves some processes characterized by smooth border crossing experience when the culture of science harmonizes with students life-world culture, science instruction will support the student’s view of the world and

the process of enculturation occurs. (Hawkins and Pea – 1987 Wolcott. 1991). These type of students are called potential scientists Costa (1995). On the other hand when the culture of science is at odds with students life world (socio-cultural beliefs), the students find it difficult to learn science.

In Nigeria, this cultural sensitivity is yet to be actualized in the teaching and learning of integrated science and other science subjects. Sensitivity to the learner's cultural environment is very important. This made Maddock (1981) in his extensive study in papia New Guinea, called for a more anthropological method to science teaching and learning in the developing countries. This appeal was repeated by Lewin (1990) who noted that at the end of 1980's, most former colonial countries had gone to the extent of successfully indigenized and developed science programmes of their own, but not too long the indigenization began to be the superficial adaptations of only important western curricula Lewin, 1990 in Cobern 1996.

The role of the science teacher in bringing about effective learning of science through instruction was emphasized by Bajah (1981) who observed that to advance in science the young African pupil of science must be made to realize the implication of superstitious and science learning. This role of science teachers has been described as co-ordinator, facilitator of resource person in multicultural education (Water 1996) and as a social mediator in sociological paradigm. (Kelly and Green (in press). Bajah finally stated that one of the main objectives of science education in Nigeria and

African countries is for science teachers to introduce science in such a way that the recipients are able to apply the methods of science and what is not science to their every day life.

Therefore science teachers are called to carryout what will not only portray adaptation of school science structure, physical environment local resources but will take cognizance of the learners home culture. To carryout this task the science teacher ought to be aware of the socio-cultural aspects of modern science and the differences between African and scientific cultures.

Aikenhead (1997) noted that “for science teachers to accomplish this pressing need for the development of technical skills and scientific ones among Nigeria students, science teachers need to develop in student the facility to cross cultural border from their every day world of family and ethnic group into subculture of school science”. He further said that students do not cross this border smoothly because of cultural conflicts. What the students need is a culture broker science teacher who will help them to move back and forth between an African culture that is socio-cultural beliefs and modern school science culture which will help them erase from their minds the socio-cultural conflicts that hinders their effective learning of science.

In a situation where all the discussed conditions are not experienced by the learners, they will resort to playing “school science games’ that will permit them to pass their science subjects without actually understanding the content or the facts. It leads to reliant on rote memorization and regurgitation of the science information as

much as possible without really involving in any proper learning of science. This also affects science teachers who have not actually mastered the scientific skills. They still employ traditional instructional strategy that are more of teacher-centred, such as lecture method in science teaching rather than learner-centred instruction. So, to rectify the issue of socio-cultural beliefs (preconceptions) hindering the effective learning of science there is the need for both curriculum planners and science teachers to identify the position of students on these beliefs and hopefully provide reasonable scientific explanation to these natural phenomena rather than shunning down students which many people are fond of doing.

Proficiency and effective science learning in school is judged by achievement outcome and if this is generally agreed that whatever students learn in science classroom is done through socio-cultural filters, then it becomes necessary for every science teacher in Nigeria and African as a whole to employ and provide empirically based information on the influence of specifically, tailored instruction on the socio-cultural beliefs of learners (Jegede and Okebukola 1990). This is the purpose of this study to see the effect of problem-solving instructional strategy on the socio-cultural beliefs hindering the learning of science.

2.9 Review of Related Studies:

A search in the literature on the effect of problem solving strategy on socio-cultural belief hindering the effective learning of

integrated appears to be scanty. Probably, little work has been done in other science subjects on instructions. Many studies have been carried out on activity mode of instructions and academic achievement in biology James (1992) carried out a study on the relative effect of inquiry and lecture methods on students achievement in biology among male and female low and high achievers. A total number of 110 school students (SS1) were used for the study. Two co-educational school were used and the students randomly selected from this school in Minna Nigeria State.

The analysis of the result when pre-test and post-test were compared, showed that there was significant difference between inquiry and lecture method in improving students academic performance in biology. Muhammad (2004) investigated the effects of activity-based instructional methods of teaching ecology on academic achievement among senior secondary school students. A total number of 100 senior secondary II students were randomly selected for two co-educational senior secondary schools in Sabon-Gari local Government of Kaduna State. The subjects were classified into two groups. One as experimental and the other as control group. Both participated in the pre-test and post-test and the post-post-test that were administered in the data collection process. The instrument used for the study was Ecology Achievement Test EAT. The data were analyzed and the findings showed that the experimental group exposed to the activity-based instructional methods of teaching ecology achieved significantly better than the control group exposed to lecture method of teaching

and there was no significant difference in the academic achievement of male and females exposed to activity-based instructional methods.

Oyedokun (1998) in her study , the effects of a conceptual change model on students achievement retention and attitude to biology concepts, the effects of two instructional strategies - conceptual change teaching strategies and the traditional teaching strategies on students achievement, retention of biology concepts and students attitude to biology as a case of study were compared. Science students in the Senior Secondary School (SSI) in two co-educational schools in Zaria. The two secondary schools were randomly selected. The study sample was divided into two groups made up of experimental group and control group. Each with a sample size of 76 students. The experimental group was taught using conceptual change teaching model while the control group was taught using traditional method.

The analysis of the result when pretest and post test were compared showed that students in the experimental class taught using the conceptual change teaching model performed better on post tests than the students in the control class taught using traditional method.

However Jegede and Okebukola (1991) in one of their studies investigated whether instruction through the use of the socio-cultural mode has any significant effect on students attitude towards the learning of science. The sample consisted of 600 senior secondary year one (SSI) students made up of 442 boys, 158 girls) from 15 secondary

schools. In Nigeria. The socio-cultural Environment scale (SCES) and the biology achievement test (BAT) were used to conduct or measure the change in attitude and achievement of subjects in a pretest-post test situation after a six-week treatment evidence was found to support the hypothesis that science instruction which deliberately involves the discussion of socio-cultural views about science concepts engenders positive attitudes towards the study of science. The findings also showed that anthropomorphic and mechanistic views can be presented in such a way as to promote positive attitudes towards the study of science in traditional cultures.

In the same vein Jegede and Okebukola (1994) attempted to determine whether or not instruction based on a socio-cultural model could significantly alter students attitude towards the learning of science and achievement in science. The sample consisted of 600 senior secondary year on (SSI) students (442 boys, 158 girls) from 15 secondary school in Nigeria. The socio-cultural environment scale (SCES) and the Biology Achievement Test (BAT) were used to measure the change in attitude and achievement of Subjects respectively in a pre test post-test situation after six weeks treatment. The findings were found to support the hypothesis that science instruction which deliberately involves the discussion of socio-cultural views about science concepts altered student attitudes toward the study of science and also indicated that some socio-cultural factors were amenable to alterations in such a way as to promote the subjects positive attitudes towards the study of science.

Jegede and Aikenhead (1999) carried out reviews on a non cognitive explanation of collateral learning theory for pupils on how to cope with disparate worldviews mediated by transcending cultural borders between their everyday culture and the culture of science. The paper explained that most assistance pupil receive when they attempt to negotiate these cultural borders influence their success at science. In the paper a new pedagogy is proposed in which teachers assume a role of culture broker in the classroom to achieve culturally sensitive curriculum and assessment.

Aikenhead and Jegede (1999) investigation on a cognitive explanation of a cultural phenomenon. They studied how students move between their everyday life-world and the world of school science, in this study they conceptualized the transition between a students life-world and school science as a cultural border crossing. The article synthesizes cultural boarder crossing with its cognitive explanation collateral learning.

The synthesis provides new intellectual looks with which the understanding of science for all in 21st-Century science classrooms in developing and industrialized countries.

Wasagu (1999) carried out a study to determine the relationship between students cultural beliefs and their academic achievement in science. Two instruments were used: Cultural Beliefs Tests (CUBS) and Science Achievement Test (SAT). the instruments were administered to 180 science secondary school students in three

science schools in Sokoto State. Nigeria. The Chi-square test and contingency coefficient were used for the data analysis.

The analysis of the data showed that

i. there was a significant relationship between cultural beliefs and achievement in science among the students.

ii. there was no significant difference between gender and the two variables of CUBS and SAT

iii. students who were found to be holding strong cultural beliefs agreed that their culture has influence their choice on CUBS.

Gender related difference and science learning, one of the problems faced by science educators today is the issue of gender difference in educational system. The problem of attracting girls to science in our various school is not yet been resolved. This has led to many innovative project like Girls into Science and Technology (GIST), Women In Science and Engineering all these aimed at making science more friendly to girls. Tracy (1990) related differential gender achievements in science to a number of factors which includes sex role model orientation, peer group expectation, class extra-curricular activities, educational background of students and parents.

Stone (1981) in his separate findings had shown that boys were better than girls in achievement and activities required manipulation. Usman (2000) has a contrast report from preview studies in the investigation on relative performance of male and female students in integrated science practical activities using Nigerian Integrated Science Teacher Education Project (NISTEP) mode of teaching. He

found no significant gender differences existing among he 50 JSSIII students selected from two co-educational Area of Kaduna state.

In Nigeria different teaching methods have been attributed to the cause of gender inequality in science achievement. According to Ajewole (1990) in his study to find out the effects of the guide discovery and expository instructional method on students' transfer of learning, observed no significant differences in the transfer of learning between male and female students exposed to the expository and discovery method. Samba (1998) in her study on conceptual change instructional strategy in the teaching of biology found that the strategy appeared to be gender related. Boys performed better than girls in the achievement test with little differences in their performance.

Further more Muhammad (2004) in her investigation on the effect of activity based instructional methods on academic achievement of senior secondary students in ecological concepts found no significant difference in the academic achievement of males and females exposed to activity based instructional strategy.

Also in a study by Wasagu (1999) to find out the relationship between science students' cultural beliefs and their academic achievement at the secondary school level in Sokoto state showed no significant differences between gender and the two variable of CUBS and SAT.

From the literature reviewed on the gender related difference and science learning the researcher deduced gender differences in

science learning and achievement is inconclusive in the sense that there are variations. So one of the objectives of the study is to investigate if problem solving instructional method will have any influence on the performance of male and female students in co-educational institutions of junior secondary schools in Gwagwalada Abuja F.C.T Nigeria.

Implications of the Literature Reviewed to the Present Study

From the reviewed literature in this chapter, the various authors suggested the need to have a change in the method of teaching science subjects (Bichi, 1988, Ezenwa, 1993, Usman 1992 and Manzanal et al. 1999). So a shift from teacher-centred method to learner-centred method which provides opportunities for the learner's interactions with the natural environment using the tools and techniques of science is necessary in promoting students academic achievement in science. Since traditional method or chalk and talk method of instruction does not in any way challenge learners ingenuity and development of cognitive skills through experiment. But rather led to students poor performance in science subjects. Gbodi and Laleye (2006).

The implications of these reviewed studies showed the relevance of activities based method of instruction. It also presented how activities based method can be used to help students to understand facts, principles, concepts and generalization of science. They also emphasized the reasons why students should be helped to think

critically, creatively so as to develop scientific skills and to be able to solve everyday life problems. Therefore this study is meant to accomplish these goals through the use of problem solving strategy.

Since some of the authors in the reviewed literature have agreed that activity based instructions helped students to improve in their academic performance, this study also was meant to see whether problem solving strategy would help to erase students preconceived ideas thereby improve on their academic performance.

CHAPTER THREE

METHODOLOGY

Introduction

This study is intended to determine the effect of problem solving strategy lecture method on socio-cultural beliefs hindering the learning of science at the Junior Secondary School level. The chapter presents the methodology which is discussed under the following sub-headings.

- research design
- population of the study
- sample and sampling techniques
- instrumentation
- validation of the instrument
- pilot study
- reliability of the instrument
- administration of treatment
- data collection procedure
- data analysis procedure

3.2 The Research Design

The study employed a pretest, posttest quasi experimental-control group design as recommended by Karlinger (1973) and Tuckman (1978). The pretest was first administered to the two

sampled groups of students the experimental and control groups to determine their equivalence. The experimental group was taught using problem-solving strategy while the control group was the taught using lecture method of instruction. At the end of the treatment period which lasted for six weeks the posttest was administered to both groups of students to find the effect of problem-solving strategy and lecture method on socio-cultural beliefs hindering students' effective learning of science. The subjects of both experimental and control groups were administered with Socio-cultural Belief Scale (SCBS) and Integrated Science Achievement Test (ISAT) as pre-test and post test. The design is represented as follows:

EG ------ 0_{1A} ------ PSM------ 0_{2B}

CG------ 0_{1B}------ LM ------ 0_{2B}

Where

EG = Experimental group

CG = Control group

0_{1A} = Pretest

0_{1B} = Pretest

PSM = Problem solving method

0_{2A} = Posttest.

0_{2B} = Posttest

LM = Lecture method

Source: Adapted from Samba (1998).

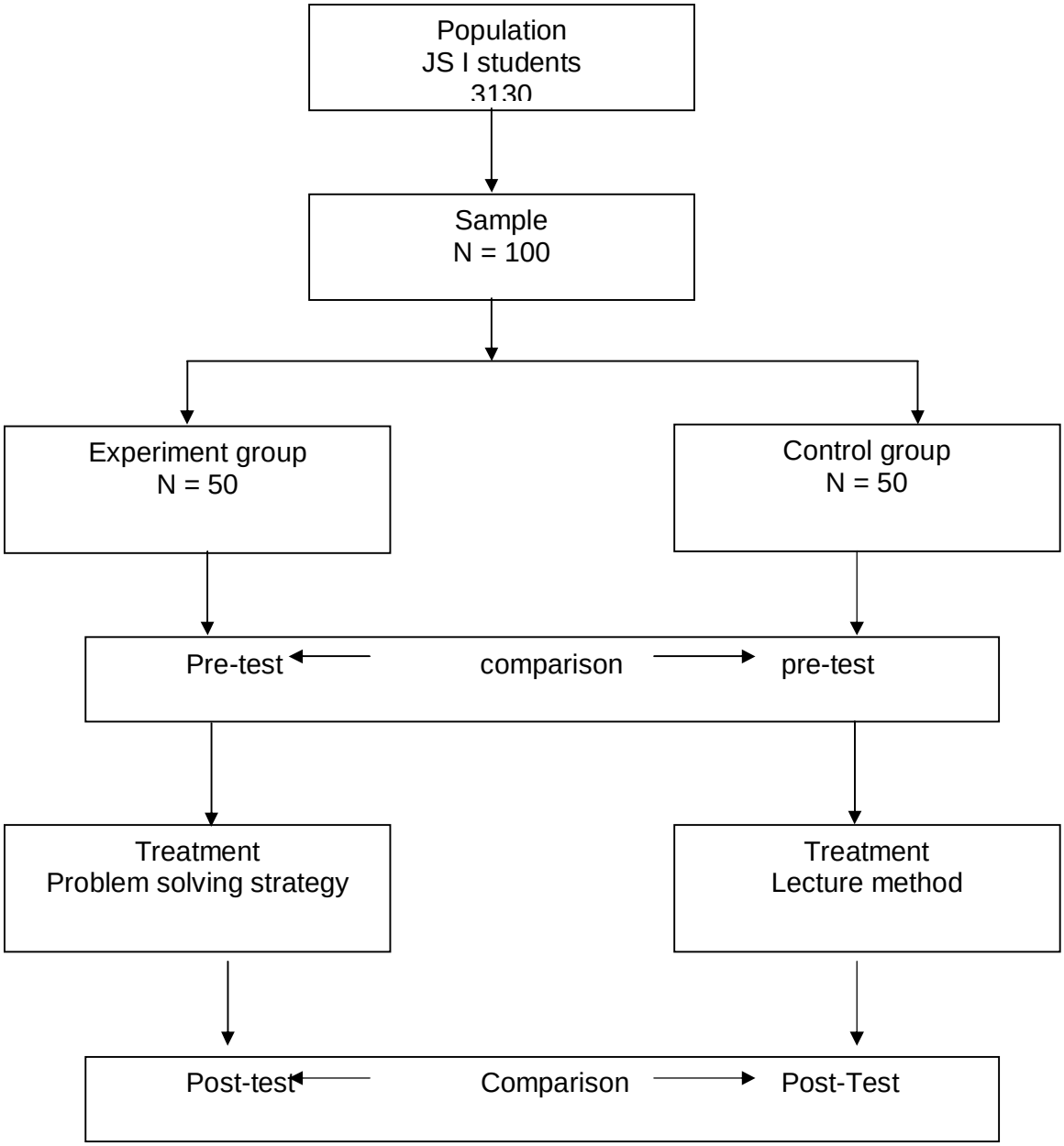


Fig. 3.1: Flow Chart for the Research Design

Source: Adapted from Manzanal et al., 1999 in Mohammad (2004).

6 Arrow showing direction of the flow chart

3.3 Population of the Study

The population for this study comprised of all the JSSI integrated science students of the co-educational schools in Gwagwalada-Abuja Federal Capital Territory (FCT). JSS1 students were used in this study since they are still fresh in the secondary school system and might be holding some socio-cultural beliefs that could hinder their effective learning of science. There are 10 Junior secondary schools in Gwagwalada Area Council and all are co-educational. The total population of students in the 10 schools is 3130 of which 1718 are males and 1412 are females. The average age of the students is 13 years. The schools in the population for this study are presented in Table 3.1. All the schools are owned by government.

Table 3.1: The Study Population

No	Name of school	Location	Enrolment of J.S.S. I Students		
			Male	Female	Total
1	Government junior secondary school	Gwagwalada	348	243	591
2	Government Junior secondary school	Phase III	131	123	254
3	Government Junior secondary school	Old kutunku	297	318	615
4	Government junior secondary school	Dobi	140	60	200
5	Government junior secondary school	Sabon Gari	168	149	317
6	Government junior secondary school	Paiko kore	115	77	192
7	Government junior secondary school	Giri	105	61	166
8	Government junior secondary school	Dukpa	50	19	69
9	Government junior secondary school	Tunga/maje	174	110	284
10	Government junior secondary school	Zuba	270	172	442
		Total	1718	1412	3130

Source: Zonal education office. Gwagwalada – Abuja. F.C.T

3.4 Sample and Sampling Techniques

For the purpose of this research, the schools that are relatively similar in the variables of interest were drawn from the target population. Four schools were randomly selected from the ten junior secondary schools by simple "picking from hat approach" in this way; after the names of these ten schools were written on pieces of papers, each of them was folded and dropped into the hat (cup). The folded

papers were shaken to mix all together. After this the picking from the hat was done randomly so then, these four schools were randomly selected from the population and the SCBC was administered to the four schools to determine which two of the four schools will be equivalent in their mean scores (as described above).

Two schools were found to be equivalent. The schools are Paikore and Dukpa secondary school. Random sampling technique was employed to determine the schools to be used for experimental and control. Paikore junior secondary school was randomly selected for experimental group while Dukpa junior secondary school was used as control. This was done by simple 'picking from hat approach'. The sampled schools were far apart. In order to have a manageable sample that is large enough for meaningful generalization, a total of 100 integrated science students were chosen by random sampling techniques from the schools. The study sample consist of 50 students from Paikore Junior secondary school and 50 students from Dupka junior secondary schools. This is in accordance with central limit theorem and in tune with Tuckman (1978) which, proposed that 50 study sample are viable for experimental research of this nature.

A stratified random sampling was used to determine the number of male and female subject (by picking from class register (even numbers the names of boys separate and names of girls separate). This is done in order to reduce the error in the sampling. It is also to determine the proportional representation of the subjects in terms of gender in testing HO_4 and $H0_5$ in section 1.4 of this research.

Table 3.3: Students Distribution In The Schools Sampled

S/No.	Names of schools	Enrolment		Total	group
		M	F		
1.	Paiko Kore Junior secondary school	30	20	50	Experimental
2.	Junior secondary school Dukpa	31	19	50	control
	Total	61	39	100	

3.5 Selection of Study Topics

Ten sub-topics out of twenty-three major topics in integrated science were selected for the purpose of this study. The teaching lasted for six weeks of four periods per week.

The topics are;

1. Characteristics of animals and plants
2. Human beings as higher animals
3. Health of the family
4. Preventing diseases
5. Growth
6. Reproduction
7. Water
8. Man in space
9. Science related occupation

10. Tools (mechanics)

The topics were extracted from the National curriculum for the Junior Secondary School integrated science (JS I 1981). The topics were selected based on where the students have socio-cultural beliefs.

3.6 Instrumentation

Two instruments were used to collect data for this study. The Socio-Cultural Belief Scale (SCBS) and Integrated Science Assessment Test (ISAT).

3.6.1 The Socio-Cultural Belief Scale (SCBS)

The SCBS Instrument comprised of 40 (forty) items of six sub-scales division based on areas where students mostly have socio-cultural belief problems. The items were obtained from the collection of STAN (2000) publication on cultural beliefs while some of the questions were constructed by the researcher based on the topics. The instrument was subjected to content validation by experts made up of science education lecturers, two integrated science teachers, one statistician and one English language specialist. The items are divided into six subscales which, are:

1. Socio-cultural beliefs connected with soil cultivation and fertility was taught to students under the integrated science topic, growth and reproduction and science related occupation, tools (machines).
2. Socio-cultural beliefs connected with solar system was taught under integrated science topic for man and space.

3. Socio-cultural beliefs connected with germ, sickness and diseases was taught under the integrated science topic Health of the family.
4. Socio-cultural beliefs connected with African world views was taught under characteristics of Animals and characteristics, activities of living things.
5. Socio-cultural beliefs connected with water cycle and light was taught under the integrated science topic water.
6. Socio-cultural beliefs connected with reproduction and hereditary was taught under integrated science topic reproduction.

The topics selected for the study are shown in Appendix E.

3.6.2 Integrated Science Achievement Test (ISAT)

This instrument is made up of 40 items adopted from Begum et al (2001) examination focus for Junior Secondary School Examination question on integrated science. The ISAT was designed to find out the extent the students understand the selected integrated science concepts taught to them. Each of the 40 multiple choice items consisted of four response options one of which was the correct answer the remaining three being the distractor. Since ISAT instrument is a standardized test there is no need for item characteristics because it is adopted from (Begun et al 2001). The 40 objective questions were based on Blooms taxonomy of educational objectives. Seventeen (17) items test knowledge of fact, thirteen (13)

test application of knowledge and ten (10) test the interpretation of concepts. From these analysis, evaluation of students understanding of the science concept was carried out. The items were scored over hundred (2½, 40) items.

3.7 Validity of the instrument

The content validation of the instrument (SCBS) was carried out by a panel of experts made up of:

a. two science education lecturers
b. two integrated science teachers.
c. English language specialist

The experts critically assessed ISAT which was adopted with respect to the following criteria.

- Appropriateness of the items
- Whether or not the statement in the tests were clear, readable, difficult or simple for JSS I students.
- Give suggestions on how to improve the quality of the test items.

Based on the suggestions from experts some of the items were restructured. For example:

- which of the following devices is used for measuring the speed of wind was remove and replaced with what does the body produce after immunity.
- Socialization of a child should be based on what? Was replace with as the baby is growing up the needs – (immunization) etc.

3.8 Pilot Study

The two instruments ISAT and SCBS were pilot tested using 40 respondents of JSI students at junior secondary school in Giri Junior Secondary School Gwagwalada area council. The instruments were tested with similar group of students to be used in the final study, which did not form part of the main sample. The test was administered in normal classroom setting. The average time taken by students to complete the work was about 45 minutes and at the end the researcher collected the scripts.

The collected scripts of ISAT were objectively scores while that of socio-cultural belief test was rated and also subjected for statistical analysis. The analysis of the scores is shown in appendix F. the result were used to calculate the reliability coefficient of SCBS and ISAT.

3.8.1a Reliability of the Instrument (SCBS)

In order to determine the reliability of each of the (SCBS) items, the split – half coefficient of internal consistency technique was used. This technique was used when a single administration of a test is involved. The scores for each half were recorded and the correlation was computed using spearman ranking statistics. To determine the calculated value the Spearman Brown split half formular was used, the reliability coefficient value obtained for the SCBS was 0.81.

The reliability established was found to be relatively high and was used for the study.

3.8.1b Reliability of the Instrument (ISAT)

In order to determine the reliability of each of the ISAT items, the split – half coefficient of internal consistency technique was used. The technique used was the test retest administration. The scores for each were recorded and the correlation computed using Spearman's Brown. Adjusting the calculated value the Spearman Brown split half formular the reliability coefficient value obtained for the ISAT was 0.91.

3.9.1 Data Collection procedure

The researcher taught both the experimental and control group students in the schools selected. The contact session for both the experimental and control group lasted for 6 weeks. The first week was used for orientation during which both the researcher and the students familiarized themselves. The problem solving method of instruction was used for experimental group, while the lecture method of instruction was used for control group.

Fig. 3.2 (Appendix G) shows the flow chart of the problem-solving method while fig. 3.3 (Appendix H) shows the flow chart of lecture method. The lessons in the experimental group were organized in such a way that students fully participated. See appendix G.

The activities in the lesson took the following forms.

- Use of diagram, charts, photo to represent ideas

- Some exercises that are brain storming. In the exercise students were given question, exercises or assignment which required them to use their ideas to find solutions to those problems.
- Teacher/students demonstration
- use of discussion
- Laboratory/field or class activities performance
- The use of paper and pencil activities

(Usman 2000) and (Mohammed 2004).

3.9.2 Administration of Research Instrument

The subjects of both experimental and control groups were administered with ISAT and SCBS as post test after six weeks of treatment. The responses of the subject in ISAT was marked and subjected to data analysis while SCBS was ranked according to Likart scale of measurement and subjected also to data analysis. The distance between the two groups are far apart (about 20km).

3.10 Data Analysis Technique

The data obtained from SCBS and ISAT were subjected to statistical analysis to test the stated hypothesis at $P \leq 0.05$ level of significance.

$H0_1$. There is no significant difference in pre and post test mean scores of student in Socio-Cultural Belief Scale when taught integrated science using problem solving strategy. Wilcoxon signed

rank test statistical technique was used to find the significant difference (if any) between the mean scores of student pretest and post test in SCBS rejecting and retaining of Null hypothesis was set at $P \leq 0.05$.

$H0_2$ There is no significant difference in mean scores of students in socio-cultural beliefs scale when taught integrated science concepts using problem solving strategy and lecture method. Wilcoxon rank statistical technique was used to find the significant difference (if any) between the mean scores in SCBS of problem-solving and lecture method. Reflecting and retaining of Null hypothesis was set at $P \leq 0.05$.

$H0_3$ There is no significant difference in the mean scores of male and female students in ISAT when taught integrated science using problem solving strategy and lecture method. t-test statistical technique was used to find the significant difference (if any) between the mean scores in ISAT of problem solving strategy and lecture method.

$H0_4$ there is no significant difference in the mean scores of male and female students in their socio-cultural beliefs Scale when taught integrated science using problem solving strategy.

Wilcoxon signed rank test statistical technique was used to find the significant difference (if any) between the mean scores of male and female taught using to problem solving strategy in SCBS. rejecting and retaining of Null hypothesis was set at $P \leq 0.05$.

$H0_5$ There is no significant differences in the mean scores of male and female students in their academic performance in integrated science when exposed to problem solving strategy.

t-test statistical technique was used to find the significant difference (if any) between the mean scores of male and female students' in ISAT. Rejection and retaining of Null hypothesis was set at $P < 0.05$.

$H0_6$ there is no significant relationship between student academic achievement in science and their performance in socio-cultural beliefs after exposure to problem solving strategy.

Spearman ranking statistical technique was used to find the related significant difference (if any) between the mean scores of students in SCBS and ISAT rejecting and retaining of Null hypothesis was set at $P \leq 0.05$

CHAPTER FOUR

ANALYSIS, RESULT AND DISCUSSION

4.1 Introduction

This study investigated the effect of problem solving strategy and lecture method on socio-cultural beliefs hindering science learning at junior secondary school level. The chapter presents the results and analysis of data, test of the hypotheses and discussion.

Two instruments were used to generate data:

i. Socio-Cultural Belief Scale (SCBS) which was used to collect data on socio-cultural beliefs of students. In both experimental and control groups.

ii. Integrated Science Assessment Test (ISAT) which was used to collect data on students academic achievement (pre and post test). The data that were obtained in the course of this study are:

   a. Scores from SCBS (pre and Post) for both experimental and control groups.

   b. Scores from ISAT for experimental and control group.

   Six null hypotheses were formulated for the study, t-test Wilcoxon, signed rank test and Spearman ranking statistics were used to test the hypotheses. P $\leq$ level at 0.05 was used as basis for retaining or rejecting the formulated null hypotheses. The Statistical Package for

Social Science (SPSS Version 7) statistical analysis was used.

4.2 Hypotheses Testing

Null Hypothesis I

Ho_1 there is no significant difference in pre and post test mean scores of students in SCBS when taught integrated science using problem solving strategy.

To test this hypothesis, Wilcoxon test was used the result obtained is shown in table 4.1.

Table 4.1 Summary of Wilcoxon Comparism of Means Scores of Pre and Posttest of Students taught using Problem-Solving Strategy.

Variable	N	X	Sd	Z	p.value	Remark
Pretest	50	140.12	26.21	2.676	0.007	Significant
Post test	50	129.36	22.90			

Significant at $P \leq 0.05$

From the table 4.1, the post test results showed that there is significant difference between the mean scores of pre test and post test. The result showed that the post test has a lower mean score in the SCBS (129.36) as compared with the pretest with mean score of (140.12). The P. value which is 0.007 is lower than fixed significant value of 0.05 therefore the null hypothesis is rejected.

Null Hypothesis 2

Ho_2 there is no significant difference in the mean scores of students in (SCBS) when taught integrated science using problem solving strategy and lecture method.

To test this hypothesis, Wilcoxon signed rank statistical was used. The result obtained is shown in table 4.2

Table 4.2 Summary of Wilcoxon Signed Rank Test Comparison of Mean Scores of Students in SCBS Taught with Problem Solving Strategy and Lecture Method.

Variable	N	X	Sd	Z	P.value	Remark
Experimental	50	114.42	34.86	2.54	0.001	Significant
Control	50	134.74	25.07			

Significant at $P \leq 0.05$

The posttest showed that there is significant difference between the mean scores of students in SCBS when taught integrated science using problem solving strategy and lecture method. The result showed that those exposed to problem solving strategy has a lower mean score in the SCBS (114.4) as compared with the control group, with the mean score of (134.4) this indicates that the problem solving strategy is more effective in reducing the socio-cultural beliefs hindering the science learning among the students than the lecture method.

Also the P- value with 0.001 indicates that there is significant difference between experimental group exposed to problem solving strategy and those exposed to lecture method in socio-cultural belief scale. Therefore the null hypothesis which says there is no significant

difference in the mean scores of students in socio-cultural belief scale taught using problem-solving strategy as compared to those exposed to lecture method is rejected.

Hypothesis 3

H_{0_3} There is no significant difference between mean scores of student in ISAT who were exposed to problem-solving strategy and those who were exposed to lecture method.

To test this hypothesis, t-test statistics was used. Table 4.3 showed the result of the analysis.

Table 4.3 Summary of t-test Comparison of Students Mean Scores In ISAT taught with Problem Solving Strategy and Lecture Method.

Groups	N	X	SD	Df	t-cal	P-value	Remarks
Exp.	50	45.6	16.67	1.98	4.2	0.001	Significant
Control	50	36.1	14.90				

Significant at $P \leq .05$

As shown in the Table 4.3. The p-value with 0.001 is lower than significant value at $p < 0.05$ This shows that there is significant difference in the mean scores of students who were exposed to problem-solving strategy (experimental group) and those who were exposed to lecture method (control group) in ISAT. This means that problem solving strategy significantly improved students academic performances in integrated science by reducing the effect of their socio-cultural belief in science. Therefore the null hypothesis which

says there is no significant difference in mean scores of students in ISAT, taught using problem solving strategy and lecture method is rejected.

Hypothesis 4

H_{04} there is no significant difference in the mean scores of male and female students' in their socio-cultural belief scales when taught integrated science using problem solving strategy.

To test this hypothesis, Wilcoxon statistics was used. Table 4.4 shows the result of the analysis.

Table 4.4 Summary of Wilcoxon signed Rank Test Comparison of Male and Female Students taught with to Problem Solving Strategy

Variable	N	X	Sd	Z	p.value	Remark
Male	30	104.933	28.32439	2.202	0.033	Significant
Female	20	122.550	26.78467			

Significant at $P \leq 0.05$

The result indicated that there is significant difference between the effect of problem-solving strategy as regards gender on their socio-cultural beliefs. The mean scores of the female students are greater than that of the male students as indicated in Table 4.4. The p-value which is 0.033 is lower than 0.05 level of significance. Therefore the Null hypothesis is rejected.

This means that male students were more affected than the female students in the use of the problem-solving strategy in eliminating the effect of socio-cultural beliefs.

Hypothesis 5

H_{01} there is no significant difference in the mean scores of male and female students in their academic performances in integrated science when exposed to problem – solving strategy.

To test this hypothesis t-test statistic was used.

Table 4.5 Summary of t-test Comparison of Mean Scores of Male and Female Students in ISAT Exposed to Problem Solving Strategy.

Sex	N	X	SD	df	t-cal	t-crit	p. value	Remark
Male	30	52.033	18.27469					
Female	20	41.500	18.23386	48	1.998	1.98	0.051	Significant

Significant $P \leq 0.05$

From Table 4.5: the result gives calculated value of t 1.998 and critical value of 1.98 at 0.05 level of significance with 48 degree of freedom. This indicates that there was significant difference between the academic performance of male and female students in the ISAT when exposed to problem solving strategy. The mean scores showed that the female students were less influenced by the problem solving strategy in reducing the effect of socio cultural beliefs on their performance in the ISAT. Therefore the null hypothesis was rejected.

Hypothesis 6

H_{06} there is no significant relationship between students' academic achievements in integrated science and their performance in Socio-Cultural Beliefs after exposure to problem-solving strategy. The result obtained is shown in Table 4.6

Table 4.6 Summary of Spearman Ranking of Problem Solving Strategy on SCBS Mean Scores and ISAT Mean Scores.

Variables	X	Sd	df	r.cal	r.crit	p.value	Remark
SCBS	114.42	34.86	48	0.411	0.195	0.001	Significant
ISAT	45.600	16.67					

Significant at P<0.05

The result in Table 4.6 shows that the calculated r.-value 0.411 is greater than r-critical value of 0.195 at 0.05 level of significance. Also the calculated significant p-value 0.001 for the test is lower than p-value of 0.05. This means that the score of students in socio-cultural beliefs (SCBS) and scores in ISAT are inversely and significantly related. Therefore the null hypothesis is rejected. This implies that the greater the socio-cultural beliefs of the students the lower their academic performance in science and vice versa.

4.3 Discussions of Results

The aim of this study is to find out the effect of problem-solving strategy and lecture method on socio-cultural beliefs hindering the learning of Integrated science at JSS level.

Null Hypothesis I

H_{01} there is no significant difference in pre and post test mean scores of students in SCBS when taught integrated science using problem-solving strategy.

The results from Table 4.1 showed that the posttest mean scores of students in SCBS is lower than that of pretest mean scores and the difference is significant. Wilcoxon signed rank test analysis was used to test

this hypothesis. This result obtained indicated that problem-solving strategy is effective in reducing the socio-cultural belief hindering the learning of science among the students. The students after being exposed to problem-solving strategy can give explanation to natural phenomena while before the exposure to this strategy, they held on to their preconceived beliefs, such as appearance of rainbow which they believed to mean that python is giving birth to a new baby, etc, they can now give its scientific explanation as refraction of light rays by droplets of water etc. this finding agreed with Wasagu (1999) where he reported that for several years scientific knowledge has not been integral part of African social-life because the minds of many Africans are loaded with power of witchcraft and superstitious beliefs in providing explanations to natural phenomenon. The finding also reflect Jegede (1997) where he reported that Nigeria like any other society that is scientifically illiterate has some unscientific explanations to natural occurrences which are in conflict with the learning of modern science by students.

Null Hypothesis 2

$H0_2$ there is no significant difference in the mean scores of students in SCBS when taught integrated science using problem solving strategy and lecture method.

The result obtained from testing hypothesis 2 showed there is a significant difference between the mean scores of students post-test in the socio-cultural beliefs compared to those exposed to problem solving strategy (experimental group) as measured by SCBS and students means

score exposed to lecture method (control). Wilcoxon singed rank test analysis was used to test this hypothesis. The result obtained indicated that the problem solving strategy is more effective in reducing the socio-cultural beliefs hindering the learning of science among the students. The students who were exposed to problem-solving strategy have their socio-cultural belief reduced. They can give scientific explanation to some of the natural phenomena, while students exposed to lecture method still hold on to their beliefs such as god of fertility which farmers must appease to avoid negative harvest and the belief that it is gods that control rain. Those in experimental groups did not hold these beliefs after they have been exposed to problem-solving strategy. This finding agreed with Okebukola (1993), where he reported that the values of a youth are influenced by the cultural system in which they are reared and that as a result individual begins to value and appreciate the socio-cultural beliefs which regulate their every day life, consequently govern their view of natural phenomenon. The finding also reflect Jegede (1997) where it was reported that socio-cultural factors control to a large extent what a child learns and what he becomes in life. The finding is also in line with Wasagu (1999) where it was reported that explanation of natural phenomena often conflict with leaning of science by students'

Null Hypothesis 3

There is no significant difference in the mean scores of students in ISAT when taught integrated science using problem solving strategy and lecture method.

The result from Table 3, show that there is significant difference between students means scores in academic performance ISAT of those exposed to problem solving strategy experimental group and those exposed to lecture method.

t-test statically analysis was used to test this hypothesis. It was observed that students in al the experimental group exposed to problem-solving strategy had significantly higher performance in integrated science test (ISAT) than those in the control who were exposed to the lecture method. This lower performance of students in control group is consistent with Maddock (1981) where it was reported that one of the major influences of science education identified by students in developing countries is their feeling that school science is like a foreign culture magic to them.

The findings is also in line with Jegede (1994) where it was reported that students brings to science class room knowledge derived from their world view of natural phenomena as the basis of understanding science lesson. In line with this Aikenhead (1997) reported that this feeling stems from fundamental differences between the culture of western science and the indigenous culture and that deficiency in science is due to mediating effect of socio-cultural factor. This means that students who have been exposed to the problem solving strategy have shed off this pre-conceived beliefs inherited in their background culture.

The effect of poor performance as observed in this study could be reduced by the use of the problem solving strategy. This finding is consistent with Permida (2004) where it was reported that problem solving strategy help students to build up confidence and ability to solve scientific

problems. In line with this observation, Okebukola (1990) reported that poor performance is significantly associated with socio-cultural beliefs. And Ogbu (1992) al so reported that school learning and academic performance are influenced by a complex social, economic, historic and cultural factors. This observation is also reflected in Okebukola (1994) where it was reported that science instruction which involves discussions of socio-cultural views about science concepts altered students' attitudes towards the study of science. In the reported it was advanced that some socio-cultural factors were amendable to alteration in such a way as to promote the subjects positive attitudes towards the study of science. Jegede and Aikenhead (1999) also reported that most assistance pupils received when they attempt to negotiate socio-cultural borders will influence their success at science. Approving the use of problem solving in improving the students academic performance, Atadoga (2000), reported that problem solving enables students use their knowledge to build on skills and concepts for themselves.

Null Hypothesis 4

There is no significant difference in the mean scores of male and female students' in their socio-cultural belief scale when taught integrated science using problem – solving strategy.

From the result in Table 4.4 there is significance difference between the mean score male and female students in their socio-cultural beliefs when exposed to problem solving strategy. The result from table 4 showed that the male students had lower mean scores than female students. This

means that the problem solving strategy was more effective in reducing the socio-cultural beliefs of male than those of female students. Wilcoxon rank statistical analysis was used to test the hypothesis.

Null Hypothesis 5

There is no significant difference in mean scores of male and female students in their academic performance in (ISAT) when exposed to problem solving strategy.

The result from Table 4.5 showed that there is significant difference in the mean scores of male and female students in their academic performance in integrated science test (ISAT) when exposed to problem solving strategy. t-test statistical analysis was used to test this hypothesis. It was observed that male students who were exposed to problem-solving strategy were significantly higher in their academic performance than the female students who had higher socio-cultural mean score. This is in consistent with stone (1981) where it was reported that boys were better than girls in academic achievement and activities that required manipulation. The finding is in line with Tracy (1990) where differential gender achievement in science was attributed to sex role model orientation in the society. This finding is however contrary to Usman (2000) where no significant difference was observed between male and female as their academic achievement in science.

Null Hypothesis 6

There is no significant relationship between students academic achievement in science and their performance in socio-cultural beliefs scales after exposure to problem-solving strategy.

From the result in Table 4.6, it was observed that significant relationship existed between students' academic achievement in science and their socio-cultural beliefs. This relationship was discovered to be an inverse or negative relationship. This means that the higher the socio-cultural beliefs of the students, the lower their academic achievement in integrated science. This finding is consistent with Wasagu (1999) where significant relationship was reported between socio-cultural beliefs and academic performance of students in sciences.

CHAPTER FIVE

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

This study investigated the effect of problem solving strategy and lecture method on socio-cultural beliefs hindering science learning among students at the junior secondary school level. This chapter discussed the summary of research procedures and findings, conclusion and some recommendations on how to improve science teaching at junior secondary school. The chapter is discussed in the following format:

- Summary
- Conclusions
- Recommendations

5.2 Summary

The purpose of this study is to find out the effects of problem-solving strategy on socio-cultural beliefs hindering science learning among junior secondary school students. The sample comprised of one hundred junior secondary one (JSSI) integrated science students from selected junior secondary school in Gwagwalada area council of Abuja FCT. The study was undertaken to seek answers to the specific questions and hypotheses stated in chapter one. The study had three objectives:

- To find out to what extent the socio-cultural beliefs of student affect their academic achievement in integrated science.
- To find out to what extent the teaching method used by the teacher will help in eliminating socio-cultural belief which hinder their understanding of science concepts.
- To find out if gender is a factor in socio-cultural beliefs hindering the teaching of science among integrated science students.

Two instruments were used for the purpose of data collection and analysis. A 40 – item SCB and validated by experts in science education and a 40 – item multiple choice achievement test ISAT adopted by the researcher validated by experts in science education.

The data collected from the instrument were analyzed using t-test, Wilcoxon signed rank test and Spearman ranking statistics to test the hypothesis at 0.05 level of significance.

5.3 Summary of Findings

The summary of the findings from the result are as follows

i. The results of the analysis shows that the posttest means scores of student on SCBS is lower than that of pretest mean scores and the difference is significant. This shows that problem-solving strategy has reduced the effect of socio-cultural beliefs.
ii. The results of this analysis showed that the mean scores of students exposed to problem-solving strategy in SCBS was

lower than that of those taught using lecture method, and the difference is significant. This indicates that problem-solving strategy is more effective in reducing the socio-cultural beliefs hindering the effective learning of science by students. The lecture method.

iii. The result of the analysis showed that the mean scores of students in taught integrated science using the problem-solving is higher in ISAT than those taught using lecture method. The difference is significant. This indicates that problem solving strategy has reduced the socio-cultural beliefs of students, thereby improve their academic performance in integrated science.

iv. The result of this analysis showed that there is significant difference between the mean scores of male and female students in their socio-cultural beliefs when exposed to problem-solving strategy. The mean scores in SCBS for the female students were higher than that of the male students. This means that problem-solving strategy effect on socio-cultural beliefs has greater influence on male students than female students.

v. The result of this analysis showed that there is significant difference between the mean score of male and female students in the ISAT. The mean scores of the male students were higher than the mean score of the female students. This means that the problem-solving strategy effect on socio-cultural beliefs was greater influenced on male students than female students.

vi. The result of this analysis showed that there is significant relationship between students socio-cultural beliefs and their academic achievement in integrated science when exposed to problem solving strategy. This implies that the higher the socio-cultural beliefs of the student the lower their academic performance in science.

5.4 Conclusions

From the findings of this study, the following conclusions were derived:

i. The use of problem-solving strategy enhanced drastically the reduction in the socio-cultural beliefs of male students and led to the students understanding of integrated science concept hence improved their academic performance in science.
ii. The effect of poor performance in the students could be reduced by improving the use of problem solving strategy.
iii. It was observed that the female students exposed to problem solving strategy has higher mean scores in their socio-cultural beliefs than their male counterpart. This means that problem solving strategy effect on socio-cultural beliefs was greater on male students than the female students. This could be attributed to the fact that boys were better than girls in achievement activities that require manipulation.
iv. Inverse relationship existed between students' academic performance in science and their socio-cultural beliefs. The

findings, indicated that the use of appropriate instructional strategy in teaching and learning of science has the potentials of reducing students socio-cultural beliefs thereby enhancing effective learning of science and improving student's academic performance in science.

5.5 Implication of Findings

The results of the study have implications for educational practice with the regards to the use of practical oriented instructional strategy in the teaching of integrated science at Nigerian junior secondary schools. Firstly, this will enable the science teachers to make science real to the students, as it will help to reduce the effect of socio-cultural beliefs or preconceptions in students, thereby enhance the effective learning of science by the students. Secondly, science concepts are better understood and learnt when the lessons are practicalized by the students. The use of problem solving strategy have the potentiality of arousing students' interest, imagination, motivation, manipulation of skills, stimulation, curiosity and creativity thereby inculcating in them the ethic of science, which can also lead to productive life and permanent learning in students. It is, therefore desirable that integrated science teachers should adopt the use of problem solving strategy in the teaching/learning of science.

The use of problem solving strategy can help to solve the problem of student poor performance in integrated science as opined by Onwuka (1994) and Atadoga (2000).

5.6 Recommendations

Based on the findings of this research, the following recommendations are made.

i. Problem solving strategy should be encouraged in the teaching and learning of integrated science and other areas of sciences at all levels of institutions of learning as science is more of practical, activities than 'verbalism'.

ii. Science teachers should be aware of socio-cultural beliefs of students and relate to students prior knowledge of science concept before teaching the new ones as it will help to check the effect of socio-cultural beliefs that will try to inhibit the effective learning of science.

iii. Science curriculum in the national policy on education should include courses that will provide scientific explanations to natural phenomena observed in African society.

iv. Seminars, workshops, conferences, and other refresher courses for science teachers should be organized from time to time, this will enable the experts and professionals to update and equip these science teachers with recent knowledge and information about socio-cultural influence in the learning of science.

v. Science educators and curriculum designers should evaluate the teaching and learning of science periodically in an

attempt to incorporate problem-solving strategy into science teaching and learning in our various schools. This could be achieved by training resource persons to monitor its effectiveness.

5.7 Limitations of the Study

In this study some issues were considered as limiting factors. Issues associated with data collection procedures was of great importance. This study was limited to only junior secondary school in semi urban areas of Gwagwalada Area Council in F.C.T. Abuja.

Some students did not attempt some questions in SCBS especially during pre test and even in posttest those by female students taught using lecture method. This may be that those students were uninterested in the instrument due to their socio-cultural beliefs or because they were lazy. In which case their mean scores in the test may be affected negatively. The test might not correctly indicate their opinion. Moreso at the time this study was conducted there were about 3130 JSS 1 students in Gwagwalada Area council of F.C.T. Abuja. But the number of students who participated in the study was 100. This represented only 3% of the entire population as such limiting proper generalization of the findings of this study.

5.8 Suggestion for Further Studies

It would appear biased to rely and conclude that some socio-cultural beliefs hinder science learning without further investigation.

There may be need to research further on the influence of socio-cultural beliefs on girl child academic performance. Studies on the effect of problem solving strategy on the female child attitude towards the learning of science.

Other studies should include science teachers' attitude towards reducing preconceptions that hinders science learning in the classrooms.

Finally the effect of problem solving strategy should be introduced to all levels of science teaching/learning.

REFERENCES

Abimbola L.O. (1977). African-view and School Science Journal of Science Teacher's Association of Nigeria 10, 1.

Abdullahi, A. (1982) Science Teaching in Nigeria Atoto Press limited Ilorin, Nigeria. Pp. 12

Aikenhead G.S. (1997). Science and culture Nexus. A research report curriculum studies. SUNTEP Prince Albert Saskatoon Canada.

Aikenhead G.S. (1996). Science education border crossing into the sub culture of science. Studies in Science Education, 27(1) 52.

Aikenhead G.S. and Jegede O.J. (1999). Cross Cultural Science Education; Cognitive Explanation Of A Cultural Phenomenon Journal In Science Teaching 36 (3) 269 – 287.

Ajewole A.F. (1990). Effect of Guided Recovery and Expository transfer of learning. Journal of Science Teachers Association of Nigeria. 26(2) 51 – 66.

Ajewole A.G. (1991). Effect of Discovery and Expository of Students to Biology. Journal of Research in Science Teaching. 28 (5) 401 – 409.

Ajewole A.G. (2000) Improving Socio Cultural Aspect Of Classroom Learning Environment In Enhancing Students performance in Biology. Journal of Science Teacher's Association of Nigeria 41 Annual Proceedings.

Ajeyelemi D.A. (1990). Science and technology in Africa: Focus on Seven Sub-Saharan Countries. University of Lagos. Lagos.

Akpan O.E. (1992) Toward Creative Science Teaching and Learning in Western schools. Cape catholic mission press.

Akpan O.E. (1994) The tricontextual Millieu to Science Learning. The Role of Curriculum Implementers. A paper At Southern African Association For Research in Mathematics and Science Education Conference At University of Durban South African 27th – 30th January.

Akpan O.E. (1991) Tricontextural Role Of An African Student In Science Classroom: A Paper At Departmental Seminar Faculty of Education, University of Cape-cost, Ghana.

Akpan O.E. and Anamah Mensal, J (1992) The Tricontextural Milieu To Science Concept Learning of African Child Need For Teaching Model.Journal of Science and Mathematics Education 1 (1). 4 – 24.

Ali A. (1982) Discovery and Expository Task Presentation Among Nigerian Elementary Mathematics Pupils: Abacus 16. 99.00

Anderson, C.A. and Smith, E.L. (1987) Teaching Science, in V. Richardson-Koetiler (Ed) Education Handbooks: A Research Perspective (Pp. 84 – 111). New York, Longman.

Atadoga MM Ph. D (2004) Problem Solving And Approaches. A Science Teachers' Association of Nigeria Publication 2004. 91.

At Water, M.M. (1994) Research on Cultural Diversity In the Classroom In D.L Gabel (ED), Handbook of Research On Science Teaching And Learning (558 – 578) New-York Macmillan publicity Company.

Awodi S. (1984). A Comparative Study Of Teaching Science Biology As Inquiry Versus Traditional Didactic In Nigeria Secondary Schools. University Microfiling International Ph. D. Dissertation. I Ann Arboa Michigan. U.SA.

Bakari, S.G. (1998) "Towards A Gender Sensitive Education. The case of Federal College of Education, Yola, M.A. Project Submitted to the University of Sussex, August.

Begun P.A, Ungwumba A.O., Sallau, M.S., Saromi. M. (2001) Exam Focus Integrated Science for JSCE Published by University Press Plc Ibadan 2001.

Berinjide F. (2006) Improving Performance of Girls in School. Action to Promote Civil Education Forum for Africa Women Educationists (FAWE) Newsletter p8-9.

Biamba, A.A. (1993) Scientific knowledge and cultural practice. Implication for Non-Science Cultures: Journal of STAN 28 (1) 13-19

Bichi S.S. (2006) Newer Approach To Primary Science Teaching. A Workshop Paper Presented at Sabon Gari Local Government Workshop for New Teachers held on 27th (4) 2006, 2 – 6.

Bichi S.S (1988). The Design Of Inventory Skills In Senior Secondary Schools Practical Biology. Unpublished M.Ed. Thesis ABU. Zaria.

Bichi S.S (2002) in Pemida R.O. (2004) Problem Solving Approach, STAN Publication. Integrated Series No. 3.

Bichi S.S in Pemida, R.O. (2004) Problem Solving Approach In STAN Publication (2004). 74.

Bloom B.S. (1975) In Gbodi E.B. and Laleye A.M. 2006: Videotaped Instruction On Learning Of Integrated, Science,. Journal of Research In Curriculum

Cameron A. (2007) Cultural and Religious barriers to learning in basic Astronomy. A South African Study. A thesis submitted to the faculty of science university of the Witwatersrand, Johannesburg in fulfillment of the degree of Doctor of philosophy.

Catsamis S. (1995) Gender, race ethnicity, and science Education in the middle grades. Journal of Research in Science Teaching 32(3), 243-257

Cobein W.W. (1994) Thinking about alternative constructions of Science and science education. A Plenary Presentation For The Second Annual Southern African Association For Mathematics And Science Education Research Conference, University Of Durban-West Ville. Durban, South Africa.

Cobern W.W. (1996) World View Theory and Conceptual Change in Science Education International Journal Of Science Education, 80, pp. 579-610.

Cobern W.W. (1996) World View Theory And Conceptual Science Education 80. 579 – 610.

Dantata G.F. Gender and Child Right Issues and education for sustainable development in Godwin A. Ashituabe Ibrahim A. Kolo (2004) Education for sustainable development in Nigeria.

Deramola S.O. (1983) "The influence of locations and sex differences on the knowledge of basic physics processed by entering form II students in Kwara state SS" Journal of science teachers association of Nigeria 21(2), 126 – 132.

Duru, A.I.A (1997) Gender Difference in Admission Trend into Federal College of Education (Technical) Omoku, Rivers State (1993-1995). Journal of Technology and Education in Nigeria, Port Harcourt, 2(1&2), 14-17.

Duschell, R.A. and Gitomar, D.H. (1991). Epistemologies Perspectives On Conceptual Change: implications For Educational Practice. A Journal Of Research In Science Teaching, Vol. 28 (1).

Ezenwa V.I. (1993) A Comparative Study Of The Effectiveness Of Concept. Mapping and Guided Discovery. Teaching Strategies on Secondary School Students Understanding Of Selected Chemistry Concept. An Unpublished Ph.D Thesis A.B.U Zaria.

Federal Ministry of Education (2004) Core Curriculum For Integrated Science Junior Secondary School NERDC Press Lagos.

Federal Ministry of Education (2004) National Policy of Education. Lagos Federal Ministry of Curriculum For Senior Secondary School Syllabus Vol. 3 science Lagos.

Fugita, T., Kaiser S, Shimizu, K and Yoshioka, R (1999) In Ahove M.A.N (2000) Eheneiro Environmental Education Research Developing And Validating Students Cultural Beliefs Inventory Using Secondary Schools Of Western Nigeria.

Gbodi, E.B. and Laleye, A.M (2006) Effect of Videotaped Instruction On Learning of Integrated Science. Journal of research in curriculum and teaching (2006) (1) 10 – 19.

Gbodi, E.B. (1998) The effect of visual perception and gender differences on Nigeria senior secondary school students' achievement in selected physical geography concepts African Journal of Information technology (AJIT), 1(1), 217 50

Glasser, R. (1991) The Maturing Of The Relationship Between The Science of Learning and Cognition and Educational Practice. Learning and Instruction, 1, 129.

Guilford J. (1988) Fundamental statistics in psychology and education 4th edition.

Hawkins. J and Plea. R.D. (1987) Took For Bridging The Cultures Of Everyday and Scientific Thinking. Journal of Research In Science Teaching 24, 291 – 307.

Inomiesia T. (1985) The Development. Validation Standardization Of Integrated Science Achievement Test For Junior Secondary Schools Unpublished Ph.D. thesis ABU Zaria.

Ivowi, U. M.O. (1994) Simplifying Difficult Concepts In Science Technology And Mathematics (STM) Presidential Address The 35th Annual Conference of science Teachers' Association of Nigeria Abeokuta 26 – 30 September.

Ivowi, U.M.O (1992) Raising The Standard Of Performance In Public Exam In Science Technology Mathematics. STAN Position No. 4.

James T. (1992) Effectiveness Of Inquiry Versus Lecture Methods Of Teaching Biology In Secondary Schools in Niger State Unpublished M.ed. Thesis. A.B.U: Zaria.

Jegede O.J (1997) 41 Journal of STAN 41 first Annual proceedings. Science Teachers Association Of Nigeria in 1970 Integrated Science Education Series 2 and 3.

Jegede O.J. and Okebukola P.A.O. 1989 a b 1990, 1991, 1993 in Jegede O.J. and Ankenhead G.S. (1999) Transcending Cultural Borders: Implications for science teaching Research in science and Technological 17 (1)

Jegede O.J. and Okebukola P.A. (1987) Some Socio-Cultural Factors Militating against Drift Towards Science And Technology In Secondary Schools. A Paper Presented at the 28th Annual Conference Of The STAN 17Th – 22nd (8) 1987.

Jegede O.J and Okebukola, P.A.O. (1991) The Effect of Instruction On Socio-Cultural Beliefs Hindering The Learning Of Science Journal Of Research In Science Teaching 28(3) pp. 275 – 282

Jegede O.J. (1995), Collateral Learning And The Eco-Cultural Paradigm In Science And Mathematics Education In African, Studies In Science Education, 25, PP. 97 – 137.

Jegede O.J. (1997) School Science And Development Of Scientific Culture: A Review Of Contemporary Science Education In African, International Journal Of Science Education. 19 . pp. 1 – 20

Jegede O.J. and Aiken head G.S. (1999). Transcending Cultural Borders: Implications For Science Teaching. Research in Science And Technological Education Vol. 17, No. 1

Jegede O.J. and Fraser. B.J. and Okebukola P.A. (1994) Altering Scio-cultural Beliefs Hindering The Learning Of Science. Instructional Science Vol. 22 Pp 137 – 152.

Jegede O.J. and Okebukola (1988, 1989) Some Socio-Cultural Factors Militating Against Drift Towards Science And Technology In Secondary Schools. Research In Science And Technological Education, 7(2) 141 – 151

Jegede O.J. and Okebukola P.A. (1991): The Relationship Between African traditional cosmology and Students Acquisition Of A Science Process Skill Intentional Journal Of Science Education vol. 13 no. 1 pp. 37 – 47

Jegede O.J. and Okebukola P.A.O. (1993) Measuring The Effects of Socio-cultural Factors In Non-Western Science Classrooms. Hong Kong Journal of Educational Researchers, 40 – 7

Jegede O.J. and Okebukola P.A.O. 1990 The Relationship Between Africa Cosmology And Students Acquisition Of Science Process Skill. International Journal Of Science Education 15(1), 37 – 47.

Jegede, O.J. (1994) African Cultural Perspectives And The Teaching Of Science, in J. Solomon and G. Aikenhead, eds, Science Technology And Society Education. New York. Teachers college press (in press)

Lewin, K.M and Burbules. N. (1993) Construction of knowledge and groups learning. In K. Tobin (Ed). The practice of constructism in science education 51 – 69 Washington D.C.: AAA Press.

Lewin, K (1990) International Perspectives on the Development of Science Education Food for Thought. Studies in Science Education, 18:1-23

Maddock M.N. (1981) Science Education: An Anthropological View Point Studies In Science Education, 8:1-26. 74(5), 541 – 54

Manzanal R.F. Barreiro, L.M.R. and Jimenez, M.C (1999) Relationship Between Ecology Fieldwork And Student Attitude Towards Environmental Protection. Journal of Research in Science Teaching. 431 – 449.

Mari J.S. (2005) The understanding of science processes and it's relationship to achievement in integrated science. A Paper presented at research seminar of science education A.B.U Zaria.

Martins O.O. (2001) Scientific Literacy. A Lecture Presentation to PGDE Class Faculty Of Education Ahmadu Belo University Zaria.

Martins, O.O (1994) The Effect Of Inquiry And Lecture Teaching Approaches on The Cognitive Preferences On Integrated Science students. Unpublished Ph.D Thesis A.B.U zaria.

Muhammad H.G. (2004). The Effects of Activity-Based Instructional Methods On Academic Achievement Of Senior Secondary Students In Ecological Concepts. An Unpublished M.ed Thesis of ABU Zaria.

Novak, J.D. (1988) Learning Science And The Science Of Learning, Studies in Science Education 15:77 – 101.

Nwideeduh, S.B (1994) Equality in Educational Opportunities in Nigeria An Overview, Journal of Technical and Science Education Port Harcourt 3 (1&2) 184 – 102.

Nworgu, B.G. (1997) Teaching For Conceptual Understanding In Physics: A Conceptual Change Instructional Model. STAN Bulletin Vol. 14 (1) 4 -7.

Nworgu B.G. (1995) Assessing Students Deficiencies In Practical Physics Skills" A. Paper Presented At 36th Annual Conference Of Science Teachers' Association Of Nigeria Held At, Kashim Ibrahim College of Education. Maiduguri, 14 -19.

Ogbu J.U. (1992) Understanding Cultural Diversity And Learning Educational Research, 21 (8) Pp. 5 – 14, 24.

Oguniyi M.B. (1988) Adapting Western Science To Traditional African Culture International Journal Of Science Education. 10 1 -9 pp. 40

Ogunleye A.D. (2002) Science Teacher's Association of Nigeria Publication 2002 Integrated Science Series, (1).

Okebukola P.A.O. and Jegede O.J. (1990) Eco-cultural Influences Upon Students Concepts Attainment In Science. Journal of Research In Science Teaching 27(7). 61 – 69.

Okeke A.U.G. and Njlita C.B. (2000). Cultural Beliefs And Their Implications To Science Teaching And Learning In Secondary schools in Anambra state. Journal of Science Teacher's Association of Nigeria proceedings . 57 – 60.

Tabath M. (2005) An Investigation Into The Relationship Between Cultural Beliefs Acquisition And Students Understanding Of Some Biological Concepts At Senior Secondary School Level. A Paper Presented At Research Seminar Of Science Education A.B.U Zaria.

Okafo U.N (2002) The Effect of Science-Technology Society Instructional Approach on Secondary School Students Achievement In Chemistry. An Unpublished M.Ed Thesis A.B.U Zaria

Ogunniyi, M.B. (2002). Border Crossing And The Contiguity Learning hypothesis. Proceedings of the 10th Annual Conference of the Southern African Association for Research in Mathematics, Science and Technology Education, University of Natal, Durban, 22nd – 26th January, 2002.

Olorukooba S.B. (2001) The Relative Effect Of Cooperative Instructional Strategy And Traditional Method On The Performance Of Senior Secondary School Chemistry Students An unpublished Ph.D Thesis ABU Zaria.

Omolewa, M. (1977) Some Earliest Problems Of Science Education In Nigeria, 1859 – 1932 Journal Of The Science Teachers Association of Nigeria, 15(3) 15 – 21.

Oyedokun C. A. (1998) The Effect Of Conceptual Change Model On Students Achievement Retention And Attitude To Biology Concepts. An Unpublished Ph.D Thesis ABU Zaria.

Pemida, R.O. (2004) Problem Solving Approach In STAN Publication (2004). 74.

Pickering, A. Ed (1992) Science as Practice And Culture. Chicago University of Chicago Press 55.

Samba R. (1998) The Efficacy Of Conceptual Change Instructional Strategy in Remediation Identified Misconceptions. On Photosynthesis and Respiration Among SS1 Students. Unpublished Ph.D thesis ABU Zaria.

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Stone D.K. (1981). The Relationship Of Psychological And Skill Factors To Science Attitude And Achievement Of Fifth And Tenth-Grade Students. Doctoral Dissertation (Laremenot Graduate School. 1981). Dissertation abstracts International. 42. 03A

Shaboh P. (2005) Investigation Of The Effect Of Superstition On Science Learning. A Case Study Of Sabon Gari Local Government Areas Of Kaduna State Nigeria. A Seminar Paper Presented At Research Seminar On Science Education.

Shaibu A.A. and Mari J.S. (2001) The use of Integrated Approach In Teaching Of Forces Science Technology Association of Nigeria. 92.

Sambo, A.A. (2005) Research Method In Education 210 - 211

Tobin K. (1986). Students Task Involvement And Achievement In Process-Oriented Science Activities-Science Education. 10(1)61-72,

Tuckman B.W. 1978. Measuring Educational outcomes Harcom Brace Jeravack inc.

Usman A. (2000). The Relationship Between Students Performance In Practical Activities And Their Academic Achievement In Integrated Science Using NISTEP Mode Of Teaching. Unpublished Ph.D. A.B.U Zaria.

Wasagu, M. (1999) The Relationship Between Science Students Cultural Belief And Their Academic Achievement At The Secondary School Level In Sokoto State Journal Of The Science teachers association of Nigeria 34, 1 and 2.

APPENDIX A
Socio-Cultural Belief Questionnaire (SCBS)

Questionnaire on effect of Problem-solving strategy on socio-cultural beliefs hindering the effective learning of science at junior secondary school level.

This Scale is intended to help in finding the effect of Problem-solving strategy on socio-cultural beliefs hindering the effective learning of science. Information given on the questionnaire shall be treated with absolute confidentiality and is meant only for the purpose of this research.

Thank you for your cooperation

SECTION A

PERSONAL DATA OF THE RESPONDENTS

Age: Occupation:

Gender: Class:

Name of School: Town

Area Council:

Instructions: Indicate agreed or disagreed by ticking **[√]** agreed statement or **[x]**disagreed statement. Where;

SA = Strongly agreed. A = agreed UD = undecided

SD = Strongly disagreed D = Disagree

		SA	A	UD	SD	D
1.	Farmers must appease the gods of stone, land before and after using the farm implements to avoid negative effect on their farm.					
2.	The fertility of soil and its effect on crops, example yam productivity is determined by the gods.					
3.	It is good to sacrifice to the god of our fathers and land before eating new yam.					
4.	The goods must be appeased during harvesting period through masquerade festival, inability to sacrifice to the spirit at this time invites punishments in the form of sickness from it.					
5.	Farmers must appease the god of stone or land before cultivating a piece of land.					
6.	When rain did not fall at the appropriate time during farming season it is because some people have offended the god of rain.					
7.	Masquerade and fowls are used by people to sacrifice particularly in order to appease the god of rain.					
8.	The appearance of the rain bow in the day time indicates that a python is crossing a river or it is a sign of the passing away of an important traditional chief or ruler.					
9.	When rainbow falls on the ground it is pursuing somebody who is trying to do evil and wants to run					

	away.					
10.	It is the god of rain that forces the appearance of rainbow.					
11.	The sun, moon and stars are special god that need to be worshiped.					
12.	Thunder and lightening indicates the anger of god on the environment.					
13.	One should not clear dump refuse or enter into a sacred sites such as river, water, hills, forest because they are believed to have supernatural powers.					
14.	It is a taboo to fell or cut down some trees near our houses because they are believed to be guarding the life of members of that family.					
15.	Witches and wizards are responsible for the outbreak of small pox in your place.					
16.	It is good to consult an oracle for the healing of sick person in the family.					
17.	The gods of the land, punishes some body who has committed evil with certain sickness.					
18.	The study of science is a weird (Strange), special activity requiring some magical and supernatural explanations.					
19.	The society frowns at a situation where the elder's points of view especially that of science teacher by younger individual is challenged or questioned.					
20.	Students hardly display the huge to ask questions in class because they believe that science is foreign culture and has little relationship with their own world.					
21.	The younger members of the Nigerian society are					

	supposed to learn and believe on the traditional beliefs of their society.					
22.	The scientific knowledge is different from the traditional beliefs of my society so I find it difficult to understand science.					
23.	scientist give false ideas about nature					
24.	Rainfall can be induced by praying to the god of rain.					
25.	Poor performance of a child in the school science can be as a result of activities of witches and wizards in the environment.					
26.	Some natural objects around us posses what man possess therefore there is need for them to be worshiped e.g. sun gives light, cloud pour out rain.					
27.	If a cry of a witch inform of bird is heard in the night and the following day a child dies, the witch said to be responsible for the death of the child.					
28.	Traditional doctors are better than medical doctors because they can do some incantations for one before they administer their drugs.					
29.	A baby that did not cry at birth is a from the evil spirit.					
30.	Pregnant woman should not see masquerade so that she will not give birth to replica of masquerade.					
31.	Appearance of rainbow means that rain will not fall.					
32.	When it is raining and the sun is shining at the same time, it means an elephant or a cow has just given birth to new baby.					
33.	Where a heavy winds blows and raise a lot of dust, papers and cellophane in a circular motion it mean					

	that the wind is from the world of the evil spirits.					
34.	When one hears the sound of the thunder and sees the lightening one must clap the two lips making a unique sound so that the thunder will not harm the person.					
35.	Death of an old person followed by birth of a new baby in the kindred is reincarnation meaning the old papa has come back again.					
36.	High mortality rate in children of the same parents are regarded dying and coming back to life 'Ogbanje".					
37.	If a pregnant woman goes to the river and fetch water she will deliver a dog.					
38.	Any man who plant hungry rice on Sunday, the hungry rice will produce weeds.					
39.	Certain sickness like leprosy are regarded as curses from the gods.					
40.	When one has some itching at the palm it means the person will receive plenty of money from unexpected person.					

APPENDIX B

INTEGRATED SCIENCE ASSESSMENT TEST (ISAT)

The instrument on the effects of problem-solving strategy on socio cultural beliefs hindering the effective learning of science. This questionnaire is intended to help in finding the effect of problem solving-strategy on socio-cultural beliefs hindering the effective learning of science. Information given on the questionnaire shall be treated with absolute confidentiality and is meant only for the purpose of this research.

Thank you for your corporation.

SECTION A

Personal Data

Age: Occupation:

Gender: Class:

Name of school:

SECTION B CONTENT

Instruction

Answer all the questions below. Select and tick the correct option for each question lettered A to E where appropriate.

1 As the baby is growing up he needs

a. in – adequate care
b. natural food
c. immunization
d. semi – solid food
e. coughing

2. Child care involves the following except

a. protection from diseases
b. giving regular birth
c. regular vaccination at stages of growth
d. avoiding child immunization
e. washing and keeping the child's cloth

3. Cholera disease causes

a. Headache
b. backache
c. dehydration
d. shivering
e. coughing

4. Heredity means

a. ability of parents to pass their characters of their off –springs
b. eating food as parents
c. dominant and recessive genes
d. responsibility given by the parents
e. a basic unit of life.

5. Genes are transmitted from parents to their offspring through the process of .....

a. Reproduction
b. Respiration
c. Excretion
d digestion
e. labour

6. A man and his wife with their children make up a family.....
a. Extended
b. Nuclear
c. compound
d. extended and nuclear
e. numerous

7. Inheritance of character is normally controlled by two contrasting genes but when one gene is expressed without the other the gene is known as.....
a. recessive genes
b. dominant genes
c. dormant genes
d. important genes
e. unsatisfactory

8. The specialized care or service before birth of a pregnant woman is referred to as.....
a. Intra partum care
b. post natal care
c. before care
d. ante natal care
e. after care

9. A doctor who specializes in caring for pregnant women and delivered mothers is called .....
a. a physician
b. an obstetrician
c. an optician
d. a radiontherapist
e. a dentist

10. The process of taking the baby off an entirely milk diet and giving him other foods in addition is called.
a. weaving
b. waning
c. Petting
d. Milking
e. Weaning

11. Which of these disease can not be prevented by immunization?

a. Poliomyelitis

b. tuberculosis

c. whooping cough

d. cholera

e. small pox

12. The specialized care given to a mother and her baby in the first six weeks following delivery is called

a. post natal care

b. ante – natal care

c. intra partum care

d. pre natal care

e. before care

13. .....is a vector of river blindness parasite

a. black fly

b. tsetse fly

c. housefly

d. Mosquito

e. bed bug

14. The carrier of hereditary characters in plants and animals are the

a. Chloroplasts

b. genes

c. nucli

d. cells

e. cytoplasm

15. Which of the following diseases is inheritable?

a. Malaria

b. colour blindness

c. small pox

d. tuberculosis

e. chicken pox

16. Malaria parasite is transmitted by

a. virus

b. bacteria

c. plasmodium

d. female anopheles mosquitoes

e. male mosquitoes

17. The basic difference between plants and animals is in

a. Chloroplast
b. Reproduction
c. Nutrition
d. Growth
e. Respiration

18. One of the characteristics of living organisms responsible for continuity of species is _____

a. Growth
b. Reproduction
c. Locomotion
d. Excretion
e. Feeding

19. Which of the following instruments is used for measuring the direction of wind ?

a. Barometer
b. Wind vane
c. Rang gauge
d. Hydrometer
e. Hygrometer

20 A person who makes use of scientific information to forecast future conditions of the weather is called

a. Astrologer
b. Meteorologist
c. Rain Maker
d. Seismologist
e. Soothsayer

21. The best equipment for measuring the amount of rainfall is called

a. Wind vane
b. An Anemometer
c. Rain A Barometer
d. A Rain gauge
e. Non of the above

22. Water borne disease include all but one of the under listed.

a. Cholera
b. Dysentery
c. Typhoid
d. Malaria
e. Diarrhea

23. Cholera is caused by
a. Vibrodiarrhoea
b. Vibro cholera
c. A virus
d. Eating beans
e. Any bacteria.

24. Symptoms of typhoid disease include all except....
a. Fever
b. Headache
c. Body pain
d. Intestinal disorder
e. Catarrh

25. Doctors give vaccination for the following diseases except.....
a. Polio
b. Tuberculosis
c. Diphtheria
d. Tetanus
e. Dysentery

26. What does body produce after vaccination?
a. Another disease
b. Antibodies
c. Antidisease
d. Cow pox virus
e. Immunity

27. Which of the following diseases is non-infectious?
a. Malaria
b. Colour blindness
c. Small pox
d. Chicken Pox
e. Tuberculosis

28. The force which keeps object moving round in a circle is called.
a. Gravitational force
b. Frictional force
c. Electrostatic force
d. Centripetal force

29. .....pulls all objects towards the center of the earth
a. Centrifugal force
b. Potential force

c. Fictional force
d. Gravitational force
e. All of the above

30. The following are prerequisite subjects for an aspiring medical student except?
a. Further mathematics
b. Biology
c. Chemistry
d. Physics
e. None of the above.

31. The following one science related occupations except?
a. Carpentry
b. Fishing
c. Pharmacy
d. Wrestling
e. None of the above.

32. The rotation of the Earth on its axis causes.....
a. Sunshine
b. Day and night
c. Eclipse
d. Rainfall
e. Night only

33. There are – planets in the solar system?
a. 9
b. 3
c. 4
d. 10
e. 32

34. The solar system comprises .....
a. Sun and planets
b. Sun and earth
c. Earth and Mars
d. Sun and Jupiter
e. Mercury and Pluto

35. The largest planet is .....
a. Jupiter
b. Mercury
c. Earth
d. Mars

e. Saturn

36. The smallest planet is .....
a. Mars
b. Mercury
c. Neptune
d. Venus
e. Pluto

37. Water cycle is .....
a. Drinking of water from natural source
b. The maintenance of body water
c. The circulation of water in nature
d. The uses of water by the primary producer
e. The circulation of water in human body.

38. The period of Conception to the delivery period is called...
a. Reproductive period
b. Gestation period
c. Development period
d. Cell division
e. Pollination

39. The part of the female reproductive organ is....
a. Sperms
b. Ovary
c. Penis
d. Testes
e. Scrotum.

40. Air in motion is called ....
a. Wind
b. Pressure
c. Volume
d. Temperature
e. Gravity

ANSWERS TO ISAT QUESTIONNAIRE

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

33. A
34. A
35. A
36. B
37. C
38. B
39. B
40. A

APPENDIX C

LESSON I

GROUP: **EXPERIMENTAL**

TOPIC: **CHARACTERISTICS OF LIVING THINGS**

CLASS: **JSS I**

NO. OF STUDENT: 50

DURATION: **80 MINUTES**

TIME: **10:40 – 12:00**

STRATEGY: **PROBLEM SOLVING**

INSTRUCTIONAL MATERIALS

Posters showing different kinds of living things card board paper showing the characteristics of living things.

BEHAVIOURAL OBJECTIVE

At the end of the lesson pupils should be able to:

i. List the characteristics of living things

ii. Explain the meaning of each characteristic.

PREVIOUS KNOWLEDGE

Students have been interacting with living and non-living thing in their environment.

INTRODUCTION

Teacher asked students question based on their previous knowledge leading to the new lesson e.g.

- let us compare a dog and a stone. Who can tell us what will happen if you whistle to a dog/ stone, which one will move and which one will not. Answer: dog.
- Can any one of them breathe as we do? Answer: yes
- Does any of them eat or drink? Answer: yes
- Does any of them increase in size? Since you have been seeing them. Answer: yes

BACKGROUND INFORMATION

Living things are quite different from non-living things. They have the following life processes or characteristics:

i. **Nutrition:** Living things like animals and trees feed on other substances while non-living things like stone, books, pencil do not.

ii. **Respiration:** Living things can breathe while non living things do not.

iii. **Excretion:** Living Organism excretes waste products from their body while non-living organism don not.

iv. **Locomotion or movement:** Living things or organisms move about in order to carry out their activities plant show growth movement only while non-living things do not move.

v. **Reproduction:** Living organisms can reproduce their young ones alive which resembles them. While non-living organisms do not.

vi. **Growth:** Living thing can grow while non-living things can not.

vii. **Irritability:** Living things are sensitive to external stimuli and can respond to them while non-living things do not.

PRESENTATION

The teacher presented the lesson in the following steps:

STEP I

The students been divided into 10 groups of 5 students per group.

ACTIVITY 1

Write three columns and put the following in their correct class and give reasons for your decision. Example.

Living things	**Non-living things**	**Reasons**
A tree		Can grow
	Rubber	Cannot move

Then do the following Bird, desk, goat, chalk, fowl, stone, sheep, glass , grasshopper , paper, elephant, charcoal, monkey book maize etc the reasons you will give can be it can move, can feed, grow, breath in air.

STEP II

Teacher provided a list of the following, flower, earth worm, lizards, ants, dog duster, chalk boo boys and the girls beans tree, guava, house flies, fish, mango tree, rat etc.

ACTIVITY II

The students are required to use the provided materials list to find out the animals that are living those that are not living, those that are plants and those that are animals.

ACTIVITY III

The students in their various groups keep the record of the activities keep the record of the activities and the results:

STEP IV

Moderation that is group /class discussion:

The students through the group leaders presents their results or findings from teacher and students moderation. The teacher does the final correction while the students effect the corrections.

EVALUATION

The teacher evaluated the lesson by asking the students the following questions:

Q. Group the following into living and non-living things: goat, rice grain, wood, cat, ant, lizard, sugar, stone.

A. goat, rice grains, cat lizard, lizard are living thing while sugar stone, wood are non living things.

Q. From the list you have made write down all the animals, how did you sort out the animals from the other living things?

A. Animal move on its own, can feed, reproduce young ones, respire etc.

Q. List all the characteristics of goat that show us that it is an animal?

A. it can grow, move about etc.

Q. Why then do you think that stone is not a living thing.

A. Stones does not grow stones does not move on its own except by the help of man etc.

CONCLUSION

The teacher concluded the lesson by summarizing some important points.

- **Movement:** Living things move about in order to carryout their activities, plants can only move some parts of their body.
- **Respiration:** Living thing breathe in air

- **Nutrition:** Living things feed in order to get energy.
- **Irritability** or response to external stimuli.
- **Growth:** living things can grow
- **Excretion:** Living things remove waste product from the body
- **Reproduction:** Living things reproduce young ones of their own kind.

ASSIGNMENT

Make a list of the living and non-living things you can see in your environment.

LESSON: 2 UNIT 1

GROUP: **EXPERIMENTAL**

TOPIC: **HUMAN BEINGS AS HIGHER ANIMALS**

CLASS: **JSS I**

DURATION: **80 MINUTES**

TIME: **10:30-11:50**

STRATEGY: **PROBLEM SOLVING STRATEGY**

UNIT TITLE: **INTEGRATED SCIENCE**

NUMBER OF STUDENTS: **50**

INSTRUCTIONAL MATERIALS

Pictures showing different kinds of living things

BEHAVIOURAL OBJECTIVES

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

i. Identify groups of living things
ii. Place man in his proper group
iii. List out the differences between man and other animals.

PREVIOUS KNOWLEDGE

Students have been taught the characteristics of living things they have also been seeing different types of living things.

INTRODUCTION

Teacher introduced the lesson by asking the students questions based on their previous knowledge. Example:

Who can mention some of the living things in our environment?

Answer: bird, fish, lizard, plant, monkey, snake etc.

What makes human beings different from other animals? How different are we from a monkey, snake, fish and plants?

Answers: We can talk, stand upright etc.

BACKGROUND INFORMATION

Animals that have hair or fur at least on parts of its body, gives birth to young ones without laying eggs, the mother feeds its young with milk from breast are called mammals examples, man, gorilla, chimpanzee, rat, elephant etc.

Mammals can be subdivided into many groups. One of the sub-groups of mammals is the primates. Human beings including you have all these characteristics so you are a primate. All primates use the thumb and the fore finger to pick things up; you are a primate but different from other primate in the following ways:

i. Human beings the only primate with 'S' curve in their back bone. This enables him to balance in upright position and to do other works

ii. Human beings have the largest skull and brain of all the primate. The human brain and body both make human beings a special primate. That is the brain enables man to think plan, solve problems better than any other animals.

PRESENTATION

The teacher presented the lesson in the following steps.

STEP 1:

The students have been divided into 10 groups of 5 students per group.

ACTIVITY I

Students wrote out from the chart and posters presented to them the names of living things such as snake, bird, monkey, elephant, fish, rat, lizard, plant, grasshopper, worm, woman, gorilla, chimpanzee.



i.



ii.



iii.



iv.



v.



vi.



vii.



viii.



ix.

Key

i.	Gorilla
ii.	Woman
iii.	Elephant
iv.	Monkey
v.	Lizard
vi.	Worm
vii.	Rat
viii.	Grasshopper
ix.	Fish

ACTIVITY II

The students used their names to group these living things based on their similarities and differences example:

a. Which of these living things have the following characteristics:

i. fur or hair in all parts of the body.

Ans: Gorilla, monkey, rat

b. does not lay eggs but gives birth to young ones alive?

Ans: Woman, Elephant, gorilla,

c. The mother feeds the young ones with breast milk?

Ans: rat, chimpanzee, monkey.

ACTIVITY III

Students further found out the characteristics of sub-grouped mammals called primate before answering the following questions:

a. Do animals in your list all have nails on their hands and feet and not claws? Ans: No.

b. Can all animals grabs things with their hands? Write out the animals that can grasp things with their hands. Ans: monkey, woman, gorilla.

c. Do all have eyes in the front of their heads and not by the sides, write down the names of those that have eyes in the front and not by the side. Ans: gorilla, woman(man), chimpanzee.

d. Can they all stand upright? If no write down the names of those that can stand up right. Ans: man, (gorilla, ch

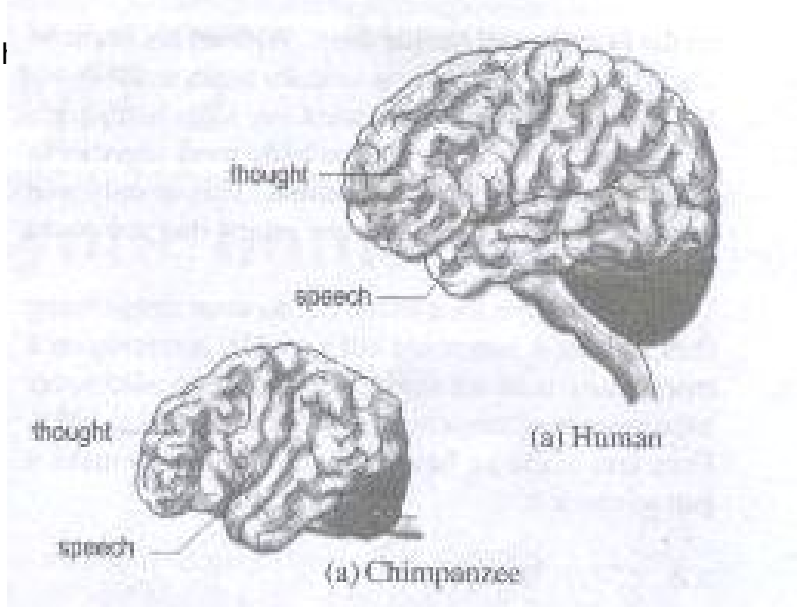


Diagram Showing the human brain and chimpanzee (other primates)

ACTIVITY IV

Student compare the skeleton and brain of man and other primates by answering the following questions:

i. Which of the 3 skulls has the largest skull?

   Ans: man skull is the largest.

ii. Which of the three skeleton has an S curve in its backbone?

   Ans: Man's skeleton.

iii. What is the effects of man's type of brain to man's development? Ans: the highly developed brain helps man to control human thinking and speech.

DISCUSSION

Students discussed in their various groups those qualities that makes man higher than other animals.

MODERATION SECTION

The students presented their answers though their group leaders for the teacher to moderate as she listened. The teacher corrected the students while the students effect the correction in their notebooks.

EVALUATION

The teacher evaluated the lesson by asking the students questions on the new lesson to test their understanding the new lesson.

- Are all primates mammals? Response: Yes
- Are all mammals primates? Response: No
- Name two primates with tails and two without tails?
- Give two examples of how the brain and body of man work together to help him do things that other primates cannot do?

  Answers to question 3 and 4 are as follows: primate with tails are a. monkey b. rate. Primate without tails are a. man b. gorilla.

  Answer to question 4: the brain and body of man work together to help him do things that other primate cannot do in the following ways: The brain enables us to think, plan and solve problems better than any other animal.

  Man has to use his body to help him do his work, example he uses his hand to make and handle tools.

CONCLUSION

The concluded the lesson by summarizing some of the salient point of the lesson such as human beings belongs to a group of animal called primates.

- Primates are a sub-group of mammals human beings differs from other primates because they move about in an upright position.
- Their brain is developed for thought and speech.
- Their ability to think helps him to solve problems.

ASSIGMENT

Look at three animals in your environment. Write down all the characteristics they have in common and submit it.

LESSON: 3

GROUP: **EXPERIMENTAL**
TOPIC: **A HEALTHY HOME ENVIRONMENT**
STRATEGY: **PROBLEM SOLVING**
CLASS: **JSS I**
DURATION: **80 MINUTES**
TIME: **10:40 – 12:00**
STRATEGY: **PROBLEM SOLVING**
NUMBER OF STUDENTS: **50**

INSTRUCTIONAL MATERIALS

Charts illustrating healthy and unhealthy home environment. Students are living in different home environments.



Unhealthy home
(A crowded home)



Healthy home
(well ventilated home)

BEHAVIOURAL OBJECTIVE

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

i. Describe a healthy home environment.

ii. Mention and list four characteristics of a healthy home environment

iii. Differentiate between healthy and unhealthy home environment.

iv. Mention at least three vectors of diseases in an unhealthy home environment.

PREVIOUS KNOWLEDGE

Students have suffered from one disease or another.

INTRODUCTION

Teacher asks students questions based on their previous knowledge leading to the new lesson such as which type of toile system do you have in your home? Where do you drop waste materials after use? etc. which type of house are you living in? How many windows do you have in your house? Etc.

BACKGROUND INFORMATION

A healthy home environment is one that is clean and free from disease carrying matter. A healthy home has the essential facilities that promote good health such facilities include functional toilet, kitchen, bathroom, and storage. These must be properly maintained and cleaned regularly. A healthy environment is clean, well ventilated and free from damp, noise, and objects that cause accidents. It also has a safe water supply. On the other hand an unhealthy environment encourages the growth of micro-organism and contains insects which carry micro-organisms from one place to another.

VECTORS:

A vector is an animal which can carry micro-organisms that cause disease from one animal to another e.g. mosquitoes, tick, rats, flies,

lice etc. this is to say that unhealthy home environment promotes diseases and epidemic like chicken pox, small pox etc.

PRESENTATION STEP I:

Teacher stimulates learners to discuss the types of houses they live in the types of houses they live in (flat, bungalow, separate compound attached houses).

ACTIVITY I

Teacher hang up the instructional material illustrating healthy and unhealthy home environments.

ACTIVITY II

Teacher encourages the students to identify and list the difference between healthy and unhealthy environments.

ACTIVITY III

The students in their various group of five present and discuss their findings.

MODERATION AND CLASS DISCUSSION

The students through the group leaders presents their findings/results for teacher and students moderation. The teacher does the final corrections while the students effect the corrections.

EVALUATION

Teacher evaluates the lesson by asking the pupils question on the new lesson e.g.

- What are the differences between healthy good environment and unhealthy environment?

- Which of the two environment would you prefer to live in? why? Can you think of two animals that carry micro-organisms that cause diseases form one animal to another?

CONCLUSION

The teacher concludes the lesson by summarizing some important points e.g. a healthy environment is one that is clean, attractive and free form disease carrying matter. It is airy and well ventilated. It is not too hot nor too cold. It does not have domestic waste lying around nor animals that carry diseases around like flies, rats etc. while unhealthy environment is characterized by unclean or dirty full of domestic waste scattered here and there. It is also overcrowded and poorly ventilated; it is always noisy and smells from decaying foods and refuse dirty toilet can be perceived in such environment.

ASSIGNMENT

Describe six ways you can make environment healthy and unhealthy for living?

LESSON 4

GROUP: **EXPERIMENTAL**
TOPIC: **PREVENTING DISEASES**
CLASS: **JSS1**
DURATION: **80 MINUTES**
TIME: **10:30 – 11:50**
STRATEGY: **PROBLEM-SOLVING**

INSTRUCTIONAL MATERIALS:

Immunization chart:

OBJECTIVE:

At the end of the lesson student should be able to explain:

i. the meaning of immunization.

ii. Enumerate some diseases the children are immunized against.

PREVIOUS KNOWLEDGE:

Students have immunized or have been injected by some medical personnel. They have seen doctors or nurses inoculating babies:

INTRODUCTION

The teacher asked students questions based on their previous knowledge leading to the new lesson as follows:

i. How many of you have been injected by a doctor or nurse before? Answer: Many of them.

ii. Have you seen doctors or nurses giving vaccination to small babies before? Answer yes.

BACKGROUND INFORMATION

There is Government programme which is intended to immunize every child against childhood disease such as polio, whooping cough, measles and tetanus etc.

This programme is called Expanded Programme on Immunization (EPI) Immunization protects people from diseases, it means that you are unlikely to have a very serious case of the disease. Your body becomes immune to harmful disease when these dangerous micro-organism enter your body, the cells in your body reacts to their presence by making antibodies. Antibodies dump these micro-organisms together so that blood cells can break them down; making them harmless to the body. Most doctors give vaccination or inoculations (injections) against diseases like diphtheria, tuberculosis, whooping cough polio and measles.

PRESENTATION

The teacher presented the lesson in the following steps:

STEP 1:

The students where divided into 10 groups of 5 students per group.

STEP 2:

Teacher gave each group a copy of immunization chart.

ACTIVITY 1:

Students identify from the chart some diseases that can be immunized at infancy.

Answer: Poliomyelitis measles, tetanus etc.



IMMUNIZATION

Immunization	Age							
	0 mth	3 mth	4 mth	5 mth	9 mth	18 mth	5 years	Remarks
B.C.G	✓							Given immediately after birth
Poliomyelitis		✓	✓	✓		✓	✓	3 doses first followed by 2 booster doses
Triple Antigen		✓	✓	✓		✓		3 doses first followed by booster at 18 months
Measles					✓			Only once in infancy
Tetanus							✓	Only once at age 5

Suggested Immunization as applicable in Nigeria. (Source: Nutrition Division, Federal Ministry of Health

ACTIVITY 2:

students trace from the immunization chart the age at which each disease is immunized against.

ACTIVITY 3:

students through their findings from immunization and compiles their finding for discussion and moderation.

DISCUSSION:

Students discussed among themselves how immunization is carried out among children in their community.

MODERATION

The teacher listened to presentations of answers by the group leaders for moderation. The teacher gave summary of students findings for then to copy into their notebooks.

EVALUATION

The teacher evaluated the lesson by asking the students questions on the new lesson to test their understanding of the lesson as follows:

i. What do you understand by the term immunization? Answer: immunization is the protection given to people against disease.
ii. Mention some diseases that you need to be immunized again in childhood. Answer: Polio, measles, tetanus, whooping cough, tuberculosis etc.
iii. When does immunity occur in your body? Answer: Immunity to a disease occurs when the body has antibodies to fight that disease.

CONCLUSION

The teacher concluded the lesson by summarizing the contents taught in a short not or chalk board summary. Immunization is the protection given to people against a disease. Every child immunized against childhood diseases such as polio, whooping cough, measles, tetanus, tuberculosis etc. the body get immune, when the body cells form antibodies that fight against such disease.

ASSIGNMENT

Find out from parents whether you have been immunized against childhood diseases such as whooping cough, tetanus, measles, polio etc.

LESSON 5

GROUP: **EXPERIMENTAL**
TOPIC: **PREVENTING DISEASES (OTHER DISEASES)**
CLASS: **JSS1**
DURATION: **80 MINUTES**
TIME: **10:40 – 12:00**
STRATEGY: **PROBLEM SOLVING**

INSTRUCTIONAL MATERIALS

Tap water, picture of a child being inoculated, picture and chart of ways through which HIV/AIDS can be transferred.

BEHAVIOURAL OBJECTIVE:

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

i. Mention some diseases common among developing countries.
ii. State the causes and ways of preventing such disease in our community.

PREVIOUS KNOWLEDGE

Students have suffered from one sickness or another and have seen other people suffering from such sickness like malaria.

INTRODUCTION

Teacher introduced the lesson by giving the students the basic information on some diseases in Nigeria e.g. our communities should work together to keep the ground water supply free from harmful micro-organism that causes most diseases. This is because some diseases can be prevented by supplying clean water to the community, others by immunization and eating uncontaminated food as we can see from our table.

BACKGROUND INFORMATION

Infant mortality rate is one of the ways of raging nations in terms of development. In many developed countries because of their advancement in science, technology, medicine and child/care delivery. The infant mortality rate is very low. In the developing countries like Nigeria the infant mortality rate is high due to their backwardness in science and technology. Many of these diseases that causes children and adult mortality can be prevented in the following ways.

Disease	Causes	Preventions
Meningitis	Virus and bacteria, through poor hygiene, coughing, sneezing, over crowded and poorly ventilated rooms	Cleanliness, sleeping in well ventilated rooms, immunizations.
Malaria	Female anopheles mosquito by biting any person.	Have proper drainage around your house to avoid stagnant water needed by breeding mosquitoes. By sleeping under mosquitoes net By maintaining clean environment.
Chicken pox	When getting in contact with an infected person	i. Isolation of an infected person to avoid spread of the disease. ii. by cleaning your environment very well.
Typhoid fever	Eating contaminated food or drinking contaminated water, unimproved sachet water 'Pure water'	i. cover you food always to avoid flies perching on it. ii. by boiling water before drinking it.
Cholera	i. By eating contaminated food e.g. dirty food. ii. drinking of contaminated water like river, ponds, stream water etc.	i. wash you hands after going to the toilet and before eating wash with soap. ii. Drink boil water always iii. Maintain good clean hygiene.
Diarrhea	Caused by bacteria present in contaminated food, over ripe fruits or water (ponds, River, stream)	i. wash you hands with soap before eating and after using the toilet. ii. Boil you water and avoid flies perching on your food.
HIV/AIDS	Sexual intercourse with the affected person, using contaminated needles and un-sterilized piecing objects, blood transfusion.	i. avoid having sexual intercourse indiscriminately. ii. use sterile injection needles and syringes, sterile objects. iii. blood should be screened before transfusion.

PRESENTATION:

The teacher presented the lesson in the following steps:

STEP 1:

The students were divided 10 groups of 5 students per group.

STEP 2:

Teacher presented to the student the picture of tap water. The picture of young child being inoculated, picture and chart of ways through which HIV/AIDS can be transferred and that of ways it cannot be contracted.

ACTIVITY I:

The students identify the source of clean water.



Clean water is necessary for good health



A young child being inoculated

ACTIVITY 2:

Teacher presented the picture of a young child being inoculated and the students identified and describe the process of preventing disease through immunization or vaccination.

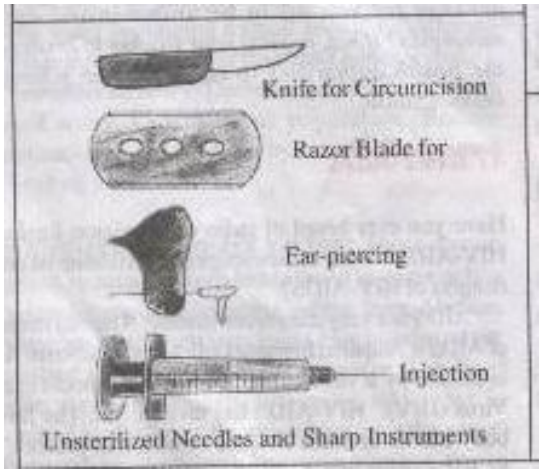
ACTIVITY 3:

From the picture of ways through which HIV/AIDS can be transferred and that of the ways it cannot be contracted, students identified and described the various ways HIV/AIDS can be transferred and the ways it cannot be contracted for example ways through which HIV/AIDS can be transferred are:

i. Sexual intercourse
ii. From pregnant mother to be the child in the womb
iii. Receiving infected blood from hospital etc.







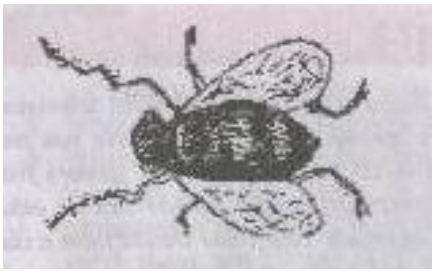


Ways of not contracting HIV/AIDS are:

i. Playing together

ii. Sharing food

iii. Reading together etc.



Insect Bite



Reading together



Shaking of hands



Sharing toilet



Playing together



Sharing food



Bathing together



Coughing and Sneezing.

ACTIVITY 4:

From the pictures presented to the students by the teacher students described ways diseases can be prevented such as by:

i. Drinking clean water from tap or pump.

ii. Immunization,

iii. Avoiding sexual intercourse etc.

STEP III

Group/class discussion: Students discussed the ways diseases can be prevented in relation to the causes and ways of prevention.

MODERATION SESSION:

The students presented their findings for the teacher to moderate as she listened to each group leader.

EVALUATION

The teacher evaluated the lesson by asking students questions on the new lesson to test their understanding of the lesson example.

i. Name three diseases that are caused by contact with dirty water. Answer: Typhoid fever, cholera, Diarrhoea etc

ii. Mention four diseases, state the causes and how they can be prevented.

Disease	**Causes**	**Prevention**
Chicken pox	Having contact with infected person	i. Isolation form infected person. ii. Living in clear environment etc.

CONCLUSION

The teacher concluded the lesson by summarizing the important points of the lesson in the following ways:

i. Most diseases can be prevented through proper care
ii. Clean water protects us from diseases carried by water.
iii. Eating good balance diet protect us from some diseases.
iv. Maintaining clean environment sleeping in well ventilated rooms, immunization prevents us from contacting diseases.

ASSIGNMENT

Each group should carry out a survey of hair cutting instruments in barber shops in your area:

i. How many barbers shops have sterilizers?
ii. Talk to the barbers on the importance of sterilizing their equipment to prevent HIV/AIDS ns other skin infection.
iii. Your class should form a club to discuss and carry out activities against the spread of HIV-AIDS and how to prevent other diseases you have learnt about.

LESSON 6

GROUP: **EXPERIMENT**
TOPIC: **GROWTH**
CLASS: **JSS1**
DURATION: **80 MINUTES**
TIME: **10:30 – 11:50**
STRATEGY: **PROBLEM SOLVING**

INSTRUCTIONAL MATERIALS

Metre rule, measuring tapes, pencils, bathroom scale, pupils themselves, Height scale, drawn on the wall.

OBJECTIVE:

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

i. define growth

ii. Measure growth of living things in term of height and weight.

PREVIOUS KNOWLEDGE

Students have learnt growth as one of the characteristics of living things, they have seen differences in height and weight of their class mates

INTRODUCTION

The teacher introduced the lesson by asking students questions based on their previous knowledge for example:

i. can you compare the height of 3 months baby and 4 years old boy, which one is greater? Answer: 4 years old.

ii. Compare your height 4 years ago were you shorter or taller than you are now? Answer taller.

iii. What is happening to your

Answer: I am growing

BACKGROUND INFORMATION

Growth is an irreversible and permanent increase in weight and size of an organism (living things). The increase is brought about by cell division and depends on organism in take of food. Living things will grow until they are fully grown usually the age of 25 years in human beings. This is why a newly born baby looks small at first and as time goes on the baby looks bigger and weighs more. Growth occurs in all living things.

PRESENTATION

The teacher presented the lesson to the students in the following steps

STEP 1:

The students stayed in their various groups which were divided into 10 groups of 5 students per group.

STEP 2:

The teacher gave each group their working materials such as measuring tapes, metre rule, Height scales.

ACTIVITY 1:

Students stood upright against the wall or metre rule looking ahead with feet together. The flat surface of a ruler is placed flat on his or her head to touch the scalp by another student. The point on the markings on the wall or metre rule which makes contact with the ruler is his or her height.

ACTIVITY 2:

Students also measure their weights using the bathroom scale. This is done by each student standing on upright on the measuring scale while another student took the readings on the scale which indicates the weight of the individual,. The records and readings are written in units of grams and kilograms.

ACTIVITY 3:

Students compared the height and weight of each student with their ages. For example Mary is 1.2 metre is 12 yrs John is 1.5 metre is 14 years old.



ACTIVITY 4:

Students measured and recorded height of their class mates.

DISCUSSION:

Students discussed how to determine the growth of living things through the measurement of height or weight increase.

MODERATION SESSION

The teacher asks the students to submit the findings for moderation through the leaders of various groups. For example the growth rate of living things can be calculated through regular measurement of their height and weight increase.

EVALUATION:

Teacher evaluated the lesson by asking students questions on the new lesson to test the understanding of lesson for example

i. What did you observed in the height and weight of each student measured? (increase or decrease in height as the person grows older). Answer: increase in height as the person grows older.

ii. Can the change in height be reversed? Answer No.

iii. Can you happened in human beings happen to plants? Answer Yes.

iv. It is because plant is a living thing and growth is one of the characteristic of living things.

v. Can you imagine yourself 3 years ago, were you shorter or taller now?

vi. Answer: I am taller. Why? It is because I am growing.

CONCLUSION

The teacher concluded the lesson by summarizing some important point of the lesson.

LESSON 7

GROUP **EXPERIMENTAL**
TOPIC **REPRODUCTION**
SUB TOPIC **CONCEPTION AND PREGNANCY**
CLASS: **JSS I**
DURATION: **80 MINUTES**
TIME: **10:40 – 12:00**
STRATEGY: **PROBLEM SOLVING**

INSTRUCTIONAL MATERIALS

i. Labeled diagram of human ovum and sperm

ii. Labeled diagram of sperm fertilizing an ovum

iii. Labeled diagram showing developmental stages of human embryo (foetus)

BEHAVIOURAL OBJECTIVE

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

i. State the meaning of fertilization in their own words.

ii. Define gestation period.

iii. Identify draw and label the diagram of sperm , ovum and the human embryo/foetus.

iv. Identify the stages of development of human embryo.

PREVIOUS KNOWLEDGE

The students have been seeing new born babies and pregnant mothers before puberty ovulation and menstruation.

INTRODUCTION

Teacher introduces the lesson by asking students questions on their previous knowledge leading to the new lesson example.

i. Who can tell us about three changes that takes place in a matured boy or girl?

ii. What is puberty?

iii. What is ovulation?

iv. You may have watched, the hatching of young chicken out of hen's egg. How did it get there?

BACKGROUND INFORMATION

When sperm unites with an ovum fertilization or conception occurs. This happens as the ovum passes down the fallopian tube in the first few days after ovulations. The zygote formed by the union moves down the fallopian tube into the womb and embeds or implants itself in the lining of the womb. There is increased blood supply to the mother's womb to ensure that the zygote is well nourished. The zygote which started as one cell divides to form more and more cells and the embryo is formed. This develops into foetus before it is delivered as a baby. The period from conception to birth is called the gestation period or pregnancy. For human beings the gestation period is about nine months.

PRESENTATION/PROCEDURE

STEP 1

The teacher divides the students into 5 groups of 5 students per group. Step II activities I teacher presents the diagram on cardboard and lead the student to identify and describe the sperm, ovum and fertilization.

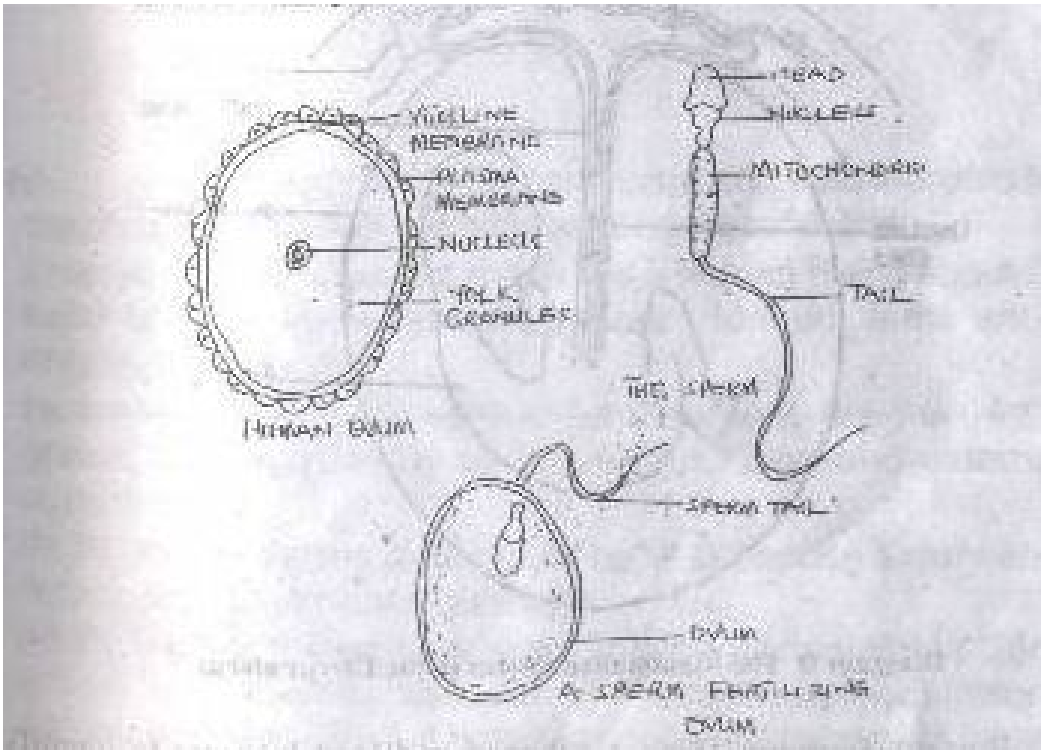


Diagram I The human ovum and sperm cells

ACTIVITIES 2

Teacher presents the diagram on cardboard and leads the students to identify and describe the features or changes that occur at each developmental stage of the foetus.

ACTIVITIES 3

Each group to list the features of each developmental stage of human embryo.

ACTIVITIES IV

the students make diagram of ovum, sperm and label them. Students also draw diagram showing the developmental stages of human embryo.

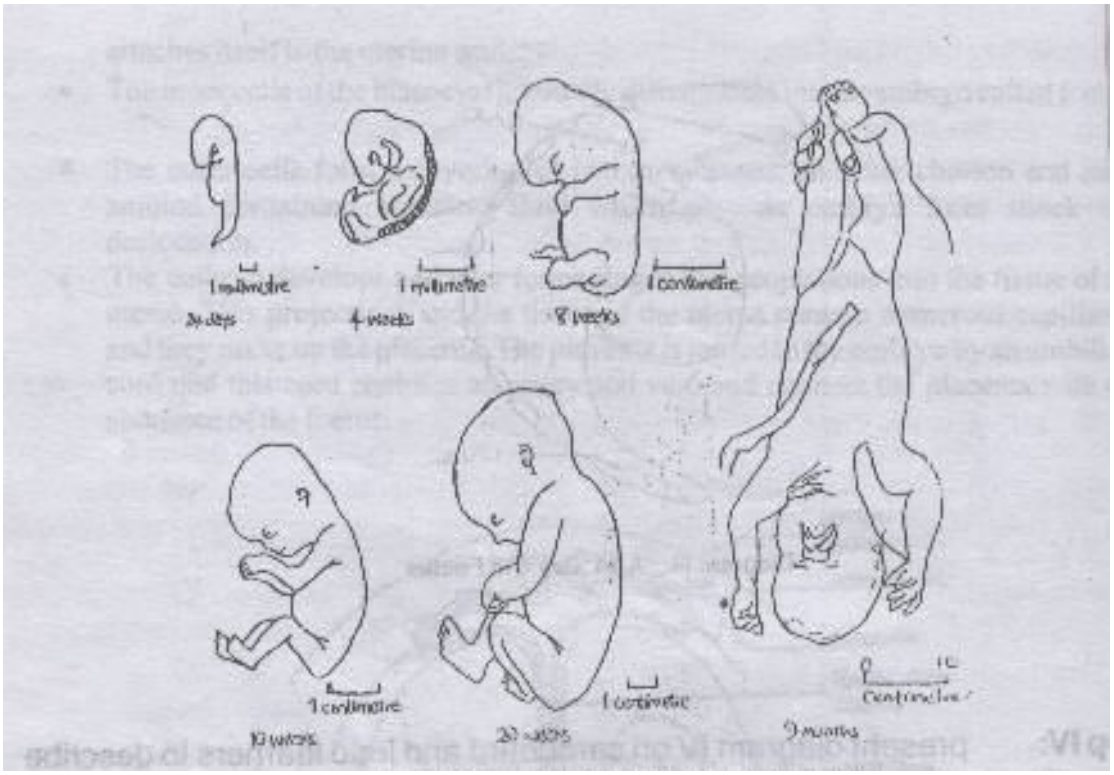


Diagram 2: Developmental Stages of Human Embryo

STEP 3

Discussion of the students findings among themselves.

STEP 4

Moderation session: the students presents their answers or results for teacher to moderate through their group leader. The group leader announces their results of his or her group for everybody's hearing in the classroom.

EVALUATION

Both teacher and the students evaluates the lesson by asking question based on the new lesson example what do you understand by the word fertilization?

- Question: define gestation period?
- Response: Gestation period is a period from conception to birth
- Question: State one feature you can see in 24 days embryo that is not in a 36 weeks foetus?
- Response: There is tail in 24 days old foetus, which is absent in 36 weeks foetus.

CONCLUSION

Teacher concludes the lesson by summarizing of some of the important point s of the lesson as below.

SUMMARY / SHORT NOTES

- When sperm unites with an ovum fertilization or conception occurs.
- The new cell formed by the union of the male and female gamete is called zygote.
- The zygote divides to form more and more cells known as embryo.
- This embryo develops into foetus before it is delivered as a baby.

The period from conception to birth is called the gestation period or pregnancy. For human beings the gestation period is nine months.

ASSIGNMENT

i. how many stages does foetus undergo before birth?

ii. Find out the gestation period of dog, cow, goat sheep etc. form Inter science books in your library and write them in a tabular form in your notebooks.

LESSON 8

GROUP **EXPERIMENTAL**
TOPIC **WATER CYCLE**
CLASS: **JSS I**
DURATION: **80 MINUTES**
TIME: **10:40 – 12:00**
STRATEGY: **PROBLEM SOLVING**

INSTRUCTIONAL MATERIALS

i. Diagram of the water cycle

ii. A round bottomed flask, beaker, heated water, cold water.

BEHAVIOURAL OBJECTIVE

At the end of the lesson, students should be able to:

- describe water cycle processes.
- mention other sources through which water can be lost into the atmosphere.
- demonstrate the water cycle processes.

INTRODUCTION

The teacher introduced the lesson by asking the students questions based on their previous knowledge leading to new lesson. Example:

i. Mention some of the sources of water we have

Answer: streams, rivers, oceans, lakes rainwater, tap water etc.

ii. What are the uses of water?

iii. Answer: we use water to wash, to cook, we drink water.

BACKGROUND INFORMATION

The sea is the source of all water in the world. the sun heats the sea; rivers, ponds and some of the water changes into vapour. The air containing water vapour rises cools and forms clouds. When the clouds are blown over high ground they release the water as rain. Rain water seeps through the soil and runs as river back to the sea, river and ponds. If rain water reaches a layer of rocks through which it cannot seep, the may accumulate and later reappear as a spring, which eventually runs back to the sea. This continuous movement of water from the land rivers and oceans to the atmosphere land rivers and oceans to the atmosphere and from the atmosphere to the land. Rivers and oceans, is known as the water cycle. Other sources through which water can get lost into the atmosphere include plant leaves; animals lose water through perspiration through elimination of waste and in the process of breathing. All these water lost into the air can get condensed to form cloud and fall again as rain and the process continues that is why it is called a water cycle.

PRESENTATION

The teacher presented the lesson using the following steps:

STEP 1

The students stayed in their divided 10 groups of 5 in each group.

STEP 2

The teacher described process of water cycle using the diagram and also performs experiment using the beaker, heated water and cold water for students to observe.

ACTIVITY 1

Students described the water cycle processes by looking at the diagram only.

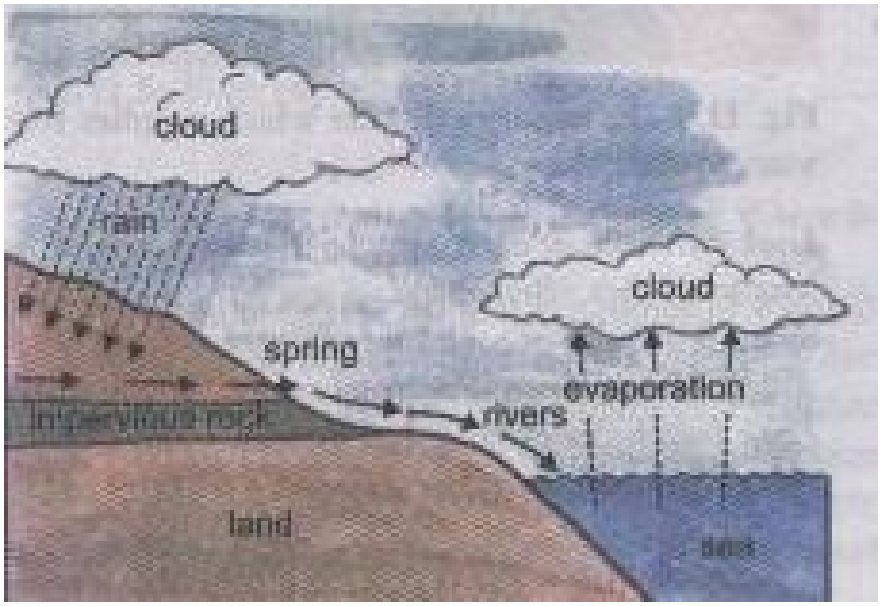


Diagram showing the water cycle

ACTIVITY 2

Students demonstrated the water cycle with beaker, round bottomed flask example:

Students heat water in a beaker until it is near the boiling point. They put some iced-cold water into a round bottomed flask and place the flask on the beaker at a slanted position, water will evaporate from the hot water, condense on the cold surface of the flask and falls in droplets back into the glass beaker.

ACTIVITY 3

Students observed and wrote down their observations that is the experiments demonstrated the water cycle in nature.

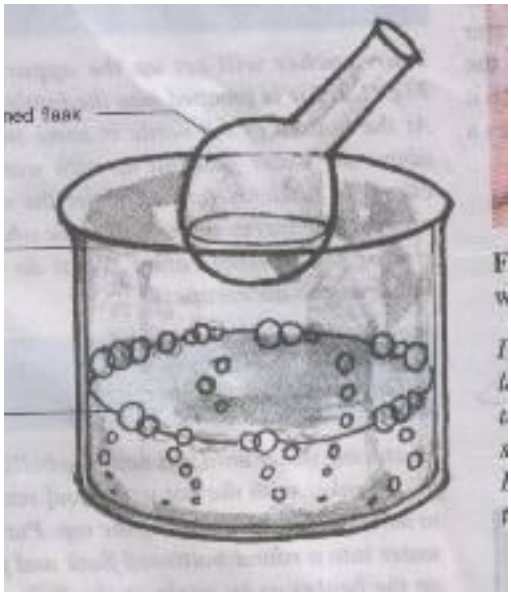


Diagram describing the water cycle

DISCUSSION AND MODERATION

Students discussed their findings and presented them to their teacher for moderation and corrections.

EVALUATION

The teacher evaluated the lesson by asking the students questions on the new lesson. Example:

i. explain with the aid of a diagram how water circulates in nature?

   Answer: In nature there is a 'water cycle'. Li quid water is heated form sea, rivers, stream etc. it is taken up by the air in the form of water vapour: as the vapour cools, the vapor condenses out as clouds. The cloud produces rain, which

falls back the ground as rainfall. This is a continuous process in nature. Therefore, it is call the water cycle.

ii. Mention other sources by which water can be lost into the air apart form rivers, stream and sea?

Answer: Through perspiration by animal elimination of waste, in the process of breathing etc.

CONCLUSION

The teacher concluded the lesson by summarizing the important points as notes for students to copy in their exercise books.

ASSIGNMENT

Describe three methods of making impure water clean or pure?

LESSON 9

GROUP: **EXPERIMENTAL**
TOPIC: **MAN IN SPACE**
CLASS: **JSS I**
DURATION: **80 MINUTES**
TIME: **10:40 – 12:00**
STRATEGY: **PROBLEM SOLVING**

INSTRUCTIONAL MATERIALS

Chart or poster showing day and night or demonstrating earth revolution round the sun.

BEHAVIOURAL OBJECTIVE

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

i. mention things that determine the weather conditions at any time
ii. give brief explanation of the words a. satellite planet b. planet and a star
iii. the purpose of sending human being into space.

PREVIOUS KNOWLEDGE

Students have been witnessing day and night, different seasons.

INTRODUCTION

Teacher introduces the lesson by asking the students questions based on their previous lesson e.g. how is it that it is light for about half the day, and darkness for the rest of the time? We can explain this if we suppose that the earth is turning round and round.

BACKGROUND INFORMATION

- The earth rotates about on axis through the North and South poles:
- Earth also revolves about the sun
- The earth's rotation about its axis causes day and night by exposing different part of the surface to the sun's rays. The revolving of the earth about the sun causes the seasons.
- The moon is a satellite of the earth and revolves round it once in about 29 days
- Moon light is sunlight reflected from the surface of the moon. And because of its relative position to the sun, which changes from day to day, we do not always see the full face of the moon. Stars are great spheres of gases which liberate a great deal of energy. Sun is a star, the bodies moving round it are planet. He moons are satellites of the planet. Human beings are able to go to space and spend days and months using a space rocket called 'space shuttle" this rocket helped man to conquer the force of gravity.
- Modern scientists stay as long as six months in space performing various experiments in medicine, technology environment weather patterns or agriculture. These experiments are beneficial to human beings.

PRESENTATION STEP:

The teacher presents the lesson in the following steps.

STEP I

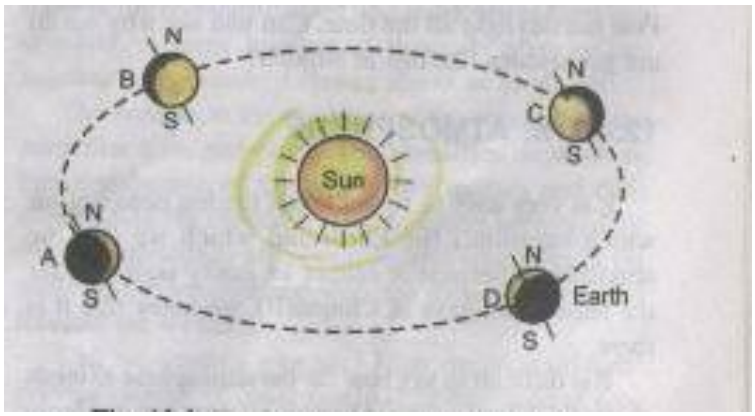
Teacher with the aid of teaching aids asks the student to demonstrate the day and night with torch light and globe.

STEP II

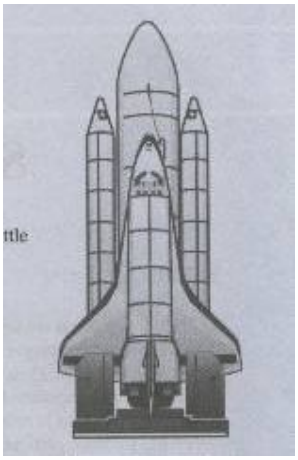
Teacher with the aid of chart of solar system explains and demonstrate the revolution of the earth round the sun.

ACTIVITY I

Teacher provides the diagram of the sun, the solar system and the moon. She asked the students to describe the position of each of these planet and their activities towards the planet.



Earth revolution round the sun



Space shuttle

ACTIVITY II

Students explain the difference between a satellite and planet b. a planet and a star.

ACTIVITY III

Students explains or describes the activities of space shuttle rocket.

STEP IV

Students in their various groups keep the record of the activities and results.

STEP V

Moderation that is group/class discussion.

The student through their group leaders presents their results or findings for teachers and students moderation. The teacher does the final corrections while the students effect the corrections.

EVALUATION

The teacher evaluated the lesson by asking the students questions in the new lesson. The students responded correctly and incorrectly.

Example what do you understand by the following words:

(a). a satellite (b). a planet and (c). a star?

Answer (a). a satellite gives light to the planet e.g. moon. (b). a planet is part or bodies of solar system which moves or revolves round the sun.

(c). stars are great spheres of gasses which liberate a great deal of energy e.g. sun.

What are the things that determine weather conditions at any time?

Answer: the rotation and revolution of the earth round the sun. rotation of the earth brings day and night while revolution of the earth round the sun bring about season (rainy and dry seasons)

What is the purpose of sending human beings into space?

Answer: Human being are sent to perform experiment that are beneficial to mankind such as in medicine, technology, environment, weather pattern and agriculture.

CONCLUSION

The teacher concludes the lesson by summarizing the important points.

- The earth rotates about on axis through the North and South poles:
- Earth also revolves about the sun
- The earth's rotation about its axis causes day and night by exposing different part of the surface to the sun's rays. The revolving of the earth about the sun causes the seasons.
- The moon is a satellite of the earth and revolves round it once in about 29 days
- Moon light is sunlight reflected from the surface of the moon. And because of its relative position to the sun, which changes from day to day, we do not always see the full face of the moon. Stars are great spheres of gases which liberate a great deal of energy. Sun is a star, the bodies moving round it are planet. He moons are satellites of the planet. Human beings are able to go to space and spend days and months using a space rocket called 'space shuttle" this rocket helped man to conquer the force of gravity.

ASSIGNMENT

What kind of experiment are carried out in space. Etc.

LESSON 10

GROUP: **EXPERIMENTAL**
TOPIC: **TOOLS FOR WORK**
CLASS: **JSS 1**
DURATION: **80 MINUTES**
TIME: **10:40 – 12:00**
STRATEGY: **PROBLEM SOLVING**

OBJECTIVE

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

i. Mention some occupation we have in Nigeria.

ii. Identify some of the traditional and modern tools in agriculture

iii. List some tools and their uses in the various occupation.

INSTRUCTIONAL MATERIALS

Picture of various basic tools used in agriculture, engineering, and medicine.

PREVIOUS KNOWLEDGE

Students have seen some of their tools and have even used some.

INTRODUCTION

Teacher introduced the lesson by asking the students questions on their previous knowledge to link them up with the new lesson for example.

Which farm tools do you use in clearing grasses in your farm?

Answer cutlasses and hoes.

What is the name of the tools the nurse or doctor uses to give injection to sick persons.

Answer: syringe and needles

How many you have seen the fisherman before? What is the name of tool he uses to catch fish?

Answer: hook.

BACKGROUND INFORMATION

Science has done a great deal to help human beings to do work more easily and more quickly. Today tool are being used in manly occupations such as Agricultural Engineering and Medicine to improve quality of human activities.

The purpose of using modern tools is to enable us to apply a small force to overcome a large work (resistance) conveniently.

Nigeria is an agricultural country. Farming is the major occupation most rural areas. The initial preparation of the land for cropping is done by men using the cutlasses and hoes to clean the farm land. Nowadays tools like the tractor can be used for farmland preparation and planting while harvester can be used to harvest the crops. Further more in the old days fishermen used a fishing hook which can only catch one fish at a time but in this modern time fishing net is used which may be operated by hand or be powered by a machine and can catch large number of fish at a time.

At the craft level carpenters and blacksmiths uses special tools example carpenter uses saw to cut wood, hammer to drive nail into wood.

More so engineering work uses many tools such as auto-machine and auto-electrician. A good example is side road auto-mechanic that uses spanners to undo the nuts in the car, a screw drives to undo the screw and jacks to lift up motor vehicles to service underneath it. The auto-electricians also uses spanner and screw drivers to remove nuts and to screw, in order to have access to various part of the connecting wires and to repair any fault.

In the field of medicine such tool as pair of scissors and forceps are used for cutting in surgical operations in hospital theatres.

Syringe, injection needles are uses to inject drugs easily into a patient's blood stream.

Stretchers are used to carry an injured person to medical attention room. An injured person can also use wheelchair or crutches to move about. All these tools help us to do better and neater job in our various occupation.

PRESENTATION

The teacher presented the lesson in the following steps:

STEP I:

The students stayed in their divided 10 groups of 5 group each.

STEP 2:

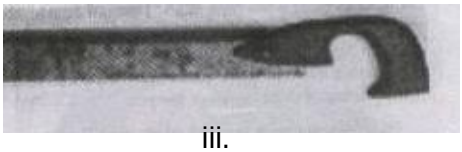
The teacher presented to the students pictures of different tools for students pictures of different tools for students to identify and group them according to the occupations in which each is commonly used. Agricultural engineering and medicine. The tools are:



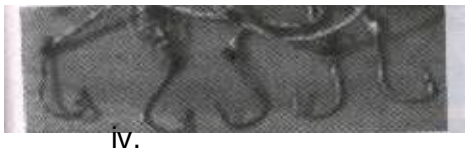
i.



ii.



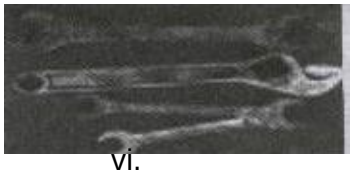
iii.



iv.



v.



vi.



vii.



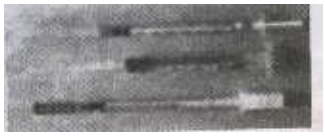
viii.



ix.



x.



xi.

Key

i. Cutlass
ii. Hoe
iii. Saw
iv. Fishing hooks
v. Hammer
vi. Spanners
vii. Jack
viii. Screw driver
ix. Net
x. Stretcher
xi. Syringe

ACTIVITY 1:

Students identified and grouped these tools according to the occupation in which each is used example:

Occupation	**Basic tools used**
Agriculture	Cutlass, hoe
Craft like fishing	Fishing hook, net
Carpentry	Hammer, saw
Engineering	Jack, spanners, screw driver.
Medicine	Syringe, stretcher

ACTIVITY 2:

Students identify the traditional and modern tools in agriculture and compare them.

Traditional tools for agriculture cutlass, hoe.

Modern tools are tractors, harvesters, etc.

i. with modern tools the human energy needed to use them is mall.

ii. With modern tools the job is completed in a short time and very finely done. Etc.

ACTIVITY 3

Students make list of these basic occupation tools and write down their uses. E.g. tractors: is used for preparing farm land and for planting crops.

Carpenter Saw is use to cut wood and a plane to smooth the surface of the wood.

The auto-electricians used spanners and screwdrivers to remove nuts and screw in order to repair any faults.

Stretcher is used in hospitals to wheel patients easily to operating theatre and back to the ward.

DISCUSSION SESSION

Students discussed tools for work under the following headings:

a. Agricultural tools

b. Crafts and engineering tools

c. Tools in medicine

d. Traditional and modern tools

MODERATION

The students presented their findings for the teacher and class moderation as they listened to each group leader.

EVALUATION

The teacher evaluated the lesson by asking students questions on new lesson to test their understanding of the lesson example:

i. Mention some major occupation we have in Nigeria?

Answer: Agriculture, craft like carpenter, Blacksmith, engineering, medicine.

ii. State the advantages of modern tools over traditional ones?

Answer: Modern tools use small energy and short time to accomplish finer job.

iii. Name, two tools used in the hospitals?

Answer: Syringe and needle the pair of scissors and forceps

CONCLUSION

The teacher concluded the lesson by summarizing the main points as follows:

- Work can be done more easily and efficiently by the use of a tool.
- The use of tools enable a small force to overcome a large resistance (work)
- The application of science to the modern tools brought about the difference between it and the traditional tools.
- There are some basic tools that are common to agriculture engineering, crafts and medicine.

ASSIGNMENT

i. Describe the tools used and the processes involved in planning crops on a farm.

ii. Visit a carpenter's shop and blacksmith shed, find out which tools are used there. Draw them and describe them.

iii. Do the same to auto-mechanic and auto-electrician's workshop.

LESSON 1

GROUP: **CONTROL**
TOPIC: **CHARACTERISTICS OF LIVING THINGS**
CLASS: **JSS1**
DURATION: **80 MINUTES**
TIME: **10:30-11:50**
STRATEGY: **LECTURE METHOD**
NUMBER IN CLASS: **50**

INSTRUCTIONAL MATERIALS:

Chart on living things

OBJECTIVE

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

i. List the characteristics of living things.

ii. Explain the meaning of each characteristics.

PREVIOUS KNOWLEDGE

Students have been interacting with living and non-living things in their environment.

INTRODUCTION

The teacher asked students questions based on their previous knowledge.

Example

i. Who can tell us what will happen if you whistle to a dog/stone, which one will move and which one will not. Answer dog.

ii. Does any of them eat or drink Answer: Yes dog etc.

PRESENTATION

The teacher presented the lesson in the following steps.

STEP I

The teacher explained briefly the topic with the help of instructional materials. Example living things are quite different from non-living things they have the following life processes or characteristics.

i. **Nutrition (Feeding):** Living things like animals land trees feed like animals and trees feed on other substances while non-living things like stone books, pencil do not.

ii. **Respiration:** Living things can breath

iii. Excretion: Living organisms excretes waste products form their body.

iv. **Locomotion or movement:** Living thing or organism move about in order to carryout their activities. Plant show growth movement only.

v. **Reproduction:** Living organisms can reproduce their young ones alive which resemble them.

vi. **Growth:** All living things can grow

vii. **Irritability or sensitivity:** Living things respond to external stimuli.

STEP 2

Teacher continued to explain the above characteristics one after the other.

STEP 3

The teacher went further on to tell the students that the non-living things do not poses all these characteristics the living things has. Any object that does not eat, respire, excrete, move, reproduce, grow etc is called non-living thing.

STEP 4 EVALUATION:

The teacher evaluated the lesson by asking the students question in the new lesson. The students responded correctly and incorrectly.

i. Mention 7 characteristics we have learnt today.

ii. Why do you think stone is not a living-thing?

iii. Explain at least four characteristics of living things.

CONCLUSION

The teacher concluded the lesson by giving the students notes to copy in their exercise book. Example: Characteristics of living things.

i. Movement: Living things move about in order to carry out their activities, plants can only move some parts of their body.

ii. Respiration: Living things breathe in air.

iii. Nutrition: Living things feed in order to get energy etc.

LESSON 2

GROUP:	**CONTROL**
TOPIC:	**HUMAN BEING AS A HIGHER ANIMAL**
CLASS:	**JSS I**
NUMBER IN CLASS:	**50 STUDENTS**
DURATION:	**80 MINUTES**
TIME:	**10:30 – 11:50**
STRATEGY:	**LECTURE METHOD.**

INSTRUCTIONAL MATERIAL:

Poster showing different kinds of living things.

BEHAVIOURAL OBJECTIVES:

At the end of the lesson the student should be able to:

i. identify group of living things

ii. Place man in his proper group

iii. List out the difference between man and other animals

PREVIOUS KNOWLEDGE

Students have taught the characteristics of living things. They have been seeing different types of living things.

INTRODUCTION

Teacher introduced the lesson by asking the students questions based on their previous knowledge example:

Who can mention some living things in our environment.

Answer: bird, fish, Lizard, plant, monkey, snake etc.

How different are you from monkey, fish, plants.

PRESENTATION

The teacher presented her lesson in the following steps:

STEP I:

The teacher presents the lesson by giving brief explanation of the topic to the students with the aid of instructional materials e.g. Animals that have hair or fur at least part of its body, gives birth to its young ones without laying eggs, the mother feeds its young with breast milk, are called mammals example are gorilla, man, rat, snake, monkey etc.

STEP 2

Teacher went further to tell them that mammals are divided into many groups. One of the subgroup is the primate Human being including you is a primate. All primate use the thumb and forefinger to pick things up. You are different form other primate because you have back bone, largest skull and brain.

STEP 3:

The teacher placed the poster showing different kinds of animals on the board for students to see.

STEP IV:

The teacher evaluated the lesson by asking the student the following questions:

i. are all primates mammals?
ii. Name two primates with tails and two without tails?
iii. Give two examples of how the brain and body of man work together to help him do things that other primates cannot do?

CONCLUSION

The teacher concluded the lesson by giving the students note to copy in their notebooks.

Human beings belong to a group of animal called primate

Primate are sub-group of mammals

Humans beings differ form other primates because they:

- move in an upright position,
- their brain is developed for thought and speech,
- their ability to think helps him to solve problems.

LESSON 3

GROUP: **CONTROL**
TOPIC: **A HEALTHY HOME ENVIRONMENT**
CLASS: **JSS1**
DURATION: **80 MINUTES**
TIME: **10:30:11:50**
STRATEGY: **LECTURE METHOD**
NUMBER OF STUDENTS: **50**

INSTRUCTIONAL MATERIALS

Chart illustrating healthy and unhealthy home environment.

OBJECTIVE

At the end of the lesson pupils should be able to:

i. describe a healthy home environment

ii. differentiate between healthy and unhealthy home environments

iii. mention some facilities that should be present in a healthy environment

iv. name at least three animals vectors.

PREVIOUS KNOWLEDGE

- Students have been taught about personal cleanliness
- Students are living in different types of home environments

INTRODUCTION

Teacher asks students questions based on their previous knowledge leading to new lesson e.g. mention some of the things you do to keep your body clean?

What are the things one can see in your homes?

PRESENTATION

STEP 1

The teacher presents the lesson by giving brief explanation of the topic to the students with the aid of the instructional materials on the chalkboard example. A healthy home environment is one that is clean and free form disease carrying matter. A healthy home has the essential facilities that promote good health such facilities include functional toilet, kitchen, bathroom, and storage. These must be properly maintained and cleaned regularly. It must be clean and well ventilated, free from noise and objects that cause accidents. It also has a safe water supply. While on the other hand an unhealthy home environment is unclean overcrowded, poorly ventilated, noisy. It encourages the growth of micro-organisms and animals which carry them from one place to another, vectors such as flies, lice, rats, mosquitoes etc. that is it promotes diseases and epidemic like small pox, chicken pox, measles.

STEP 2

Teacher goes further to explain the lesson notes to the students

STEP 3

Teacher continues her explanation by referring to the diagram of healthy and unhealthy environment on the chalkboard.

EVALUATION STEP 4

- Teacher asks students questions to test their understanding of the lesson example what are the differences between the healthy home environment and unhealthy home environment? Which of the two would you like to live in ? why?
- Describe six ways in which you can make your environment healthy?
- Mention or name 3 vectors that carry micro-organisms from one person to another?

CONCLUSION

Teacher concludes the lesson by giving the students notes to copy.

LESSON 4

GROUP: **CONTROL**
TOPIC: **PREVENTING DISEASES**
CLASS: **JSS1**
DURATION: **80 MINUTES**
TIME: **10:40 – 12:00**
STRATEGY: **LECTURE METHOD**

INSTRUCTIONAL MATERIAL

Picture of young baby being immunized.

OBJECTIVE

- At the end of the lesson students should be able to state the meaning of immunization.
- Enumerate some diseases that students are immunized against.

PREVIOUS KNOWLEDGE

The students have seen doctors and nurses inoculating babies.

INTRODUCTION

The teacher introduced the lesson by asking students questions on their previous knowledge as follows:

i. How many of you have been injected by doctors on nurses before?

ii. How many of you have seen doctors or nurses giving injections to babies or adult before. Answer: Many

PRESENTATION

The teacher presented the lesson in the following steps:

STEP I

The teacher explained the topic briefly with the help of teaching aids that is the picture of young baby being inoculated by nurse hanging on the blackboard.

STEP 2

Teacher continued on the explanation refereeing to her lesson note example there is government programme which is intended to immunize every child against childhood diseases such as polio, whooping cough, measles and tetanus etc. this programme is called expanded programmes on immunization.

Immunization protect people form diseases when your body is immune to disease. It means that you are unlikely to have a very serious case of the disease.

STEP 3

The teacher went further to talk on the immunization example your body becomes immunized to harmful disease when these dangerously micro-organism enter your body, the cells in your body reacts to their presence by making antibodies. Most doctors give injection diseases like diphtheria, tuberculosis, whooping cough, polio, measles etc.

STEP 4

Teacher evaluates the lesson by asking the pupils questions on the new lesson. The students responded few correctly and many incorrect example.

i. What do you understand by the term immunization?

ii. Mention some diseases you need to be immunized against in childhood?

iii. When do immunity occur in your body? Etc.

CONCLUSION

Teacher concluded the lesson by telling the students to copy the notes on the blackboard in their note books.

LESSON 5

GROUP:	**CONTROL**
TOPIC:	**PREVENTING DISEASES AND (OTHER DISEASES)**
CLASS:	**JSSI**
NUMBER IN CLASS:	**50**
DURATION:	**80 MINUTES**
TIME:	**10:30 – 11:50**
STRATEGY:	**LECTURE METHOD**

INSTRUCTIONAL MATERIALS:

Picture of a sick person

OBJECTIVE:

- At the end of the lesson students should be able to mention some diseases common among developing countries especially Nigeria.
- State causes and way of preventing such diseases

PREVIOUS KNOWLEDGE

Students have suffered from one sickness or the other. They have also seen people suffering from such sickness like malaria etc.

INTRODUCTION

The teacher introduces the lesson by asking students questions based on their previous knowledge example:

i. How many of you have suffered from sickness before?

ii. Mention some of the sickness people suffer in our communities. Answer: Malaria, Headache, Fever, Stomach ache etc.

iii. What are the causes of these diseases? Answer: Witch, etc.

PRESENTATION

The teacher presented the lesson in the following steps:

STEP 1

The teacher explained briefly the topic with the help of instructional materials that is the picture of a sick person hanging on the blackboard.

STEP 2

Teacher continued on explanation refereeing to her lesson note example our communities should work together to keep the ground water supply free from harmful microorganism that causes most of the diseases. This is because some diseases can be prevented by supplying clean water to the community, other by immunization and eating uncontaminated food.

STEP 3

The teacher went further to talk on the prevention of diseases. Most diseases can be prevented through proper care such as HIV/AIDS, Chicken pox, typhoid fever, cholera that is by drinking contaminated water.

STEP 4

EVALUATION

The teacher evaluates the lesson by asking students questions on the new lesson. The student responded correctly and incorrectly example.

i. Name some diseases that can be caused by drinking contaminated water?

ii. Mention causes and ways of preventing some diseases.

CONCLUSION

The teacher concluded the lesson by giving the students notes on the blackboard to copy in their notebooks. Such as

i. Clean water protects us from diseases carried by water such as typhoid fever, cholera etc.

ii. Eating good and balance diet protect us from some diseases.

iii. Maintaining cleaning environment sleeping in well ventilated rooms immunization prevention us from contracting diseases etc.

LESSON 6

GROUP: **CONTROL**
TOPIC: **GROWTH**
CLASS: **JSS1**
DURATION: **80 MINUTES**
TIME: **10:30 – 11:30**
STRATEGY: **LECTURE METHOD**

INSTRUCTIONAL MATERIAL

Charts of growth on the blackboard.

OBJECTIVE

At the end of the lesson pupils should be able to

i. Define growth

ii. Measure growth of living thing interms of height and weight.

PREVIOUS KNOWLEDGE

Students have learnt growth as one of the characteristics of living things they have also seen differences in height and weight of their classmates.

INTRODUCTION

The teacher introduced the lesson by asking students questions based on their previous knowledge for example:

i. Can you compare the height of 3 months baby and 4 years old boy? Which one is greater.

ii. Compare your height e years ago and now, were you shorter or taller? Answer: Taller

What is happening to you

Answer: I am growing.

PRESENTATION

The teacher presented the lesson using the following step:

STEP I

The teacher explained the topic briefly with the help of the teaching aids that is chart on growth of human being hanging on the black board.

STEP 2

Teacher continued on the explanation refereeing to her lesson note example. Growth is an irreversible and permanent increase in weight and size of organism (living things). The increase is brought about by cell division and depends on organism intake of food.

STEP 3

The teacher went further to talk on the growth example every living ting will continue to grow until they are fully grown usually the age of 25 years in human beings. This is the reason why a newly born baby look small at first and as time goes on the baby looks bigger and weighs more. Growth occurs in all living things.

STEP 4

The teacher evaluated the lesson by asking students questions on the new lesson students responded correctly and some incorrectly. e.g.

i. Can change in growth of living thing be reversed?
ii. Can growth that happened in human beings happen in plants?
iii. Why?
iv. Can you imagine yourself 3 years ago, were you shorter or taller now?
v. Why?

CONCLUSION

Teacher concluded the lesson by telling the students to copy the notes on the blackboard into their notebooks.

LESSON 7

GROUP: **CONTROL**
TOPIC: **REPRODUCTION**
SUB TOPIC: **CONCEPTION AND PREGNANCY**
NUMBER OF STUDENTS: 50

DURATION: **80 MINUTES**
TIME: **10:30 – 11:50**
MODE OF TEACHING: LECTURE METHOD.

INSTRUCTIONAL MATERIALS:

Chart or diagrams of reproductive system.

BEHAVIOURAL OBJECTIVE

At the end of lesson students should be able to:

i. state the meaning of fertilization

ii. define gestation period

iii. draw and label the diagram of sperm, ovum, draw the diagram of developmental stages of human embryo.

PREVIOUS KNOWLEDGE

Students have seen pregnant women and new born babies before. Students have been taught about puberty, ovulation.

INTRODUCTION

Teacher asks students questions based on their previous knowledge:

i. What is puberty?

ii. Who can define ovulation.

iii. Mention 3 changes that take place in matured boys and girls.

PRESENTATION STEP I

The teacher presents the lesson by giving brief explanation of the topic to the student with the aid of instructional materials on the chalkboard example. When sperm unites with ovum fertilization or conception occurs. This happens as the ovum passes down the fallopian tube in the first few days after ovulation. The zygote formed by the union moves down the fallopian tube into the womb and embeds or implants itself in the lining of the womb. There is an increased blood supply to the mothers womb to ensure that the zygote is well nourished. The zygote which started as once cell divides to form more and more cells and the embryo is formed. This develops into foetus before it is delivered as a baby. The period from conception to birth is called the gestation period or pregnancy. For human being t he gestation periods is about nine months.

STEP II

The teacher continues her explanation on conception and pregnancy refereeing to her lesson notes.

STEP III

The teacher gives further explanation by referring to the diagram on the chalk board

EVALUATION: STEP IV

The teacher asks student questions based on the new lesson example:

i. What is fertilization?

ii. Define gestation period etc.

CONCLUSION

The teacher concludes the lesson by given t he students note to copy

LESSON 8

GROUP: **CONTROL**

TOPIC: **WATER CYCLE**

CLASS: **JSS 1**

DURATION: **80 MINUTES**

TIME: **10:40 – 12:00**

STRATEGY: **LECTURE METHOD**

BEHAVIOURAL OBJECTIVES

- At the end of the lesson students should be able to describe water cycle.
- Mention other sources through which water can be lost into the atmosphere.
- Demonstrate water cycle processes.

PERSONAL KNOWLEDGE

Students have been taught sources of water and purification of water.

INTRODUCTION

Teacher asks pupils questions based on their previous knowledge leading to the new lesson e.g. what are the sources of water supply? Ans: rain, tap etc.

PRESENTATION

STEP I

Teacher with the aid of teaching aids lead class discussion on the water cycle.

STEP 2

Teacher goes further to explain to the students the process of water cycle.

STEP 3

Teacher demonstrate the process of water cycle to the students.

EVALUATION

Teacher asks students questions on the new lesson to test their understanding of the lesson e.g. how does water circulate in nature? etc.

CONCLUSION

Teacher concludes the lesson by asking the students to copy the chalkboard in their note books.

The sea is the source of all water in the world. the sun heats the sea, rivers, ponds land some of the water changes into vapour the air containing water vapor rises cools and forms clouds. When the clouds are blown over high ground they release the water as rain. Rain water seeps though the soil and runs as river back to the sea, river and ponds. If rain water reaches a layer of rocks through which it cannot seep, it may accumulate and later reappear as a spring, which eventually runs back to the sea. This continuous movement of water from the land rives and oceans to the atmosphere land rivers and oceans to the atmosphere and from the atmosphere to the land, rivers and oceans, is known as the water cycle.

LESSON 9

GROUP: **CONTROL**
TOPIC: **MAN IN SPACE**
CLASS: **JSS 1**
NUMBER IN CLASS: **50**
DURATION: **80 MINUTES**
TIME: **10:20 – 12:00**
STRATEGY: **LECTURE METHOD**

INSTRUCTIONAL MATERIAL

Chart showing day and night picture of space shuttle.

OBJECTIVE:

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

i. mention things that determine the weather conditions at any time
ii. give brief explanation of the words a. satellite planet b. planet and a star
iii. the purpose of sending human being into space.

PREVIOUS KNOWLEDGE

Students have been witnessing day and night, different seasons.

INTRODUCTION

The teacher introduce the lesson by asking the students questions based on their previous knowledge example how is it, that it light for about half the day, and dark for the rest of the time? We can explain this if we suppose that the earth is turning round and round.

PRESENTATION

STEP 1

The teacher explained briefly the topic with the help of instructional materials.

STEP 2

The teacher continued on the explanation refereeing to her lesson notes example. The earth rotates about an axis through the North and South Poles.

Earth also revolves about the sun the earth's rotation about axis causes day and night by exposing different parts of the surface to the sun's rays. The revolving of the earth about the sun causes the seasons (dry and rainy seasons)

The moon is a satellite of the earth and revolves round it once in about 29 days.

STEP 3

The teacher went further to talk on the topic (man in space) example Moonlight is sunlight reflected from the surface of the moon, and because of its relative position to the sun which change from day to day, we do not always see the full face of the moon. Stars are great spheres of gases, which liberate a great deal of energy.

Sun is a star, the bodies moving round it are planet. The moons are satellites on the planet. Human beings are able to go to space and rocket called "Space shuttle". This rocket helped man to conquer the force of gravity.

Modern scientists stay as long as six months in space performing various experiments in medicine, technology environment weather patterns or agriculture. These experiments are beneficial to human beings.

STEP 4 EVALUATION

The teacher evaluated the lesson by asking the students questions in the new lesson. The students responded correctly and incorrectly.

Example what do you understand by the following words:

(a). a satellite (b). a planet and (c). a star?

Answer (a). a satellite gives light to the planet e.g. moon. (b). a planet is part or bodies of solar system which moves or revolves round the sun.

(c). stars are great spheres of gasses which liberate a great deal of energy e.g. sun.

What are the things that determine weather conditions at any time?

Answer: the rotation and revolution of the earth round the sun.

rotation of the earth brings day and night while revolution of the earth round the sun bring about season (rainy and dry seasons)

What is the purpose of sending human beings into space?

Answer: Human being are sent to perform experiment that are beneficial to mankind such as in medicine, technology, environment, weather pattern and agriculture.

CONCLUSION

The teacher concluded the lesson by giving the students notes to copy in their exercise books.

LESSON 10

GROUP: **CONTROL**
TOPIC: **TOOLS FOR WORK**
CLASS: **JSS 1**
DURATION: **80 MINUTES**
TIME: **10:40 – 12:00**
STRATEGY: **LECTURE METHOD**

INSTRUCTIONAL MATERIAL

Picture of some tools used in agriculture, engineering and Medicine.

OBJECTIVE

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

i. Mention some occupation we have in Nigeria.

ii. Identify some traditional and modern tools in agriculture

iii. List some tools and their uses in the various occupation.

PREVIOUS KNOWLEDGE

Student have seen and used some of these tools before.

INTRODUCTION

The teacher introduced the lesson by asking the students questions on their previous knowledge example.

i. Which farm tool do you use to clear grasses in our farm. Answer: Cutlass, hoes etc.

ii. What is the name of the tools the nurse or doctor uses to give injection to the sick? Answer: Needles.

PRESENTATION

The teacher presented the lesson in the following steps:

STEP 1

The teacher explained briefly the topic with the help of the teaching aid that was hanged on the blackboard.

STEP 2

The teacher continued on the explanation referring to her lesson note example. Science has done a great deal to help human beings to do work move easily and more quickly. Today tools are being used in many occupation such agriculture, engineering and medicine to improve quality of human activities. Nigeria is an agricultural country. Farming is the major occupation in most rural areas. The initial preparation of the land for cropping is done by men using the cutlasses and hoes to clear the farmland. Nowadays tools like tractors and harvester can be used to clear and harvest crops.

STEP 3

The teacher went further to talk on tools for work. Example fisherman formerly use fishing hook but these days they can use fishing net which can catch large number of fish at a time. In engineering field, they use Auto-mechanic and auto-electrician spanners, screw drivers, jacks to lift up mot vehicles etc.

In medicine, they use syringe and needless to inject drugs easily in a patient blood stream.

Structures to carry injured person wheel chair or crutches to move about by injured person etc.

STEP 4 EVALUATION:

The teacher evaluates the lesson by asking the students questions on the lesson. The students responded correctly and incorrectly. Example:

i. Mention some major occupation?

ii. State the advantage of modern tools over the traditional tools?

iii. Name two tools used in the hospital?

CONCLUSION

The teacher concluded the lesson by giving the students notes to copy in their exercise books.

APPENDIX D

TABLE SHOWING THE RESULT OF SOCIO-CULTURAL BELIEF TEST (PRE-TEST)

DESCRIPTIVE

SCHOOLS	N	Mean	Std. Deviation	Std. error	95% Confidence Interval for mean	
					Lower Bound	Upper Bound
PAIKO	25	129.4400	27.69586	5.53717	118.0118	140.8682
DUKPA	25	135.4400	11.77243	2.35449	130.5806	140.2994
SABO	25	120.7200	20.33167	4.06633	112.3275	129.1125
DOBI	25	140.6000	27.4198	5.48240	129.2849	151.9151
TOTAL	100	131.5500	23.60165	2.36016	126.8669	136.2331

RESULT OF THE SCHOOLS SELECTED
T-Test
Group Statistic

SCHOOLS	N	MEAN	STD. DEVIATION	STD. ERROR MEAN
SCORES				
PAIKO	25	129.4400	27.68586	5.53717
DUKPA	25	135.4400	11.77243	2.35449

T- Test
Group Statistics

SCHOOLS	N	MEAN	STD. DEVIATION	STD. ERROR MEAN
SCORES				
SABO	25	120.7200	20.33167	4.06633
DOBI	25	140.6000	27.41198	5.48240

SCORES

	MINIMUM	MAXIMUM
PAIKO	83.00	184.00
DUKPA	110.00	156.00
SABO GARI	86.00	152.00
DOBI	73.00	194.00

ANOVA

	Sum Of Squares	df	Mean Square	F	Sig.
Between Groups	5469.390	3	1823.130	3.523	.018
Within groups	49677.360	96	517.473		
Total	55146.750	99			

Multiple comparison
Dependent Variable: Scores
LSD

(I) Schools	(J) Schools	Mean differences (I-J)	Std. Deviation	Std. error	95% Confidence Interval for mean	
					Lower Bound	Upper Bound
PAIKO	Dukpa	-6.00000	6.43411	.353	-18.7716	6.7716
	Sabo	8.72000	6.43411	.179	-4.0516	21.4916
	Dobi	-11.16000	6.43411	.086	123.9316	1.6116
DUKPA	Paiko	6.00000	6.43411	.353	-6.7716	4.0516
	Sabo	14.72000*	6.43411	.024	1.9484	-1.9484
	Dobi	-5.16000	6.43411	.425	-17.9316	-7.1084
SABO-GARI	Paiko	-8.72000	6.43411	.179	-21.4916	4.0516
	Dukpa	-14.72000*	6.43411	.024	-27.4916	-1.9484
	Dobi	-19.88000*	6.43411	.003	-32.6516	-7.1084
DOBI	Paiko	11.16000	6.43411	.086	-1.6116	23.9316
	Dukpa	5.16000	6.43411	.425	-7.6116	17.9316
	Sabo	19.88000*	6.43411	.003	7.1084	32.6516
TOTAL	100	131.5500	23.60165	2.36016	126.8669	136.2331

***The mean differences is significant at the .05 level**

Independent Samples Test

	Levene's Test for Equality of Variances	
	F	Sig.
Scores Equal variances assumed Equal variances not assumed	6.742	.012

Independent Samples Test

	Levene's Test for Equality of Variances	
	F	Sig.
Scores Equal variances assumed Equal variances not assumed	2.631	.111

APPENDIX E

Table 3.4: The Test Items Specification of SCBS

Topic	Number of items	Question No.	Integrated Science Topic
Socio-cultural beliefs, connected with soil cultivation and fertility	5	1,2,5,13,14	Growth reproduction tools (machine
Socio-cultural beliefs connected with solar system	2	11,26	Man and space
Socio-cultural beliefs connected with germ, sickness and diseases.	4	16,17,39,15	Healthy of the family
Socio-cultural beliefs connected with African world views	16	1,3,4,6,7,9,14,15,18,19 20,21,22,23,25,40,	Characteristics of animals and plants Human being as a higher animals science related occupation
Socio-cultural beliefs connected with water cycle, light	7	31,32,33,34,8,9,10	Water
Socio-cultural beliefs connected with reproduction and hereditary	6	29,30,35,36,37,32	Reproduction and hereditary
Total	40		

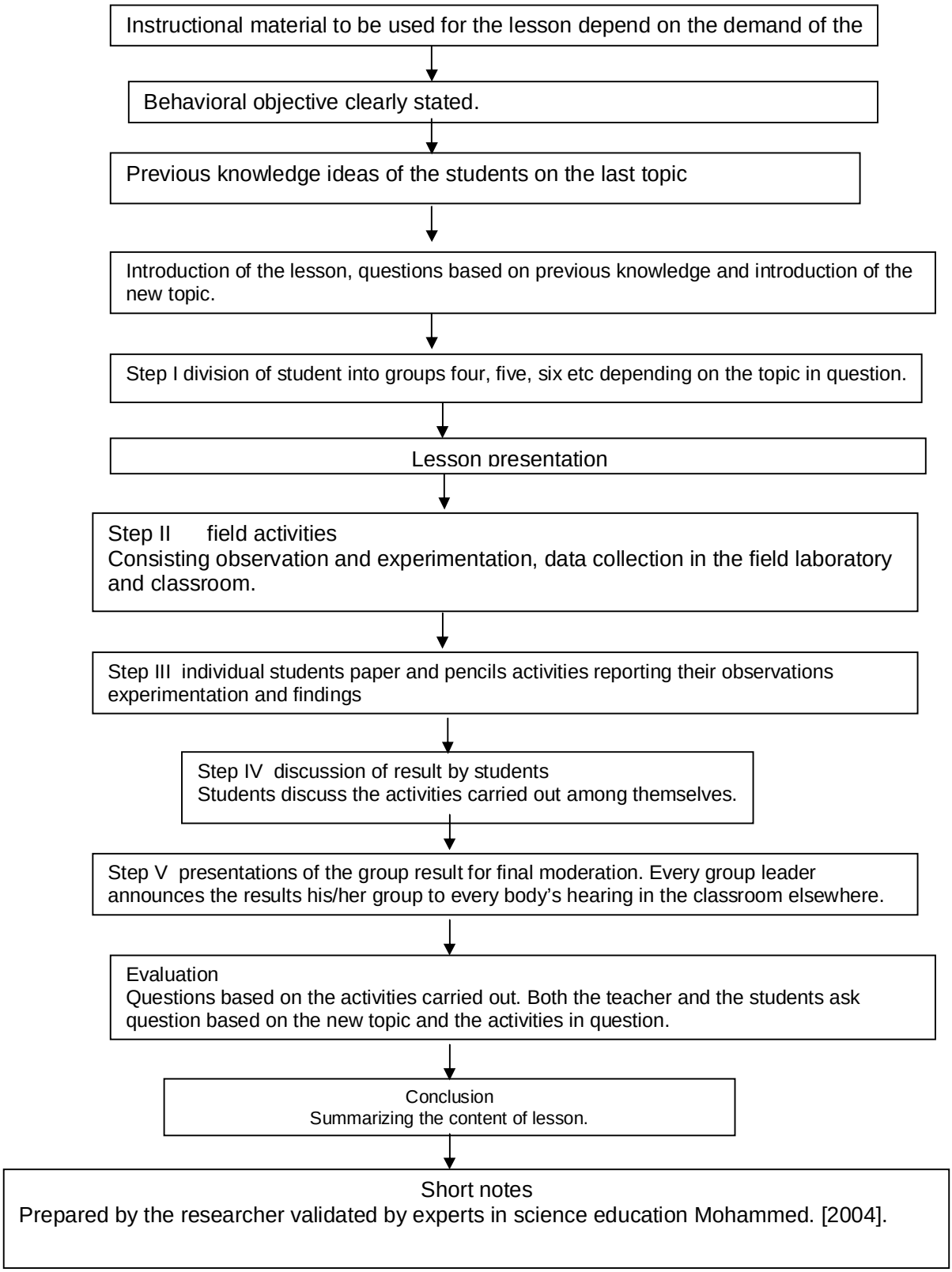
APPENDIX F

TABLE 3.5: THE TEST ITEMS SPECIFICATION OF ISAT

Integrated Sci. Topic	Number of items	Blooms level of educational objective	Question No.
Reproduction, Science related occupation, water, health of the family, preventing diseases	13	Application of knowledge	10,11,12,13,17,20,22,23 24,25,36,37,38,
Reproduction, Mans and Space Characteristic of plants and animals,	17	Knowledge of fact	1,2,4,5,6,14,15,16,17,19 23,26,27,28,29,32,33,34 35,36,39,
Tools machine, Air Science related growth reproduction	10	Interpretation of concepts	3,6,7,8,9,18,19,20,21,29, 30,31,40,
Total	**40**		

APPENDIX G

DESIGN OF THE PROBLEM SOLVING STRATEGY TOPIC SELECTED FOR THE LESSON



APPENDIX H

DESIGN OF THE LECTURE-BASED METHOD.

