# EFFECTS OF GUIDED DISCOVERY, SIMULATION AND EXPOSITORY STRATEGIES ON SECONDARY SCHOOL STUDENTS' IMMEDIATE AND DELAYED RECALL IN GEOGRAPHY IN EDO STATE

**BY**

**IGHALO, OKHUELEIGBE GODWIN**
**MAT. NO. 141839**

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## ABSTRACT

Geography is one of the subjects that is relevant to life experiences. Geography by its nature requires both operational and conceptual understanding of its content for students to acquire geographical skills. Findings from previous studies on teaching and students' performances in geography have shown that the traditional teaching strategies which are prevalent in Nigerian classrooms are less effective .Teaching strategies which can apply the new knowledge and develop student's skill are desirable. Therefore, this study investigated the effect of instructional strategy (guided discovery, simulation and expository strategies) on secondary school students' immediate and delayed recall in Geography ,with study habit as moderator variable.

The study adopted the quasi-experimental design. Study habits was studied as moderator variable. A 3x2 factorial design with pretest-posttest, non-randomized control group was employed. A multi-stage sampling technique was used to select the Edo central senatorial district out of the three senatorial districts in the state where there is high concentration of co- educational schools. Two co- educational schools were randomly selected from each of the three selected Local Government Areas (Esan West, Esan Central & Esan Southeast ) in the Edo central senatorial district. Participants were 480 senior secondary two students in non- randomized intact classes.Geography Achievement Test (r=0.80), and Study Habit inventory (r = 0.81) were used. Data were analysed using analysis of covariance and scheffe test as post-hoc at 05 significant level

There was significant mean effect of treatment (Guided discovery ($F_{(2, 469)} = 59.369$, $\eta^2 = 0.200$) and Simulation ($F_{(2, 467)} = 41.000$ $\eta^2 = 0.148$) on student immediate and delayed recall (24 hours later) in Geography. Significant difference existed among participants exposed to guided discovery ($\bar{x} = 16.501$), simulation ($\bar{x} = 14.550$) and expository ($\bar{x} = 12.959$). With regards to delayed recall, guided discovery ($\bar{x} = 18.370$), was more effective than simulation ($\bar{x} = 16.921$), while expository was the least ($\bar{x} = 12.954$). The mean score shows that students profited most from guided discovery followed by simulation, while students exposed to expository teaching recorded the least in immediate recall in Gepography. Guided discovery ($\bar{x}$=18.370) was more effective than simulation ($\bar{x}$=16.921), while expository has the least effect ($\bar{x}$= 12.951) on delayed recall so students exposed to guided discovery strategy performed significantly better than those exposed to simulation strategy, while those exposed to expository strategy recorded the least score. There was significant main effect of study habit on students' immediate and delayed recall in Geography . The interaction effect of study habit was not significant.

Guided discovery learning strategy was most effective in bringing about improvement in students' performance in Geography.If this learning strategy is employed in schools, and students are motivated and encouraged, there is the tendency for the teaching and learning of Geography in secondary schools to motivate the learners to choose career that has to do with geography.



**keywords** : Guided discovery, simulation and expository strategies , achievement in Geography

**Word count :** 468

## CERTIFICATION

I certify that this research was carried out by Ighalo Okhueleigbe Godwin in the International centre for Educational Evaluation (ICEE) Institute of Education, University of Ibadan.

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**Dr. Folajogun V. Falaye** ***Date***
B.Sc (Hons), M.sc, M.Ed, Ph.D
Senior Research Fellow

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## DEDICATION

This work is dedicated to God Almighty, my beloved wife and my wonderful loving children.

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# CHAPTER ONE

# INTRODUCTION

## 1.1 Background to the Study

Geography is one of the school subjects that have relevance to life's experiences. It is one of the oldest school subjects in Nigeria and indeed the world (Kwala, 2010) .It bears relevance to other school subjects, in that it has relationship with some other related topics in subjects such as Physics, Chemistry, Biology, History, Economics and Mathematics (Abegunde, Adegoke, Onwvumere & Dahiru, 2005). Geography is key to understanding and acting effectively in our world. More than any other school subject, Geography enables people to comprehend the earth and its environment, and to appreciate the delicate balances between the human and physical elements that bind people to this planet (Stoltman 1990).

Despite its importance and status as a school subject, the teaching of Geography is beset by many problems. For instance, most Geography teachers do not use appropriate strategies and techniques to impart the requisite knowledge and skills to students. (Adekunle 2006, Kwale 2003, Kwale 2008, Mairo & Nyako; Oguagbaka 2006). Consequently, student performance in secondary school Geography has not been impressive; hence it continues to decline. Researchers have attributed student poor performance to many factors, prominent among which are the teacher factor (Anikweze, 2000; Okilagwe,2002), student factor (Falaye, 2006), inadequacy of manpower (Adinna 1988, Awaritefe 1988, Yalokwu 1990), and lack of instructional facilities needed in Geography lessons within and outside the classrooms (Yalokun & Amadasun 1990). Chief examiner reports on West African Senior Certificate Examinations of 2005 and 2007 corroborated this. These reports revealed poor performance of students in Geography, but little or no effort is being made by the

government, policy makers, teachers and other stakeholders to curb the persistent and disturbing trend in teaching and learning of the subject. In view of these problems, Ighalo (2009) opined that in addition to the use of appropriate teaching techniques, teachers should also understand students' varying ability to solve problems in any school subject as well as their environment and apply this knowledge in teaching .

Similarly, available literature reveals that some variables have been identified to be responsible for students' consistent low performance in senior school Geography examination. Among these are outdated maps (Emilefo 2010), and poor funding which pose a problem as there is always no money for the school to purchase various instructional aids like textbooks, maps, projectors, television sets, field equipment, support fieldwork (Orieto 1988) among others. Attitude of schools authority also pose serious obstacle to the teaching and learning of Geography (Emilefo 2010). Brkic-Vejmelka (2000) discovered that the problem of student not learning Geography is caused by Geography methodology. He also observed that the decline of interest in Geography is increased by an attempt at the present time to adopt the use of statistics and Mathematics. The fear of mathematics in Geography is made worse when some over-zealous modern Geographers use Mathematics even when it is not necessary for proper understanding of Geography. Chinda (2003) said Geography syllabus is very complicated and also the course content is very vast for easy teaching and learning. That is a major constraint to students' effective learning of Geography, hence it could be said that students' study habit in the subject is affected.

Curriculum experts were of the opinion that the introduction of Mathematics and Statistics to learning of Geography poses a big problem for students in senior secondary school classes. The problemis derived from a general difficulty with Mathematics itself. In secondary schools, students' attitude towards Mathematics is

negative in relation to other subjects on the curriculum. It is feared by almost all students and is perceived to be meant for the gifted few. This attitude exhibited by students, extends to Geography (Brkic-Vejmelka, 2000) .

The general poor performance in Geography in secondary schools is evident in the West Africa Examination Council (WAEC) results, which indicated consistent poor performance of students in Geography for the period of 2001-2011.

**THE WEST AFRICAN EXAMINATION COUNCIL**
**TEST DEVELOPMENT DIVISION**
**P.M.B. 1076, YABA, LAGOS**

**Table 1.1; STATISTICS OF ENTRY AND RESULTS FOR MAY/JUNE WASSCE GEOGRAPHY (2001-2011) IN NIGERIA**

| YEAR | TOTAL ENTRY | TOTAL SAT | NO AND % OBTAINING CREDIT | | | | | | | NO AND % OBTAINING PASS | | | FAILURE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | A1 | B2 | B3 | C4 | C5 | C6 | 1-6 | D7 | E8 | 7-8 | F9 |
| 2001 | 615772 | 552823 | 3233 | 4571 | 24718 | 18095 | 19467 | 55723 | 125807 | 84950 | 92676 | 177626 | 239223 |
| | | 89.77 | 0.58 | 0.82 | 4.47 | 3.27 | 3.52 | 10.07 | 22.75 | 15.36 | 16.13 | 32.13 | 43.27 |
| 2002 | 262257 | 233682 | 1753 | 2380 | 10172 | 7293 | 7833 | 20177 | 49608 | 37177 | 40616 | 77793 | 99030 |
| | | 89.10 | 0.75 | 1.01 | 4.35 | 3.12 | 3.35 | 8.63 | 21.22 | 15.90 | 17.38 | 33.29 | 42.37 |
| 2003 | 592634 | 548116 | 2836 | 4671 | 24561 | 15791 | 20985 | 54831 | 123675 | 99391 | 103363 | 202754 | 196774 |
| | | 92.48 | 0.51 | 0.85 | 4.48 | 2.88 | 3.82 | 10.00 | 22.56 | 18.13 | 18.85 | 36.99 | 35.90 |
| 2004 | 595529 | 556274 | 3644 | 3502 | 24829 | 5481 | 19923 | 48233 | 105612 | 65071 | 106155 | 171226 | 263192 |
| | | 93.40 | 0.65 | 0.62 | 4.46 | 0.98 | 3.58 | 8.67 | 18.98 | 11.69 | 19.08 | 30.78 | 47.31 |
| 2005 | 618372 | 573475 | 10467 | 11459 | 38374 | 24846 | 19934 | 59101 | 164181 | 70122 | 74757 | 144879 | 253321 |
| | | 92.73 | 1.82 | 1.99 | 6.69 | 4.33 | 3.47 | 10.30 | 28.62 | 12.22 | 13.03 | 25.26 | 44.17 |
| 2006 | 675569 | 635098 | 27487 | 25797 | 87839 | 28127 | 44812 | 77070 | 291132 | 75097 | 68587 | 143684 | 186040 |
| | | 94.00 | 4.32 | 4.06 | 13.83 | 4.42 | 7.05 | 12.13 | 45.84 | 11.82 | 10.79 | 22.62 | 29.29 |
| 2007 | 734141 | 694750 | 6747 | 9132 | 47125 | 32753 | 40965 | 81926 | 218648 | 90407 | 107359 | 197766 | 261237 |
| | | 94.63 | 0.97 | 1.31 | 6.78 | 4.71 | 5.89 | 11.79 | 31.47 | 13.01 | 15.45 | 28.46 | 37.60 |
| 2008 | 729645 | 689110 | 8637 | 110.88 | 55530 | 35283 | 42511 | 84109 | 237158 | 93065 | 109650 | 202715 | 240616 |
| | | 94.44 | 1.25 | 1.61 | 8.06 | 5.12 | 6.17 | 12.21 | 34.42 | 13.51 | 15.91 | 29.42 | 34.92 |
| 2009 | 786271 | 747877 | 13268 | 16258 | 86626 | 29600 | 50050 | 111737 | 307539 | 96498 | 90611 | 187109 | 209994 |
| | | 95.12 | 1.77 | 2.17 | 11.58 | 3.96 | 6.69 | 14.94 | 41.12 | 12.90 | 12.12 | 25.02 | 28.08 |
| 2010 | 776826 | 737467 | 18229 | 22456 | 110960 | 36609 | 59125 | 121454 | 368833 | 75920 | 84739 | 160659 | 185392 |
| | | 94.92 | 2.47 | 3.05 | 15.05 | 4.96 | 8.02 | 16.47 | 50.01 | 10.29 | 11.49 | 21.79 | 25.14 |
| 2011 | 903885 | 863032 | 33370 | 34418 | 151132 | 46076 | 73781 | 148527 | 487304 | 90265 | 96939 | 187204 | 178901 |
| | | 95-48 | 3.86 | 3.98 | 17.53 | 5.33 | 8.54 | 17.20 | 56.46 | 10.45 | 11.23 | 21.69 | 20.72 |

**Source:** WAEC Test Development and Research Unit, Lagos, Nigeria ( 2012 )

The problem of acquiring geographical skills thus appears to be one of the reasons why students perform poorly in Geography, particularly in the Senior School Certificate Examination (SSCE) (WAEC examiners reports 2005 and 2007). According to the WAEC examiners reports, lack of geographical skills could be overcome by the students if adequate attention is paid to the teaching of Geography in schools, and if there are qualified geography teachers. Qualified geography teachers should teach students the process of map reading and interpretation and give them regular assignments on all aspects of map reading. The report also stated that there was poor performance in construction of statistical maps and diagrams, and that there should be qualified teachers to teach students and give regular exercises of drawing and interpretation of statistical maps and diagrams so as to enable students acquire geographical skills.

There are 1053 secondary schools in Edo State (Planing, Research and Statistics Dept. Ministry of Education, Benin City 2004). According to State Economic Empowerment and Development Strategy report (2005), eighty percent of the schools have ill-equipped libraries, poor staffing and substandard laboratory facilities. Only twenty percent of the schools that are well equipped with adequate staffing. In These well equipped schools (which are sampled in this work), the enrolment ratio has increased from thirty-five percent to seventy-five percent. There is also a reduction in the drop-out rate of the schools from thirty-one percent to twenty percent . Finally, in these schools, the number of students is reduced to a maximum of twenty-five per class. The schools are regarded as those with adequate facilities for improved learning. Some of the schools which fall into this category are used as samples for student performance in Geography in SSCE in Edo State.

Students' poor performance becomes obvious when cognizance is taken of students' result in Geography in West African Senior School Certificate Examination (WASSCE) in Edo State between 2006 - 2010. (Table 1.2)

**Table 1.2: Distribution Of Students Enrolment/ Performance In Ssce Geography Examination In Some Schools In Edo State From 2006 – 2013**

| Name of school | Year | Total entry | Grade1-6 (credit) | | Grade 7-8 (pass) | | Grade 9 (failure) | |
|---|---|---|---|---|---|---|---|---|
| | | | No | % | No | % | No | % |
| School A | 2006 | 35 | 15 | 43% | 11 | 31% | 9 | 26% |
| | 2007 | 41 | 13 | 32% | 21 | 51% | 7 | 17% |
| | 2008 | 29 | 8 | 28% | 6 | 21% | 15 | 51% |
| | 2009 | 30 | 12 | 40% | 7 | 23% | 11 | 37% |
| | 2010 | 21 | 4 | 19% | 3 | 14% | 14 | 67% |
| | 2011 | 35 | 15 | 45% | 8 | 20% | 12 | 35% |
| | 2012 | 28 | 5 | 20% | 3 | 15% | 20 | 65% |
| | 2013 | 16 | 4 | 20% | 12 | 80% | - | - |
| School B | 2006 | 15 | 3 | 20% | 8 | 53% | 4 | 27% |
| | 2007 | 18 | 7 | 39% | 3 | 17% | 8 | 44% |
| | 2008 | 25 | 4 | 16% | 9 | 36% | 12 | 48% |
| | 2009 | 12 | 1 | 8% | 14 | 33% | 7 | 59% |
| | 2010 | 11 | 2 | 18% | 4 | 36% | 5 | 46% |
| | 2011 | 18 | 7 | 30% | 1 | 5% | 10 | 60% |
| | 2012 | 24 | 4 | 13% | 12 | 55% | 8 | 32% |
| | 2013 | 13 | 6 | 29% | 10 | 40% | 7 | 31% |
| School C | 2006 | 17 | 6 | 35% | 4 | 24% | 7 | 41% |
| | 2007 | 22 | - | 0% | 12 | 55% | 10 | 45% |
| | 2008 | 21 | 2 | 10% | 10 | 47% | 9 | 43% |
| | 2009 | 20 | 4 | 20% | 6 | 30% | 10 | 50% |
| | 2010 | 15 | 3 | 20% | 5 | 33% | 8 | 47% |
| | 2011 | 29 | 9 | 22% | 11 | 56% | 9 | 22% |
| | 2012 | 30 | 15 | 50% | 5 | 15% | 10 | 35% |
| | 2013 | 32 | 11 | 32% | 15 | 48% | 6 | 20% |
| School D | 2006 | 65 | 9 | 14% | 18 | 28% | 38 | 58% |
| | 2007 | 48 | 16 | 33% | 5 | 11% | 27 | 56% |
| | 2008 | 30 | - | 0% | 9 | 30% | 21 | 70% |
| | 2009 | 50 | 14 | 28% | 21 | 42% | 15 | 30% |
| | 2010 | 31 | 6 | 19% | 17 | 55% | 8 | 26% |
| | 2011 | 41 | 10 | 25% | 20 | 49% | 11 | 26% |
| | 2012 | 29 | 12 | 45% | 10 | 34% | 7 | 31% |
| | 2013 | 40 | 2 | 5% | 20 | 50% | 18 | 45% |
| School E | 2006 | 19 | 4 | 21% | 11 | 58% | 4 | 21% |
| | 2007 | 29 | 11 | 38% | 3 | 10% | 15 | 52% |
| | 2008 | 32 | 6 | 18% | 14 | 44% | 12 | 38% |
| | 2009 | 15 | 3 | 20% | 4 | 27% | 8 | 53% |
| | 2010 | 10 | 1 | 10% | 3 | 30% | 6 | 60% |
| | 2011 | 18 | 3 | 11% | 11 | 75% | 4 | 17% |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | 2012 | 12 | - | - | 11 | 90% | 1 | 10% |
| | 2013 | 20 | 4 | 20% | 15 | 75% | 1 | 5% |
| School F | 2006 | 25 | - | 0% | 8 | 32% | 17 | 68% |
| | 2007 | 30 | 6 | 20% | 13 | 43% | 11 | 37% |
| | 2008 | 41 | 12 | 29% | 3 | 8% | 26 | 63% |
| | 2009 | 24 | 6 | 25% | 7 | 29% | 11 | 56% |
| | 2010 | 18 | 4 | 22% | 4 | 22% | 10 | 56% |
| | 2011 | 20 | 6 | 27% | 9 | 48% | 5 | 25% |
| | 2012 | 21 | 2 | 5% | 4 | 20% | 15 | 75% |
| | 2013 | 25 | 6 | 20% | 9 | 37% | 10 | 43% |
| School G | 2006 | 14 | 3 | 21% | 5 | 36% | 6 | 43% |
| | 2007 | 22 | 7 | 32% | 3 | 13% | 12 | 55% |
| | 2008 | 25 | 6 | 24% | 9 | 36% | 10 | 40% |
| | 2009 | 30 | 4 | 13% | 16 | 53% | 10 | 34% |
| | 2010 | 18 | 2 | 11% | 11 | 61% | 5 | 28% |
| | 2011 | 25 | 5 | 22% | 2 | 10% | 18 | 68% |
| | 2012 | 31 | 8 | 24% | 3 | 6% | 20 | 70% |
| | 2013 | 30 | 5 | 18% | 4 | 14% | 21 | 68% |
| School H | 2006 | 18 | 3 | 17% | 7 | 39% | 8 | 44% |
| | 2007 | 16 | 1 | 6% | 8 | 50% | 7 | 44% |
| | 2008 | 21 | 5 | 24% | 4 | 19% | 12 | 57% |
| | 2009 | 23 | 4 | 17% | 2 | 9% | 17 | 74% |
| | 2010 | 17 | 4 | 24% | 6 | 35% | 7 | 41% |
| | 2011 | 19 | 2 | 11% | 1 | 3% | 16 | 86% |
| | 2012 | 24 | 4 | 22% | 11 | 42% | 9 | 36% |
| | 2013 | 26 | 5 | 21% | 11 | 41% | 10 | 39% |
| School I | 2006 | 26 | 2 | 7% | 9 | 35% | 15 | 58% |
| | 2007 | 34 | 8 | 24% | 13 | 38% | 13 | 38% |
| | 2008 | 29 | 6 | 21% | 5 | 17% | 18 | 62% |
| | 2009 | 17 | 4 | 24% | 9 | 52% | 4 | 24% |
| | 2010 | 9 | 1 | 11% | 3 | 33% | 5 | 56% |
| | 2011 | 15 | 6 | 35% | - | - | 9 | 65% |
| | 2012 | 24 | 3 | 15% | 17 | 68% | 4 | 17% |
| | 2013 | 30 | 8 | 25% | 12 | 40% | 10 | 35% |

**Source:** Office of the principal of each school

A close look at Table 1.2 reveals that student performance in the subject has been on the decline. Among the schools samples across the state, for example, school A, 26% failed the subject, 31% had grade 7-8, while 43% had credit pass in 2006. In 2010, 67% failed, while only 19% had credit  Also in  2006,  only 4 of students enrolled in school E had credit, representing 21% of the population; while 79% had either an ordinary pass or failed the subject.In the same school, only 10 students enrolled for the subject in 2010; with one credit pass representing 10% of the students while others had just a pass, or failed

completely. This trend supports the view of most researchers such as Iloeje, Onokpala and Odemerho (1999) that students are not doing well in Geography because most of the schools do have trained geography teachers and necessary facilities to encourage students to improve in their performance in the subject.

Geography is a technical subject. The teacher has to be adequately and efficiently grounded in pedagogy. With good professional background, the teacher will be able to determine each child's background, the peculiarities of each subject that is related to Geography, and arrange learning experiences based on individual differences on the subject. This will help students, not only to understand Geography, but also to understand how it influences their future career.

In view of this, Chalmers and Keown (2002) argued that teachers are most effective in teaching when they are developed in three different ways – professionally, personally and socially. Geography is one of such school subjects where teachers need all round efficiency to be able to impart the required reading, writing and mathematical skills. These skills are basic to all aspects of Geography as differences in these reading, writing, mathematical skills etc, also influence Geography instructional strategy.

In fact, adoption of effective instructional strategies lead to improved student performance, whereas, adopting poor teaching strategies lead to poor performance and frustration on the part of the students. Odogun (1995) reported vividly that poor performances of students are the direct result of techniques adopted by teachers. Therefore, effective instructional strategy not only improves students' performance, but motivates the learners. It is in recognition of the importance of adopting appropriate instructional strategies in improving students' performance that researchers continue to seek for appropriate strategies that will ensure effective teaching and learning (Brown 1999). Ngeow and Kong (2003) suggested scientific approach to teaching, in which the

teacher listens, observes and encourages every student to participate in the lesson. Such scientific approaches, according to them,include guided discovery and simulation strategies. According to them, the strategies are scientific because they stimulate students' innovative, initiative, inquiry and scientific attitude. The strategies help students to develop thinking and decision making abilities, which are vital in equipping learners to liveand interact effectively and meaningfully within their environment. The adoption of these strategies therefore, will result in improved student performance and bring about the much desired educational enhancement.

The guided discovery strategy is that in which teachers ask students to infer a conclusion, generalisation or pattern of relationship from a set of data or facts (Tamir, 1995). When using strategy, students are provided with materials to manipulate, explore and experiment in order to find out facts and gain knowledge by themselves. Onwuka (1985):86 said "it is a method whereby the teacher provides the students with opportunity to discover new truths, new rules and methods to tackle problem, as well as new value for themselves". Ighalo (2009):40 stated thatd "it is a process through which pupils are collectively involved in teaching-learning process and they reach generalisation rather than accepting facts and information from the teacher". This method is appropriate at all levels of education, from pre-school to university. At any level with this method, the processes of observing, making inferences, classifying, formulating hypothesis, and predicting are all sharpened (or reinforced) by the students' experiences (Harry 2002)

Discovery strategy can be grouped into two: guided and unguided discovery. The guided discovery strategy involves the teacher's direct guidance and supervision of students, while the unguided discovery allows students free choice of investigation. In the case of guided discovery, the teacher plays the role of a facilitator and a guide ( Okwilagwe 2011). Guided discovery has relevance in our present day educational system

because apart from Geography, many other school subjects are affected by the problems of unimpressive performance by the students (Awosolu & Esugbohungbe, 2002). This is one of the reasons why guided discovery strategy is adopted in this research work.

In using the simulation strategy, the teacher encourages the students to express in their own words, the basic arguments for the various sides of an issue (Boston, 1998). It is a teaching strategy that promotes human interaction when used effectively. Simulation as an instructional mode is used to put the students in a "real" situation without taking the risks (Eggen & Kauchak 2001). However, simulation is meant to be as realistic as possible where students are able to experience consequences of their behaviour and decisions. Simulation is commonly used in Social Studies and sciences but can be used in other subjects ( Brkic 2000 ). Simulation as a teaching strategy has an important role in our educational system, since it is a dynamic way of presenting very thought provoking ideas, problems, issues and realities in our past and present socio-economic life to students (Okwilagwe 2011). This strategy will help the students to improve in their performance in Geography and related subjects because it makes for easy retention of knowledge.

Many authorities have recommended simulation as a way to improve learning. Alsup and Altmyer (2002), Laver (2003), McGee, Corriss and Shia (2001) and Verkler (2003) emphasized that simulation is a representation or recreation of a real object, problem, event, or situation. Although it mirrors reality, simulation removes the possibility of injury or risk to the participants, they concluded. The learner is nevertheless an active participant. He engages in demonstrating a behaviour or previously acquired skills or knowledge. This strategy can be used to motivate students, provide information, enhance conceptual development, change attitude, assess performance, and provide interdisciplinary activities (Verkler 2003). This is why many researchers like Lopus and Placone (2002) believed that in the use of simulations, students

become immersed in the activities almost immediately. Simulations are great icebreakers for diverse groups of students, unlike expository strategy of teaching, which is direct instruction (Carnine, 2000).

Carnine (2000) highlighted that expository is a popular strategy often referred to as teacher-led. This strategy provides few optional choices for student initiated activities. It is perhaps the oldest and still the most popular plan of teaching. The teacher talks or addresses the pupils by means of reading his notes. Primarily, it is the teacher who talks while the pupils listen and sometimes take notes. In using this strategy, the teacher must use ideas and words which are familiar to the pupils. He has to present the matter or deliver his goods systematically, adopting a suitable order. The teacher must not present his materials in a rush. He must always repeat and emphasize important points. In this method, the teacher must be clear and distinct and when possible, make use of illustrations. In order ensure that the students do something else besides listening, the teacher must ask and invite questions at intervals and, also devise suitable activities (Onwuka, 1985).

Expository as a conventional strategy has not actually helped to achieve the much desired improved performance needed by the learners. In view of this, Awosolu and Esugbohungbe (2002) pointed out that learners are just passive recipients of information, and there is very little interaction between learners and their teacher, hence this strategy of teaching may not achieve desired objective of Geography. The strategy operates under the assumption that the learner is an empty vessel, which the teacher must fill up with knowledge.

Another problem linked to poor teaching and learning of Geography is the large volume of work in the curriculum.(Chinda, 2003,Ighalo & Falaye, 2010, Nwanoke, 1991). This has affected student performance in the subject because of poor recall. According to

Nwanoke (1991), the course content of Geography is too vast for easy teaching and learning . He further emphasized that teachers find it difficult to teach the wide syllabus effectively. Chinda (2003) discussing the problem of effective learning of Geography, pointed out that well trained teachers are needed to teach the complicated syllabus of Geography curriculum.

More often than not, Geography students are not exposed to all the aspects of the subject due to the large volume of work in the subject (Ighalo & Falaye, 2010). Since students are not opportuned to concretise their learning experiences in the subject, they are unable to fully grasp the necessary rudiments of the subject, therefore recall of Geographical facts is difficult, since recall is the ability to produce correctly what had been previously learnt.

According to Chauhan (1990), recall is one of the ways to measure memory. It is a memory task in which individuals must retrieve previously learned information (Santrock, 2001). It requires a person to reproduce correctly, what he has previously learned. If learners are not properly prepared using appropriate strategies, both immediate and delayed recall of geographical facts will be hindered. Immediate recall is the ability to remember something that has just happened in the recent past or what you have just learned (Nairane 2000). In that situation a student who is able to recall what has just been learned is said to have an amazing power of instant recall. Such a student would? perform better in that subject. Delayed recall on the other hand, is a situation where learners are tested on their study outcome after a little delay and not immediately after the study. The students are tested in the course of their study to determine whether they have the ability to recall what they have learned. This will help the teacher to assess their level of comprehension. The poor performance of students in Geography, no doubt can be linked with this problem. To curb the problem of poor recall faced by students in Geography,

Kwale (2010) emphasised that instructional materials such as relevant text books, geographical equipments and geographical gardens as well as qualified teachers should be adequately provided by the in schools by the government. Unfortunately, till date, many teachers teach Geography without using the appropriate strategy and relevant geographical tools.

Another variable of interest in this study, which is believed that it would influence students' learning and improve performance in Geography, is students' study habit. Study habits are learning tendencies that enable students work privately. Study habits could be good or poor. A good study habit is a systematic and co-ordinated way a student uses to gain greater access to learning materials and develop confidence in him/herself or his/her academic work (Agbaje, 2010). Poor study habit on the other hand, occurs where a student is not conscious about learning materials thereby performing poorly in academic work and developing lack of confidence in him or her self (Sainji, 2003). Good study habit creates awareness in the students, which in turn equips them with career awareness skills. When students are equipped through good geographical training, it enables them pursue careers of their interest (Emilefo, 2010).

Effective instructional strategy will therefore, promote good study habit thereby exposing the students to various career opportunities. It is glaring in many of Nigerian schools that teachers of Geography do not use various strategies of teaching in the classroom. This problem calls for re-organsation of our educational system in order to actualised proper learning of the subject. To realize our dream, the federal and state government need to employ qualified teachers to teach the subject.

Also, potential and practising geography teachers should be exposed to these scientific methods of teaching, so that the educational objectives in geography could be achieved. Instructional strategies that will enable Geography teachers complete the

curriculum and improve students' performance are needed (Oguagbaka 2006). It is not possible for proper teaching and learning to take place in the Geography classroom without a complete change from the conventional teaching method to a more scientific teaching strategy. This will bring about improved performance by students in Geography.

The use of scientific strategies to teach Geography will also help to eliminate the real constraints tostudents' effective learning of Geography. Both the teachers and students will benefit from the conducive learning environment that will now be created in the classroom. Mastery of the subject will eliminate the age long problems of teaching Geography, such as negative attitude towards Geography by the stduents and the inability to complete the curriculum by the teachers (Mairo & Nyako, 2003).

## 1.2 Statement of the Problem

Many factors have been identified to affect students' learning and performance in secondary school Geography. The factors have been grouped under school, teacher, student and home factors. The instructional strategy of the teacher is an important factor and is a major challenge in the teaching and learning process. The traditional teaching strategies which are prevalent in the Nigerian classroom have been found to be less effective.

Many studies have been carried out to address these problems of learning and performance in school Geography. However, these studies, despite their scope, looked at relationships among the factors, and may not have manipulated some of the variables (instructional strategy, and study habits ) to find their effects on learning of Geography.

The scientific approaches needed to teach Geography in order to ensure improved performance by students are not used by the teachers in the classroom. . It is on this aspect of not teaching the subject scienctifically that this current study investigated the effect of treatment (guided dishonouring, simulation and expository strategies) on senior

secondary school stduents' performance in Geography. It also examined the effects of study habit and its interaction with treatment on students performance in Geography.

## 1.3 Hypotheses

In the light of the above stated problem of this study, three null hypotheses have been formulated to be tested.

$H_{O1}$ There is no significant main effect of treatments on students' (a) immediate recall and (b) delayed recall in Geography.

$H_{O2}$ There is no significant main effect of study habit on students' (a) immediate recall, and (b) delayed recall in Geography.

$H_{O3}$ There is no significant interaction effects of treatments and study habit on students' (a) immediate recall, and (b) delayed recall in Geography.

## 1.4 Scope of the Study

This study was interested in finding out whether students' immediate and delayed recall in Geography was significantly affected by teaching strategy (guided discovery, simulation and expository) and study habit, as well as their interactions. The population for this study comprised of all the Senior Secondary two (SS 2) Geography students in all public secondary schools in Edo State. Content coverage included; physical, and map work which are the core areas in Geography. The students in SS 2 were chosen because they had been exposed to almost all aspects of Geography scheme of work.

## 1.5 Significance of the Study

The study shifted attention from the conventional teaching method (expository) to more scientific teaching strategies (Guided discovery and Simulation strategies); as a way of promoting learning of Geography, such that might lead to a better understanding and improved performance in the subject. The study would influence Geography teachers not

to use only the conventional method, but also to improve students' understanding of geographical concepts and allay students' fear that Geography is a difficult subject.

The outcome of effective classroom interaction by teachers to interact would improved students' performance. Adopting effective classroom interaction would enable teachers organise their lessons in such a way that it would promote good study habits among the students. These strategies should be employed in various schools in which Geography teaching and learning take place, in order to aid understanding of Geography that would enable students perform well in external examinations. Furthermore, Geography teachers would be able to employ these teaching strategies and consider the various variables used in this study in organising the classroom, so as to make lessons more attractive to students thereby fostering better understanding of the concepts being taught.

## 1.6 Conceptual Definition of Terms

- **Instructional strategy:** This is the method the teacher uses or adopts to achieve learning objectives in the classroom.
- **Guided discovery:** This is a teaching method in which the teacher tasks students to infer a conclusion, generalisation or pattern of relationships from a set of data or facts.
- **Simulation:** This refers to the method the teacher uses to teach to make his teaching real. It is an imitation which removes all doubts from students.
- **Expository method:** This is a method of teaching whereby the teacher's role is to impart knowledge, merely by providing information for his/her students. The teacher talks or addresses the students by means of reading his notes and books to students.

- **Study habit:** This is the manner and way a student can plan his/her private readings after classroom interaction so as to attain mastery of the subject. It is a learning tendency that enable students to work privately in order to gain maximally in academic work.

### 1.6.1 Operational Definition of Term

- **Recall:** This is the ability of the learner to remember something that has been learned either in the immediate or in the past. .
- **Good Study Habit:** An effective way a student uses to gain acess to learning materials and thereby improve in his or her academics work. These are students whose scores in the achievement test is usually are forty five percent and above which is the average score.
- **Poor Study Habit:** This is a situation where a student is not conscious about his or her academic work which creates fear or lack of confidence in his/her ability. These are students whose score is usually below forty five percent in the goegraphy achievement test.
- **Instructional Strategy:** This refers to the way the teacher arrange learning experiences based on individual differences on the subject. The way the teacher organise his/her teaching to help the students understand the topic of the lesson.
- **Guided Discovering:** This referes to the approcah of teaching in which the students are left to perform or carry out the learning with limited guidelines. Here the teacher guides the students by asking thought provoking questions .
- **Simulation:** This method refers to the appraoch of teaching in which the teacher demostrates and the students more or less do exactly what he/she does. The techer uses picture and other teaching materials to ask thought provoking questions as he or she proceeds.

- **Expository Strategy:** This refres to the approach of teaching and learrning in which students are given ready made instructional materials, teacher explain the topic and clarifies some concepts which the student find difficult. The teacher focuses on the learners areas of weakness for remediation and also writes chalkboard summary for them to copy.

# CHAPTER TWO

# LITERATURE REVIEW

The review of literature were organised under the following headings.

**2.1** Theoretical background .

**2.2** Geography as a school subject.

**2.3** Problems of performance in secondary school Geography.

**2.4** The concept and theory of recall

**2.5** Immediate and delayed recall in learning.

**2.6** The concept of instructional strategy.

**2.7** Instructional strategy and students' achievement in Geography.

**2.8** The concept of study habit.

**2.9** Study habit and students achievement in Geography.

**2.10** Intraction of instructural strategy, study habit and students'Achievement.

**2.11** Appraisal of literure reviewed

## 2.1 Theoretical background.

In behavioural perspective, learning can be defined as an observable change in behaviour**.** The modern behavioural theory was initiated by Skinner and Tyler ( 1961) and was improved on by modern theorists as stated by Orlich, Harder, Cullahan, Trevisan and Brown (2007). Tyler, with his use of behavioural objectives and guided lesson design, instituted a major educational application of behaviourism. In view of this theory, Canine(2000) emphasizes that when one applies behavioural theory of instruction, one will find oneself establishing specific learning objectives and building a sequence of learning activities that proceed from simple to complex.

This model that has its foundation embedded in behaviourism principles is called direct instruction,that is, teacher-led instruction. Basically, the techniques involve academic focus and provide optimal choices for students' initiated activities. They also emphasise factual knowledge. Thus, these strategies, which include guided discovery, simulation and expository are based on behavioural assumptions and implications.

Kosloff, Lanunziatta, Cowardin and Bessellien (2001) summarised the steps and the strengths of behavioural model of instructional strategies which are based on behavioural assumptions and implications thus:

**Steps**

- Review and check previous work
- Present new material in small unit
- Provide for guided practice
- Provide for feedbacks and corrections
- Supervise independent seat work
- Review concept every week and every month

**Strengths**

- Contents are delivered to entire class
- Teacher controls focus of attention
- Process maximises available time
- Feedback assesses class understanding of learning.
- Teacher focuses on class objectives
- Teacher provides clarity through explanations
- All students work on some tasks

Educational researchers have attached much importance to the behaviour of teachers and students, related teacher-students interactions to student learning and study teaching in

its natural setting. They have also exposed the variety of domain of learning outcomes (such as affective, cognitive and psychomotor). This study however, tries to provide a framework for analysing instructional models to discover their theoretical bases. The classical Gestalt theory of Kohler which gave credence to cognition in learning and made a lot of contributions to teaching according to Chauhan (1990) is a basis for further research on teaching and learning.

According to cognitive field theorists, teaching is a process of developing understanding or insight in the learner while learning is the organisation of precepts and purpose by the learner. Classroom experiences on the other hand, are related to the individual goals of students. They are encouraged to discover relationship so that they might use it to create the consequences of their efforts.

The model thus, enables a teacher to align his or her teaching strategy with the content, thereby helping students to be more successful learners. The goal of this model is to develop students' academic and thinking skills from a novice level to a more expert level. One way to help students is to teach them how to think about concepts and how to make plans to learn new information more efficiently. Also, it provides adequate experiences in which students structure the learning and teaching process by themselves. In other words, it helps students to have access to knowledge, understand how to organise it, and be self- motivated to learn. This theory has a lot of implication for this research for the fact that it is based on classroom interaction.

Cognitive emphasis has become the basis of numerous approaches to learning (Driscoll, 2000, & Roeddiger 2000). There are many cognitive approaches to learning out of whichthree are relevant to this study: cognitive information processing, cognitive constructivist and social constructivist.

**Cognitive information processing approach**: This focuses on how children process information through attention, memory, thinking and other cognitive processes.

**Cognitive constructivist**: This approach emphasizes the child's cognitive construction of knowledge and understanding.

**Social constructivist**: This approach focuses on collaboration with others to produce knowledge and understanding.

One of the objectives of this theory is for the teacher to teach the students how to think and how to make plans to learn new information more effectively. A second goal of this theory is to provide the students with adequate experiences, where the students structure the learning and teaching themselves (Ashman & Conway 1993).

The Social constructivist model, which seeks a more student-centred instructional model will be adopted in this research. The model emphasizes a range of beliefs and pedagogical approaches (Gagnon & Collary 2001; Phillips, 2000; Shapiro 2000). This approaches emphasize actual practice to get good result. It emphasizes on teachers adjusting their instruction methods to align with students' way of thinking and working in order to aid fast learning and development. More emphasis is also laid on the structure and organisation of the subject matter. According to Santrock (2001), the focus is to study students' reactions in order to determine the method and ways of presentation that will prove most effective. This helps students develop sharp focus without hindrance in the immediate and delayed recall on the subject matter.

**Steps in Social Constructivism:**

1) Learner must construct his or her own meaning.
2) Learning is contextual
3) Learning is dependent on the shared understanding of learners' ability to negotiate with others.

4) Effective teaching involves understanding students' existing cognitive structures and providing appropriate learning activities to assist them.

5) Teachers can use one or more key strategies to facilitate conceptional change.

6) The key element of conceptional change can be addressed by specific teaching method.

7) Greater emphasis is placed on learning how to learn than on accumulating facts.

8) Students are motivated through modelling. ( Anderson 1994)

## 2.2 Geography as a School Subject

Geography is one of the oldest school subjects in Nigeria and the world in general. Its learning is beset by many problems. Oguagbaka (2006) has observed that instructional materials for Geography curriculum are grossly inadequate in most of our secondary schools and even higher institutions of learning. Despite the relevance of this subject, there are lots of problems hindering the effective learning and teaching of the subject.

Geography is a very interesting subject. The subject has a lot of ideas which are real and easy to understand. In fact, geographical concepts are relevant to life's experiences. A well trained geographer can perform many vital roles in the political and socio-economic sectors of the society. He can use his geographical knowledge, attitude and skills in such areas as urban, economic, rural and regional planning, census, publishing, war prosecution, teaching, consultancy services, agriculture, estate management, survey, foreign policy, research institutes, general administration, business, commerce, co-operative management etc. (Abegunde, Adegoke, Onwumere & Dahiru, 2005). In short, in choosing a vocation, and in the choice of a business or career path later in life, Geography has a definite practical value to the individual.

Considering the relevance of Geography in enrich all other fields, important that the subject is taught well in schools and students encouraged to study and excel in the

subject. Over the years however, records have shown that students have not been doing well in the subject, hence in the year 2000, the West African Examination Council through its Chief Examiner's report gave some reasons why students are performing poorly in the subject. These are:

(i) Inability to read and interpret survey maps.

(ii) Inability to reduce maps and insert features accurately on the maps;

(iii) Inaccurate measurement of map outlines

(iv) Inability to adhere to the rubrics of the paper.

(v) Poor plotting of graphs and drawing of statistical maps;

(vi) Poor grammatical expression.

(vii) Inability to compare points and make comparisons with the use of tables.

All these problems are the results of bad conditions surrounding the teaching and learning of Geography.

Iloeje, Onokpala and Odemerho (1999), also emphasised that students are not doing well in Geography because they lack practical approach to the subject. They listed some areas of weaknesses thus; they cannot recognise and identify the geographical features in their locality; they cannot describe and analyse geographical features intelligently among others.

They further recommended four sets of features and activities students should look out for when studying Geography. These are physical features, cultural and man-made features, human activities and resources. They concluded that students should be able to look out for these things and discover how they are functionally related.

As a follow up on the report of students' performance in the subject, WASSCE reported vividly again in 2007, on why students are so poor in Geography. The problems and weaknesses noticed in the students are;

Poor knowledge of map reading and interpretation of survey maps. Poor identification and description of relief. Poor performance in construction of statistical maps and diagrams Students lack broad knowledge so they narrowly give one word answers which make then perform poorly. Students do not prepare adequately, hence, they do not read extensively to cover all aspects of Geography. Students do not know how to use comparative words while making comparisons. Most students usually fail to understand the requirements of questions and so they always write off point.

The report, however, summarizes the way out of these numerous problems Thus: That teachers of Geography should be qualified, teach well and give students regular exercises. Also, teachers, through the use of effective teaching methods should cover all aspects of the syllabus and make students read extensively to cover all what is being taught.

## 2.3 Problems of Performance in Secondary School Geography

Attitude is a combination of feelings and beliefs which result in a predisposition to respond favourably towards persons, groups, ideas or objects. Attitudes are unconsciously learnt as people engage in everyday interaction processes (Abosi, 1986). Ezeanochie (2009) noted that attitude is a human expression that is made up of three interrelated components; belief, feelings and behaviour. Attitude manifests in an individual when he/she forms an opinion (beliefs) about the attitude object. Attitudes are learnt over time by being in contact with the subject area. Information about the subject area is received through instruction and consequently attitude is developed. In line with this, if a person is favourably predisposed towards an academic course, that favourable disposition should lead to favourable behaviours like academic achievement.

Attitude has cognitive, affective and behavioural components. The cognitive aspect pertains to the ideas or propositions that express the relations between situations and attitudinal objects. The affective pertains to the emotions and feelings that accompany the encounter while the behavioural component pertains to the predisposition of readiness for action (Alao, 1990)

Many factors influence students' attitude towards a subject- the difficulty of learning a task, the occupational preference/choice, the instructional strategy (teaching method), the learning environment and among others. The instructional strategy in a Geography practical class may influence the learning outcomes in a Geography class either positively or negatively. For the task to be motivating, the answer to a question/task must not be known beforehand (White, 1996).

Geography as an environmental subject is very relevant to our life experiences. Since Geography is a very vital subject, it is very necessary that teachers ensure that learners develop positive attitude towards the subject. The subject helps a lot in studying other subjects, hence, Abegunde, Adegoke, Onwumere and Dahiru (2005) opined that Geography helps to understand some other related topics in Physics, Chemistry, Biology, History, Economics, and Mathematics,etc. Teachers can as well stimulate students' attitude towards the subject by using appropriate geographical tools for teaching. Ighalo (1985) noted that aerial photographs, maps, globe and other geographical tools remain storehouses of diverse information which could stimulate students to investigate into almost all aspects of human endeavour.

Also, Ighalo (2009) emphasized that attitude of students has effect on students' performance in school Geography, whether the school is located in the urban area where they are exposed to cognitive learning materials or rural areas where such cognitive

learning materials are not available. It therefore follows that students' attitude plays a significant role in students' performance in Geography.

Geography is a very useful subject either in choosing a vocation or in following a business or professional life. A geographer is an expert with a skill that is valuable to the society. Naturally, we need geographical knowledge. In Nigeria too, we need better geographical understanding to solve national problems. As a result, it is very important that students should develop positive attitude towards the subject. In view of this fact, the Canadian Council for Geographic Education (2006) gave ten reasons why students should develop positive attitude towards, and study Geography.

1. To understand basic physical system that affects every day life (e.g. earth-sun relationships, water cycle, wind and ocean current).
2. To learn the location of places and the physical and cultural characteristics of these places in order to function more effectively in our increasingly independent world.
3. To understand the Geography of past time and how Geography has played important roles in the evolution of people, their ideas, places and environment.
4. To develop a mental map of your community, province or territory, country and the world, so that you can understand the "where" of places and events.
5. To explain how the processes of human and physical system have been arranged and sometimes changed the surface of the earth.
6. To understand the spatial organisation of society and see order in what often appears to be a random scattering of people and places.
7. To recognise spatial distribution at all scales – local and world wide – in order to understand complex connectivity of people and places.
8. To be able to make sensible judgement about matters involving relationship between physical environment and society.

9. To appreciate earth as the homeland of humankind and provide insight for wise management decision about the planet resources that should be used.

10. To understand global interdependence and to become a better global citizen.

Emilefo (2010) in discussing the acquisition of geographical skills, problems and prospects, wrote that there is a dearth of qualified Geography teachers in our schools, hence many students are not offering Geography at the school certificate level. He concluded that under this condition of inadequate manpower, there is no doubt that it will be difficult to impart the desired geographical skills on Geography students. Infact shortage of staff in the right quantity and quality as well as shortage of required instructional facilities needed in Geography lessons within and outside the classrooms have been the major problems hindering effective teaching and learning of Geography. Under this condition of inadequate manpower, there is no doubt that it will be difficult to impart the desired geographical skills into Geography students, hence their poor performance.

Okwilagwe (2011), also writing on students performance in Geography, commented that the WAEC Chief Examiner report of 2000, 2005 and 2007 on students' performance in Geography are so unimpressive, as they reavealed that a large number of Geography students perform poorly on some aspects of Geography such as the map reading and interpretation of maps and the use of scale. They also perform poorly on some aspects of physical and regional Geography that require interpretation and calculation, an indication of their lack of knowledge of these and other aspects of the subject.

Kwali (2010) noted that due to the increase human population in Nigeria, there is a corresponding increase in the enrolment of students to study Geography in our schools. In the 1980s for example, one may find 45 students in a class out of which only 20 may offer Geography as a subject. Today, out of 85 students in a class, 70 would be offering

the subject. One may then wonder how better learning can take place where teacing materials and teachers available are not proportional to the high population of learners. However, there are lots of constraints to students' effective learning of Geography which have also affected students' performance and made the training and turnover rate of Geography teachers to be grossly inadequate to meet our present manpower requirements.

From the foregoing, Geography is an essential field to every human being, for it consists of the knowledge of the world around us. Therefore, developing positive attitude as well as boldness and self confidence towards Geography has a place in one's intellectual development. In consideration of the performance of students and how they are being greatly influenced by their attitude, towards this subject, facilities, teacher factor, vastness of the subject etc findings revealed that these factors affect performance either positively or negatively.

## 2.4 The Concept and Theory of Recall

Recall in memory refers to the retrieval of events or information from the past along with encoding and storage. It is one of the three core process of memory. According to Encyclopaedia Britannica, there are three main types of recall: free recall, cued recall and serial recall. Also, two main theories of the process of recall are the two-stage theory and the theory of Encoding specificity

**Theories of recall**

**Two-Stage Theory**: This is also called Austin Simonson theory which states that recall begins with a search and retrieval process, and then a decision or recognition process where the correct information is chosen from what has been retrieved. In this theory, recognition only involves the latter of these two stages, or processes, and this is thought to account for the superiority of the recognition process over recall. Recognition only

involves one process in which error or failure may occur, while recall involves two (Watkins & Gardener 1999).

**Encoding Specificity Theory:** This theory finds similarities between the process of recognition and that of recall. The encoding specificity principle states that memory utilizes information from the memory trace, or the situation in which it is retrieved. Encoding specificity helps to take into account, context cues because of its focus on the retrieval environment, and it also accounts for the fact that recognition may not always be superior to recall (Tulving & Thomson 1993).

**Types of recall**

**Free recall:** This describes the process in which a person is given a list of items to remember and then is tested by being asked to recall them in any order (Bower 2000). Free recall often displays evidence of primacy and recency effects. Primacy effect is displayed when the person recalls items presented at the beginning of the list first and more often. The recency effect is when the person recalls items presented at the end of the list first and more often.

**Cued recall:** This is when a person is given a list of items to remember and is then tested with cues to remember materials. Researchers have used this procedure to test memory. Participants are given pairs, usually of words to study. Afterwards, the experimenter gives the participant words to cue him/her to recall the words with which it was originally paired. The words presented can either be visual or auditory. (Botvinick, Wang, Cowan, Roy, Bastianen, Mayo and Houk 2009).

**Serial recall:** This is the ability to recall items or events in the order in which they occurred (Henson 1996). The ability of human beings to store items in memory and recall them is important to the use of language. The ability to recall in serial order has been

found not only in humans, but in a number of non-humans. These include Primate spehes and some non-primates (Botuinick et al 2009).

**Factors that affect recall**

**Attention:** The effect that attention has on memory recall is quite huge. It seems that the only time attention largely affects memory is during the encoding phase. During this phase, performing tasks can severally impairs the level of success in memory retrieval. It is believed that this phase requires much attention in order to properly encode the information at hand, and thus a distracting task does not allow proper input and reduces the amount of information absorbed.

**Motivation:** motivation is a factor that encourages a person to perform and succeed in the task at hand. Parlous research on classical conditioning illustrates positive and negative reinforcement as a motivational tool. Any form of motivation thus, generally leads a person to better recall (Roebers, Moga and Setineider 2001).

**Interference:** In the absence of interference, there are two factors at play when recalling a list of items; the recency and the primacy effects. The recency effect occurs when the short- term memory is used to remember the most recent items, and the primacy effect occurs when the long-term memory has encoded the earlier items.

**Context:** Context dependency effects on recall are typically interpreted as evidence that the characteristics of the environment are encoded as part of the memory trace and can be used to enhance retrieval of the other information in the trace. In other words, you can recall more when the environmentis similar in both the learning and recall phases.

**State-Dependent Memory:** State dependent retrieval is demonstrated when material learned under one state is best recalled in that same state.

**Gender:** Consistently, females perform better that males on episodic memory tasks including delayed recall and recognition. However, males and females do not differ on

working, immediate and semantic memory tasks. In general, neuro-psychological observations suggest that anterior lessons cause greater deficits in females than in males. It has been proposed that the gender differences in the strategies is used to process information, rather than anatomical differences (Yarmey 1999).

## 2.5 Immediate and Delayed Recall in Learning.

It should be noted that for proper learning to take place, the teacher must use a variety of, as well as good methods of learning to enhance understanding of the learners. Today however, the reverse is the case in most Nigerian schools. In view of this, Kwale (2010) observed that Geography teachers stick to one method of teaching which makes most lessons of the subject fail to achieve the target behavioural objectives of their lesson plans. Therefore, the employment of one technique of teaching in execution of classroom activities by teachers is a big bottleneck to the actual comprehension of most geography topics.

Instructional materials for geography curriculum are grossly inadequate in many of our secondary schools and even higher institutions of learning, (Oguagbaka, 2006). In a situation like this, effective learning cannot take place and it is impossible to have proper learning which is capable of changing one behaviour for a better society. Kwale (2003) observed that even in schools where some learning materials could be found, they are only kept in geography laboratory as decorative instruments or facilities that are not used during lesson by teachers and students, due to negligence by teachers and sometimelys because of overpopulation of the students. How then can better learning that can bring about positive thinking be achieved when instructional aids are not employed for the purpose intended?.

Lack of adequate qualified teachers is a point to mention as observed by Chinda (2003). Infact, Geography as a course has become more complex and enrolment in it has

increased. This calls for many qualified teachers to teach the complicated syllabus of the curriculum. But in the 21st century, qualified teachers of the subject are scarce; and consequently, effective learning of the course is not easy to come by (Kwale, 2008).

It has been observed by Chinda (2003). that the course content of Geography is very vast for easy teaching and learning. Students are usually scared by the vastness of the subject such that even if they offer it, they cannot learn it properly as they lack the boldness and self confidence to study the subject.

Other impediments to effective learning of Geography include lack of fund to carry out excursion, difficult nature of the subject and negative attitude of students towards the subject among others.

The strategies for curbing problems of effective learning of Geography are numerous. However, Oguagbaka (2006) has suggested that the federal and state government should always employ enough qualified teachers to teach the subject. In addition, potential as well as practising Geography teachers should be exposed to geographical instruments such as globe, charts, rain gauge, minimum and maximum thermometers etc. They should be taught how and when to use these equipment effectively in the classroom considering the nature of geography curriculum. This will go a long way in sustaining the interest of students in geography lesson as well as facilitating proper learning on the part of the students.

Instructional materials such as maps, textbooks, geographical equipments, geographical garden etc, should be adequately provided by the government. It is necessary to emphasize here that most lessons being presented by teachers of Geography fail to achieve the target behavioural objectives simply because teachers lack adequate and relevant teaching aids to facilitate their lessons. The moment these materials are made

available and teachers are aware of how and when to use them, proper learning would take place.

Mastery of the subject matter and planning of lessons are good strategies to curb the problems under review. Mairo and Nyako (2003) observed that a teacher has to be academically superior to his pupils, at least, as far as the subject he is teaching is concerned. In line with this statement, if geography teachers do not have mastery of the subject content, they would not have superior subject knowledge in class, and therefore would not be able to teach the subject effectively to realize purposeful learning. In the same vein, if teachers of Geography do not plan their lessons properly before going to the class, students would not comprehend lessons very well. This invariably affects delay and immediate recall in the subject, thereby making students performance in the subject unimpressive.

## 2.6 The Concept of Instructional Strategy

Good teaching is difficult because it demands a lot of physical and mental energy. The teacher usually develops an attitude and appreciation, and expects to enjoy his students, their ideas and questions. Instructional methods and teaching methods mean the same thing. They are primarily descriptions of the learning objective activities and flow of information between teachers and students. In short, they are ways of presenting information to students. Such methods fall into two categories; teacher-centred approaches and student-centred approaches. There is not one best approach to instruction. Some approaches are better suited to teacher-centred learning, while others clearly need student-centred approaches (Shuell, 1996)

It is apparent that in good teaching, the importance of motivating students to success cannot be overemphasized. Lack of success can lead to inappropriate behaviour and frustration on the part of students. Techniques that can enhance students' achievement

are usually applied. Researchers have reported that the time allocated to a content area is positively associated with learning in that area (Fisher, Berliner & Dishaw, 1980).

In developing teaching techniques, teachers are faced with the task of placing the students in an educational setting tailored to suit student learning. The setting in which services are provided has a strong influence on the students and teachers. However, some researchers have attributed the poor performance of students to the teaching techniques adopted and the teaching aids used by teachers. (Odogun, 1995) . Most teachers apply the conventional method (expository method) of teaching. In the method, most students struggle to understand the concept in different perceptions. They try to connect ideas and accept these ideas as reality (Ogirima & James, 2009). Researchers have identified some instructional techniques which they qualified as scientific and emphasized that they can be tried to see if they will help in the teaching and learning of Geography in schools. Among the recommended strategies are guided discovery and simulation teaching methods.

**Guided-discovery:** Piaget emphasized that children learn best when they are active and seek solutions for themselves. This implies that students would learn better by making discoveries, reflecting on them, and discussing them rather than imitating the teacher. Students learn better when they actively construct knowledge and develop understanding (Santrock, 2001).

Involvement with others create opportunities for students to evaluate and refine their understanding as they are exposed to thinking of others and as they participate in creating shared understanding (Gauvanin, 2001). This helps in the development of the student cognitive ability.

Some theories have emphasized that students construct knowledge by interacting with others. Therefore, teachers are expected to provide support for students to explore and develop their understanding. Teachers should create opportunities for students to learn

along with them and their peers in constructing knowledge (Vygotsky, 1987). This implies that in this method, the teacher serves as facilitator and guide in discovering knowledge, not as director and moulder of children's learning. Teachers should, therefore, create brainstorming sessions for students to enable them come up with good learning strategies.

**Simulation strategy:** Simulation enables students engage in relevant exercises. They may begin to perceive that knowledge learned in one context can become valuable in different situations. Boston (1998) in discussing the importance of simulation as a teaching method, said it encourages students to express in their own words, the basic arguments for the various sides of an issue, thereby promoting their cognitive development. Hence it is said that simulation seems to be applied more easily to the study of issues than processes.

Whether simulation will work for you or not depends on your goals and objectives. The strategy is very appropriate if you wish to promote human interaction. If you want to provide experiences that students may not get from the routine application of learning skills or principles, then simulation can achieve this end. Brown (1999) highlighted that with some ingenuity, knowledge of subject, good initiative, and imagination, anyone can design an effective small-group simulation.Orlich et al (2007) gave ten goals of simulation as an important teaching strategy thus:

(i) Develop changes in students' attitude

(ii) Change specific behaviours

(iii) Prepare participants for assuming new roles in the future

(iv) Help individuals understand their current roles

(v) Increase students' ability to apply principles.

(vi) Reduce complex problems or situations to manageable elements

(vii) Illustrate roles that may affect students' lives that they may never have imagined

(viii) Motivate learners

(ix) Develop analytical processes

(x) Sensitize individuals to other persons' life roles.

**Expository Teaching Strategy:** This method enables the teacher to help gain better understanding of a subject, topic or event. According to Onwuka,(1985) the teacher finds it necessary at times to arouse the students' interest. In fact, where resources and time are limited, the method becomes inevitable.

The emphasis of this instructional method is basically academic. This is a structured, teacher-centred technique that is characterised by teacher direction and control with high expectation for students' progress, maximizing the time students spend on academic tasks and efforts by the teacher (Stevens and Rosenshine 1981). It de-emphasizes non-academically oriented teacher-student interaction, such as conversation about personal concerns. In this technique, the teacher is directly in control, chooses and minimizes the amount of non-academic tasks. This method is highly structured and academically oriented towards learning environment.

## 2.7 Instructional Strategy and Student Achievement in Geography.

The acquisition of geographical skills is usually achieved through geographical teachings. In geographical teachings, certain problems are inherent which can also be said to pose limitations to the achievement in Geography (Emilefo, 2009)

A number of reasons or factors have been found to have contributed to students' poor achievement in schools. Some of these factors include teacher ineffectiveness (Ezike & Obodo, 1991) as quoted by Ogirima and James (2009) among others. To address this ineffectiveness, researchers have proposed different instructional techniques that would

enhance teaching and learning of Geography. This makes it apparent that researchers are concerned with achieving positive changes in teaching techniques, because education is a profitable investment that develops skills and imparts knowledge to students to meet the challenges of living ( Okorie, 2000).

The method of teaching could be regarded as the vehicle through which a message is delivered. The conventional method of teaching therefore, could be regarded as the existing traditional methods of instruction which have been used in our educational system over the years. Among such conventional methods of instruction are expository methods, lecture method, peer tutoring method, role play method, etc.

Among the conventional methods of instruction, no one method could be said to be most appropriate. Rather, classroom experience shows that in most cases, two or more teaching methods are combined by teachers in classroom practice. In this regards, Yoloye (1995) as quoted by Ibode (2005) cautioned that there is no such thing as the correct method of teaching because a variety of methods may be applicable to the same topic or subject. A method that is more fruitful than another in a particular context may become much less effective in a different context.

The use of effective teaching methods with the help of teaching aids enable students, not only to understand the subject, but also to know the relevance of such subjects to their future career. Hence, Orubu (1987) said "the appropriate use of materials and devices in any instructional method in the teaching of Geography and Social Studies help students understand what is being taught. He posits that combining the Instructional method with use of teaching aids makes a lesson interesting and motivate students to learn. He concluded by stating that teaching of Geography and Social Studies requires the use of materials and devices that will facilitate learning. Suffice to say therefore, in any school

where teachers use instructional method with teaching aids and devices in the teaching of Geography, students perform better academically.

A comparison of two instructional methods - field instruction and discussion was undertaken in a study by Bennett (1993). A unit on ecology was taught using each method for separate groups of seventh graders. Bennett found no significant gain from the traditional classroom discussion method, but noted that the field experience technique was as effective as the discussion technique.

The effectiveness of learning Geography through field experiences was probed by Glenn (1998), whose study involved a comparison of the field technique with the use of colour slides with classroom discussion. In one of the comparison,s the field trip group scored significantly higher than the group taught with slides.

Significant increase in student test scores resulted from use of pre-trip instructional materials, according to the results of a cognitive gain study on a museum field trip experience for junior high school earth science students (Gennaro, 1991). An experimental group demonstrated statistically significant differences in gain scores as compared to a control group making the same field trip, but without pre-trip instruction.

In Wise's and Okey's (1993) meta-analysis of instructional strategies, one category examined was presentation mode. This category included those means of instruction where the setting was different from a traditional learning environment. Field instruction was a targeted mode of learning within this category. The mean effect size obtained for cognitive and other (attitude, problem-solving) outcome was .26 based on 103 studies. Thus, field instruction was consistently found to be more effective than traditional strategies of learning.

The research data reviewed indicated that there are substantial achievement differences in the effectiveness of different approaches to field-based instruction. Both teachers and investigators should study successful approaches to improve their work.

From time,, a lot of researchers have been critical about how to manage differences in geographical skills and abilities. Since students in the same classroom vary in terms of individual abilities in reading Geography, teachers must be vigilant to employ instructional methods that will take care of their learning differences. Brown (1999) in his critical examination of teacher effectiveness said teachers need to determine each child's background in map reading and other aspects of Geography and to arrange learning experiences based on these differences. Since reading and arithmetic skills are basic to map reading skills and other aspects of Geography, differences in skills aquired by students in these fields also influence the Geographical instructional programme. These researchers further advised that while delivering classroom instruction, teachers should not assume that the actual presence of maps and other geographical materials in a classroom and in textbooks will ensure their use by students. This assumption would of course be misleading. The teacher must rather, choose effective instructional strategies and adapt materials available to the abilities of students and plan definite times for their use.

According to Okwilaagwe (2002), Geography teachers are to explore and use current strategies and teachniques of teaching that will help in the discharge of their duties and effectively impart the requisite knowledge, skill and values to students. The way the teacher sees his instructional objectives determines to a large extent, the teaching method to apply. In view of this, Emeke and Odetoyinbo (2004), reported that the teaching strategies (Lecture method) employed for integrated science would not ensure proper implementation of integrated science curriculum and the achievement of the objective of the subject at the junior secondary school level in Nigeria. They stated that it is important

that Geography teachers are guided in their teaching by objectives of the subject they teach so as to apply the instructional strategy effectively.

Even WAEC in 2005 stressed the need to employ effective instructional methods when teaching Geography so that students can improve on their performance in Geography examination. The chief examiner's report stated that schools should endeavour to secure the services of qualified Geography teachers who would use good instructional strategy with teaching aids, textbooks and other available materials to teach students the basic geographical concepts they are expected to know at the WASSCE level. If this is done, there will be much improvement in the teaching and learning of Geography.

## 2.8 The Concept of Study Habit

Study habits are learning tendencies that enable students work privately. According to Azikiwe (1998) as quoted by Agbaje (2010), study habit is described as the adopted way and manner a student plans his/her private readings after classroom learning so as to attain mastery of the subject. Joe (2004) in his work asserted that learning without thought is a labour lost. In this regard, he recommended that students' good study habit must include forming questions on every topic and answering those questions. Besides, review of past question papers by students aids their acquisition of knowledge and better study habits.

Hassan (1983) and Sanda (2004) as quoted by Agbaje (2010) in their studies observed that the activities a learner must carry out to have good study habit include:

(i) Regular class attendance

(ii) Good note taking

(iii) Good study place (environment)

(iv) Developing good memory and

(v) Space reverses.

Carew (1994) observed that study skill counselling involves providing systematic, co-ordinated instructions and teaching on how to gain greater access to learning materials and develop better study habits. The implication is that students become more confident, develop better self-image, and become less anxious about examination without fears. The assumption is that changes in the way a person thinks, feels and acts about his/her situation can be affected if such changes are made in the past before he/she behaves and performs.

The attitude of students towards studies at the secondary school stage, whether positive or negative is developed from the home at a tender age (nursery or primary school age). So, parents offer guidance to their children to develop reading habits before they go to school. Contrary to popular opinion, learning reading does not begin in schools; parents naturally become their children's first teachers and usually can help set their feet on the soil of the school. Semethrust (1995) stated that children naturally learn to talk by imitation. Reading experience could be acquired by learning and instruction, often from one's parents. Young children learn naturally when their parents read to them and allow them to touch and handle books at home. The very best parent -child activities are those that allow parents to support their children's endeavours. Semethrust (1995) also believed that parents should make reading easier for their children by giving suitable interpretation to what they have read and answering the children's questions.

However, students are charged with the responsibility of knowing their purpose for going to school and adopting strategies that would lead to the fulfilment of that purpose. If the purpose is right and legitimate, the strategies must include study habits that provide internalisation of knowledge.

## 2.9 Study Habit and Student performance in Geography

Most researchers have used study habit interchangeably with study skills, study method/technique or study behaviour.Aladogao (1998), Carew (1994), Drake (2001) and Sainji (2003) stated that study habits are the attitudes, behaviours and styles a learner adopts in the process of learning to meet the goals he/she has set for him/herself. Earlier on, Akinboye (1974) defines study habit as a powerful behaviour pattern directed towards learning, perceiving, questioning, reading, reciting and reviewing in an attempt to master a task. In describing study habit, Bakare (1977) listed eight components of the construct. These are home-work and assignment, time allocation, reading and note-taking, study period procedures, concentration, written work, examination and teacher consultation.

The effectiveness of any study method adopted bya learner depends on some physical and psychological factors. Akinboye (1974) supported this view point when he stressed that most secondary school students in Nigeria study effectively when they are provided with planned psychological support. Hassan (1993) supported this also, when he said students who take to good study habits move faster in their studies than others, do not have carried-over courses and pass excellently well. In order to promote effective learning, educationists and researchers have designed techniques or skills of study.

Robinson (1970) developed a study technique he called the 'SQ3R' in which the learner is expected to apply self-control. Robinson has this to say about the benefit of the technique.

> These five steps of the SQ3R technique, survey, question, read, recite and review, should result in faster reading and fixing of the important points in the memory. You will find one other worthwhile outcome.

The main components of this method include – surveying, questioning, reading, reciting and reviewing, which are abbreviated as SQ3R.

A major problem in getting the subjects to use the SQ3R study technique according to Beneke and Harris (1982) is that it requires a lot of personal effort on the part of learners. They found that many of the subjects who tried the technique abandoned it as result of the intensive personal effort required which they could not develop. These researchers suggested that the SQ3R technique should be introduced and taught gradually to the subjects. Akinboye (1980) supported this view-point, by combining the use of positive reinforcement and the SQ3R method. Its efficacy was found to cut across both arts and science subjects. In his study, using 176 form five subjects in a 2x2 factorial design found that subjects whose study habits were modified performed better in reading and mathematics than those in the control group.

In an experimental study, Beneke and Harris (1982) taught 38 subjects using self-control procedure and SQ3R study technique to improve study habit. The students that were taught using this method showed a significant gain in their Grade Point Average (GPA) than the control group. The inference from the study was that this method has more positive effect than teaching through the conventional methods.

In another study, McReynolds and Church (1993) used 39 undergraduates and investigated the differential effects of self-contracting, study skills development, and no treatment technique on the improvement of study behaviour of college underachievers. Their main interest was in improving study habits of subjects which they believed would consequently improve their performance. The findings showed that the study group that used the SQ3R and the self-contracting group performed significantly higher than the no treatment group.

Briggs, Tosi and Marley (1991) and Driskell (1996) have found from their studies with university students in some parts of America that guided note-taking and study skills system were related to academic performance. They found that study habits and relevant attitudinal and motivational factors were related to academic achievement more than personality and other psychological variables.

Working with 207 undergraduates, Popham and Moore (1980) used study habit and attitude inventory and Burrow's college inventory of academic adjustments to find the relationship that existed between study habits and attitudes and study habits and academic performance. The findings showed a high significant relationship in both cases.

In line with studies that indicated a positive relationship between study habit and academic performance, Bakare (1975) in a survey of some psychological correlates of academic success and failure found a correlation coefficient of .44 and .56 between study habit and academic performance of 43 males and 19 females secondary school students in the urban and rural areas respectively. He inferred that the relationship between the variables was significant.

On the effectiveness of guided note-taking and study skills system, Driskell (1996) found that the two variables had significant effect on performance of low predicted grade point average of freshmen in the university. Farrell-Moskwa (1992) investigated the correlation between student learning styles and the academic achievement of 58 students in a sub-urban middle school who were involved in the study. The result indicated a negligible relationship between learning style and academic achievement. Also, in a study conducted by Owolabi (1990), he investigated the study habits of 274 Nigerian secondary school students. The result showed no relationship between study habit and academic performance.

Abe (1995) in an ex-post facto design involving 624 junior secondary school class three students in Oyo State found that study habit influenced achievement in Social Studies. He also found that most of the variables used in the study that had indirect effects on students' achievement in social science did so by adopting a positive study habit.

A growimg number of scholars have suggested that many of the problems of learning are the artifacts of discontinuities which are brought about by the separation of learning from real life functions (Fagbemi, 2001), and in the exclusion of the students' language, values and mode of congnition in the school environement (Ugoduluwa 2007) as quoted by Oluwatimilehin (2012). It seems that causes of low academic achievement are diverse and cannot be associated with a single major factor. For instance, proponents of self-concept have found that self-concept and its variables may be a paramount factor in academic failure. Causes of fluctuating performances among students have also been attributed to teacher – students interaction, intrinsic and extrinsic motivation (Tukur & Musa 2001), Classroom behaviour (Turkur & Musa 2001) and other extraneousvariables. However, it has been observed that studies on the relationship between study habit and students' academic achievement in Nigeria cannot be said to be exhaustive (Ugodulunwa, 2007) as quoted by Oluwatimilehin and Owoyele (2012).

In summary, findings by almost all the researchers, showed positive relationship between study habit and academic performance of students. However, even though a majority of the researches in education indicate a relationship between students' study habit and academic performance, there is need to investigate the effects of study habit on student's immediate and delayed recall in Geography.

## 2.10 Intraction of Instructional Strategies, study Habit and Students' Achievement

Teachers and students are the principal actors in the teaching –learning prcoess. Each come into the learning situation with some responsibilities. The process of classroom

interactionis not as mechanical as some may think. Rather, they are planned and organised behavious which the teachers or instructor tries to exhibit as he or she passes on the subject matter content to the learner (Okwilagwe, 2011). The learners on their part, however, should no longer be seen as passive recipeints but as active participants in their learning experiences. For teaching to be effective, cognitive psychologists are of the view that it should be interactive, a dialectic or dialogic process between the teacher and the learner. This implies that teachers ensure the use of interactive methods and exhibit communicative behaviour between themselves and their students in the classroom. In a situation where teacherare deficient of teaching techniques and can not ensure the use of interactive methods however, there are bound to be problems.

In recent times, there has been reports of large scale educational failure which has become an issue of major concern among stakeholders in the Nigerian education sector. Yoloye (1999) submitted that theories of educational disadvantages and social cultural pathology have been most prominent in the explantion of this failure. He went further to say that successful achievement in any form of activitity is based upon study, interpretation and application and that studying should have a purpose. It therefore depends on the individual to decide whether he or she wants to study to gain new ideas or to understand the relationship between two different ideas What one gains as a result of studying depends on the degree to which one succeeds in achieving his/her aim or purpose.

Okwilagwe (2002) in discussing the role of the teacher in actualizing the objective of Geography said scholars have, from the knowledge gained through research findings, endorsed the following methods and strategies in teaching Geography in order to reduce the failure rate among students. These strategies are; guided discovery, inquiry method, programmed instruction, mastery learning, simulation and advance organisers among

other. These methods are by no means exhaustive, but have one thing in common: they emphasize individuality in problem solving. Modern day Geography, by virtue of having gone through scientific re-organization, emphasises the development of problem solving and discovery attitude and skills in students. Problem solving and discovery approaches are scientific, and are systematic approaches to solving problem of varied nature.

Study habit act as another variable connected with Geography students' performance. Study habit reflects student usual act of studying and also serve to direct the learner's cognitive processes during learning. Study habits includes documentation of activities: time management, setting appropriate goals, choosing appropriate study environment, using appropriate note-taking strategies, choosing main ideas and organisation (Proctor, Prevatt, Adams, Reaser, & Petscher, 2006). A lot of researches are ongoing to find suitable learning environment for students to study. In the same vein, Sharp and Benfield (2005) review the experience and study habits of learners in schools, in order to identify areas worthy of future investigation. They found some connections among study habits and performances and suggested deeper investigation for the purpose of highlighting the experiences,study habits and strategies of effective learners.

The various strategies and methods advanced for teaching and learning of geographic information in this research have implication for the advancement of Geography knowledge and skills, and for positive attitude development towards Geography for secondary school leavers in Nigeria. Therefore, whichever method or strategy a teacher adopts in teaching geographical concepts;s ideas or topics depend to a large extent on the teachers views of his or her role as a facilitator or custodian of knowledge.

## 2.11 Appraisal of Literature Reviewed

Instructional methods are used by teachers to create learning environments and to specify the nature of activities which both teacher and learner will be involved in during lesson. What children learn depends not only on what they are taught, but also how they are taught, their developmental level, and their interests and experiences. It is therefore required that much closer attention be paid to the methods chosen for presenting material. (Saskachewan Education 1988)

Even though the methods in this study can complement each other, guided discovery seeks a high level of student involvement in observing, investigating, drawing inferences from data or forming hypotheses. Guided discovery takes advantage of students' interest and curiosity, often encouraging them to generate alternatives or solve problems. In guided-discovery strategy, the role of the teacher shifts from lecturer/director to that of facilitator, supporter and resource person. The teacher arranges the learning environment, provides opportunities for student involvement, and when appropriate, provides feedback to students while they conduct an inquiry (Martin, 1983).

Guided discovery requires systematic conduct, not haphazard bungling (Ehindero 1984; Eze 1982) . Geography is an environmental subject. Environmental education is a rich arena for discovery learning and problem solving. Students can collect water quality data, using standard, scientifically accepted practices for analysis and discussion. They construct meaning from the data. (Orlich, Horn, Carpenter & Brantner, 1999). This strategy can be used in all subjects and is very rewarding. Challenge your students to explore selected themes from history (Wilson, 2002), genetics (Echevarria, 2003) or other areas (Kalayei & Cohen, 2003). The key point is that thought comes before action because this teaching technique enables students gain knowledge through experiment.

The fact that simulation encourages students to express in their own words, the basic arguments for the various sides of an issue makes the strategy more rewarding and effective in the teaching and learning encounter. Onwuka (1985) said that simulation endeavours to introduce elements of reality into the teaching/learning situation. This teaching strategy is an effective means of helping the students to understand not only the feelings, emotions, and prejudices of other people, but also the basic principles and concepts in different disciplines.(Saylor & Alexander, 1974)

Also, for the fact that when the expository strategy is adopted, the teacher delivers his goods systematically. Adopting a suitable order makes the method rewarding, but primarily, it is the teacher who talks while the students listen and sometimes take down notes. Too often, this method is abused. In fact, some researchers observed that some teachers in their studies did no real teaching, but spent all their time in lecturing their pupils, which usually meant that they used words over the heads of the passive pupils. From the aforementioned, it can be concluded that even though the method may be rewarding at times, it does not necessarily make teaching effective, hence students do not improve in performance.

As stated in the National Policy on Education (2004), one of the goals of education is to facilitate the acquisition of both physical and intellectual skills which would enable students to be self-reliant and become useful members of the society in the future (Federal Republic of Nigeria, 2004). Therefore, students are charged with the responsibility of knowing their purpose for education and adopting strategies that would lead to the fulfilment of that purpose. If the purpose is right and legitimate, the strategies must include study habits that provide internalisation of knowledge. In short, to achieve the goals as stated in the National Policy, one has to cultivate good study habits. Hence, Drake (2001) and Sainji (2003) stated that study habits are the attitudes, behaviour and styles a

learner adopts in the process of learning to meet the goals he/she has set for him/herself. In other words, good study habit is a vehicle that enables students to move faster in their educational endeavour.

This study examined the relationship among instructional strategies, study habit and students' performance in secondary school Geography. The teacher is a social agent. He should make the classroom environment favourable study for teaching, learning and studying. He should also develop the skills for a single learning situations at a time like problem solving ability, intellectual inquiry, memory, retention and concept formation in a logical way among students (Sasikala, 2012). The present study will help the teacher to promote the interaction of learning by improving the study habit and academic achievement of students.

In fact, the use of various techniques for teaching Geography should be encouraged. This is because the numerous topics in the subject require the use of several effective teaching methods. This, when done within conducive learning atmosphere will preclude effective learning of the subject by learners. This will encourage students, thereby enhancing recall, whether immediate or delayed in the subject..

# CHAPTER THREE

# METHODOLOGY

**3.0** The chapter addresses the research design, population,sampling procudure and sample, instrumentation and method of data analysis.

## 3.1 Research Design

The study investigated the effects of three instructional strategies on immediate and delayed recall in Geography. It was a pre test – post test control group design in a quasi experimental setting. This design was considered appropriate because intact classes were used. The intact classes were randomly assigned to treatment group.

A 3x2 factorial design allows variables that are not manipulated to be included by building them into the research design. Three dimensions of instructional strategy were used: guided discovery method ($T_1$), simulation method ($T_2$) and expository method ($T_3$), (control group). Study habit operated at two levels (good study habit and poor study habit).

The design also provided the opportunity for determining how the independent variables combined to affect student behaviour. That is, it provides an opportunity to determine the combine effects of the independent and moderator variables. Table 3.1 shows the distribution of students according to , study habit and treatment**.**

**Table 3.1: 3x2 Factorial matrix.**

| **Treatment (T)** | **Study habit** |
|---|---|
| Guided discovery (Experimental) $T_1$ | Good study habit |
| | Poor study habit |
| Simulation (Experimental) $T_2$ | Good study habit |
| | Poor study habit |
| Expository method (Control) $T_3$ | Good study habit |
| | Poor study habit |

In symbolic form, the design is shown as follows:

$O_1$ $T_1$ $O_2$ $O_3$

$O_1$ $T_2$ $O_2$ $O_3$

$O_1$ $T_3$ $O_2$ $O_3$

$O_1$, represents the pre-test before treatments.

$T_1$, $T_2$, $T_3$, represents treatments for all the groups.

$O_2$, represents post test for immediate recall

$O_3$, represents post test for delayed recall..

## 3.2 Variables of the Study.

The variables of the study are;

**Independent Variable**:

Teaching Strategy varying at 3 levels

(a) Guided discovery

(b) Simulation

(c) Expository

**(B) Moderator Variables**

Study habit -Varying at two levels

(a) Good study habit

(b) Poor study habit

**(C) Dependent Variables**

(a) Immediate recall

(b) Delayed recall

### 3.3 Population

The population for the study comprises all the Senior Secondary two (SS II) students in Edo State of Nigeria.

### 3.4 Sampling Procedure

Multi-stage sampling procedure was used to select the study sample. Edo State has three senatorial districts. Edo central senatorial district was randomly chosen. Six schools that met the specified criteria for this study were selected from the Senatorial District. At the school level, intact classes were assigned to treatment groups, two schools for each treatment. In each of the selected school, the simple random sampling technique was used to select an arm of the SS2 class. In all, 480 students in Senior secondary school two (SS2) from the six schools in the senatorial district participated in the study.

**Selection criteria are:**

(a) The scope of work covered by the school. With the new Geography curriculum, the areas covered by the research, that is Physical Geograpy and Map reading, have been completed in SS11 and also a solid foundation had been laid in SS1.

(b) Year of establishment (not less than 25 years and with a geography laboratory). This is to ensure that the schools have the instructional materials for teaching the subject.

(c) Experienced geography teachers with a minimum of 10 years teaching experience and at least a B.Ed degree in Geography to be selected as research assistants.

**Table 3.2: Analysis of Samples Selection**

| S/N | Name of Schools | No of Participants | Local Govt. Area |
|---|---|---|---|
| 1 | School A | 86 | Esan West |
| 2 | School B | 75 | Esan West |
| 3 | School C | 97 | Esan Central |
| 4 | School D | 56 | Esan Central |
| 5 | School E | 74 | Esan South East |
| 6 | School F | 92 | Esan South East |
| | **Total** | 480 | |

### 3.5 Instruments for Data Collection.

The instruments that were used in this study were

1. Geography Achievement Test (GAT)
2. Study Habit Inventory (SHI)

1) **Geography Achievement Test (GAT):** The geography achievement test was designed by the researcher to measure acquisition of knowledge in some selected topics, with SS2 Geography students used as treatments.

Table of Specifications was drawn from the Geography content of SS2 work. Four levels of the cognitive domain of Bloom's taxonomy of educational objectives were tested. They include knowledge, comprehension, application and analysis. (Bloom, Madus & Hasting 1981). The items in the GAT were limited to these cognitive levels because of the age and academic level of study target group. The content validity was established by giving the instrument to experts (educational evaluators) to moderate. Geography teachers in the school whose students were used for pilot testing also assisted in the moderation of the questions to ensure a high standard.

The test had two sections, section A consisted of student's demographic details such as name of school, class, sex, age of students. Section B is a 40-items multiple choice test chosen out of initial draft containing 100 items with four options A-D. The 40 items had difficulty indices ranging between 0.53 and 0.75, while the discriminating indices ranged between 0.46 and 0.62. The reliability index of GAT was 0.80. This was established by using Kuder Richardson 20 formula (KR20). The maximum obtainable score was 40, that is, each item attracted a score of 1.

**Table 3:3.** Table of Specifications for Geography Achievement Test (GAT)

| Topics/Objectives | Knowledge 23% | Comprehension 28% | Application 28% | Analysis 21% | Total 100% |
|---|---|---|---|---|---|
| Tectonic processes on landforms | 2 | 2 | 3 | 1 | 8 |
| External processes on landforms | 2 | 2 | 1 | 1 | 6 |
| Work of a river | 1 | 2 | 2 | 1 | 6 |
| Scale, bearing and distance | 3 | 2 | 3 | 2 | 10 |
| Relief, contour and distance | 1 | 2 | 1 | 1 | 5 |
| Section, gradient and intersivibility | 1 | 1 | 2 | 1 | 5 |
| Total | 10 | 11 | 12 | 7 | 40 |

**Table 3.4: Items Distribution According to the topic and Objective for Geography Achievement Test (GAT)**

| Topics/Objectives | Knowledge 23% | Comprehension 28% | Application 28% | Analysis 21% | Total 100% |
|---|---|---|---|---|---|
| Tectonic processes on landforms | 32,35 | 39,40 | 23,26,38, | 27 | 8 |
| External processes on landforms | 24,25 | 28,34 | 29 | 36 | 6 |
| Work of a river | 31 | 33,22 | 37,21 | 30 | 6 |
| Scale, bearing and distance | 2,3,5, | 4,11 | 1,6,9 | 7,8 | 10 |
| Relief, contour and distance | 14 | 17,16 | 10 | 15 | 5 |
| Section, gradient and intersivibility | 18 | 19 | 13,20 | 21 | 5 |
| Total | 10 | 11 | 12 | 7 | 40 |

2) **Study Habit Inventory (SHI):** Study Habit Inventory (SHI) designed by Bakare (1977) was adopted. It consists of two sections, the first section shows background information of the subjects. The second section is made up of 45 Likert type items in 8

sub-components. The sub- components measure the study habit of students. It includes work and assignment, time allocation, reading and note taking, study period procedure, concentration, written work examination and teacher consultation. The participants responded to a 5 point Likert scale response options of;

- Almost never
- Less than half of the time
- About half of the time
- More than half of the time
- Almost always

It was recently validated by Ola and Morakinyo ( 2010) and test re-test reliability estimate of 0.83 was obtained. Cronbach alpha was used to established the reliability co-efficient of the instrument. The reliability co-efficient is 0.81.

### 3.6 Method of Data Collection.

The data for this research work were collected by the researcher with the help of research assistants and Geography teachers in each of the schools that were involved in the study. The Geography teacher is the subject classroom teacher and the research asistant is the other Geography teacher in the school but not directly teaching the class used for the research project. The research assitants help the Geography teachers to ensure that the students are in their classes prepared for the lesson before its commencement. The researcher developed the teaching (treatment) package for each group. The teachers were trained by the researcher on how to use them effectively. Before the commencement of the programme both the Geography teachers and the research assistants were trained on how to use each package on each treatment group through micro-teaching sessions. The training of the geography teachers and research assistants lasted for one week. To further ensure appropriateness and effectiveness in the use of the teaching strategies,Geography

teacher in the schools were closely monitored throughout the period of the treatment. The work was done by the researcher visiting the schools and being physically present during the teaching in most of the sessions.

### 3.7 Treatment Packages.

First, a pre-test was administered on the participants before treatments followed by study habit inventory. The three groups were exposed to the treatments. This was followed immediately with the test for immediate recall. Lastly, after two weeks, the test for delayed recall was administered.

There are three treatments packages:

**Package I**: Guided Discovery method ($T_1$) on experimental group I

**Package II**: Simulation method ($T_2$) on experimental group II

**Package III**: Expository method ($T_3$) control group.

The researcher used experienced teachers (with teaching qualification degree in geography education) in each school that were selected for the study. Each teacher used one package. The rationale for using six schools was to allow each package to be used by two teachers to eliminate the problem of teacher validity. Each of the treatments were mounted in different schools to eliminate the problem of contamination that may result if all the treatments were administered in one school.

Treatments lasted for eight (8) weeks. There were twenty-four (24) lessons for each treatment group of three (3) periods per week.

**Package I: Guided discovery**

**Step 1**: The teacher sets the stage for learning by providing all the materials which will help the students to learn. Such materials include globes, atlas, thread, pins, compass, topographical maps and other thematic maps.

**Step11**: Then, with a few carefully worded instructions, the students are guided by the teacher to make some discoveries through observations, description, measurement, computation etc.

**Step 111**: Through observation and description, students write summary of what they observed. The teacher assists the students to give the description of both natural and man made features and their relationship.

**Step 1V**: The teacher guides the students to understand the different geographical tools, by asking the students to identify the contents of all the materials used. This will help them to understand geographical materials and the topics.

**Step V**: The Teacher asks students to summarise the sequence as a proof of their acquisition of geographical knowledge.

**Step V1**: The teacher asks some questions so that they will be able to understand the statements written down in summary and also apply them to other matters of geographical interest.

**Step VII**: The Teacher finally examines students' summary in line with the topic to see whether students' explanations of problems and issues show that they have acquired some geographical skills.

**Step V111**; Teacher gives the students take home assignment.

**Package 11 Simulation**

**Step 1**: First, the teacher involves students in a positive learning activity by bringing into the classroom some pictures of geographical materials. These are coloured diagrams,

charts, graphs, pictures of hills, slopes, towns, cities, villages, rivers, oceans, bridges and other geographical features. The teacher also ensures that all exercises going on in the classroom at this time, like asking questions on the materials, will simulate the students to learn. The teacher takes the students to the field to observe similar features that they have seen in the pictures and diagrams.

**Step 11**: The teacher introduces the basic concepts by explaining to the students, the relationships among the various objects as they appear in the maps and diagrams. Using visual materials like globes, pictures, maps, protractors, drawing pens etc, the teacher encourages students on how to make an outline of geographical features

**Step I11:** The teacher arranges the students in groups. The groups should not exceed four in number for effective supervision.

**Step 1V:** The teacher guides the students in each group to interact by asking each other questions on what they observe to understand the differences and similarity in the instrutional materials

**Step V:** The teacher use pictures and photographs to illustrate some topics. Picture cutting and photographs that are related to the problem or topic slated for discussion are display and the teacher draw on the chalkboard and ask the students to imitate him or her and draw. This encourages independent learning and improves students ability to draw diagrams in geography.

.**Step VI**: The teacher assists the students to acquire those skills that are concerned with the recognition of features and the assessment of these features on the maps and diagrams.

**Step V1I**: Finally, the teacher ensures a common knowledge base by helping students to acquire certain skills such as the identification of phenomena, selection and report writing which are useful to the geographers. This is done by the teacher moving round the groups to ask related questions and assists the students to answer questions where necessary.

**Package III Expository**

**Step 1**: The teacher reviews the previous work by asking specific questions orally based on previous knowledge.

**Step 11**: The teacher talks and demonstrates while the students listen and sometimes take down notes.

**Step 111**: The teacher repeats and emphasises important points and makes use of illustrations.

**Step 1V**: The teacher would sometimes ask and invite questions at intervals and devises suitable activities like using globes and atlas to demonstrate.

**Step V**: Finally, the teacher provides clarity of concepts based on students' questions through explanations. He either gives summary on the chalkboard or dictate the notes to the students. The teacher moves round the classroom to ensure students copy the note given to then in summary form by the teacher before leaving the class.

### 3.8 Data analysis

Analysis of co-variance (ANCOVA) was used to analyse data gathered. This corrects the initial differences among participants. Interaction effects of the independent variables were also revealed. Scheffe Post Hoc was used for the pair-wise comparison of treatment groups. The hypotheses were tested at the .05 significants level (P=.05).

# CHAPTER FOUR

# RESULTS AND DISCUSSION

## 4.0 Introduction

This chapter outlines and discusses the results of the study. The focus of the study was to investigate the effect of instructional strategy (guided discovery, simulation and expository) on students performance (immediate and delayed recall) in Geography, considering study habit as the moderator variable.

## 4.1 Testing of the stated hypotheses.

**4.2 Dependent variable:** Students' immediate recall in Geography.

**4.2.1** $Ho_1$ (a) There is no significant main effect of treatment (intructional strategy) on students' immediate recall in Geography.

This hypothesis has instructional strategy as independent variable and students' immediate recall in Geography as dependent variable. The statistical tool used to test this hypothesis was analysis of covariance (ANCOVA). The result of the hypthesis is presented on Table 4.1

Table 4.1 shows the main effect of treatment on students' immediate recall in Geography.

**Table 4.1:** Summary of 3x2 Analysis of covariance (ANCOVA) of immediate recall in Geography by Treatment, and Study Habit.

Dependent Variable: immediate recall

| Source | Type III Sum of Squares | Df | Mean Square | F | Sig. | Partial Eta Squared |
|---|---|---|---|---|---|---|
| Corrected Model | 3841.399[a] | 6 | 640.233 | 83.048 | .000 | .512 |
| Intercept | 1843.927 | 1 | 1898.595 | 246.277 | .000 | .342 |
| Pretest | 1723.133 | 1 | 1723.133 | 223.517 | .000 | .320 |
| Teachibmethod | 915.352 | 2 | 457.676 | 59.368* | .000 | .200 |
| SHIleve | 6.033 | 1 | 6.033 | .783 | .377 | .002 |
| Teachibmethod * SHIlevel | 4.616 | 2 | 2.308 | .299 | .741 | .001 |
| teachibmethod * SHIlevel | 3654.148 | 474 | 7.709 | | | |
| Error | 111124.014 | 481 | | | | |
| Total | 7495.544 | 480 | | | | |
| Corrected Total | | | | | | |

p< 0.05

**Key;**

Teachibmethod = Teaching by method.

SHI Level = Study Habit Inventory.

Table 4.1 shows that the main effect of instructional strategy on students' immediate recall in Geography is significant $F(_{2}, _{474}) = 59.368$; $p<0.05$. Therefore the null hypothesis $Ho_1$ (a) was rejected. The partial eta squared of 0.200 implies that treatment (guided discovery, simulation and expository) account for 20.0% of the observed variance in immediate recall in Geography.

**Table 4.2:** Estimated Marginal means and standard Error: Treatment groups

Summary of mean scores of instructional strategies on students' immediate recall in Geograpgy.

**Dependent Variable: immediate recall**

| Treatment | Mean | Std. Error | 95% Confidence Interval | |
|---|---|---|---|---|
| | | | Lower Bound | Upper Bound |
| Guided Discovery | 16.501[a] | .233 | 16.044 | 16.958 |
| Simulation | 14.550[a] | .226 | 14.106 | 14.995 |
| Expository | 12.959[a] | .221 | 12.526 | 13.393 |

Table 4.2 shows that the mean post-test scores of students exposed to guided discovery is highest ($\bar{x}$ =16.501), followed by simulation ($\bar{x}$ = 14.4550) and lastly, expository ($\bar{x}$ = 12.959).That is, the mean for guided discovery strategy is greater than that of simulation; and mean for simulation is greater than that for expository. It could therefore be inferred that students of teachers in the guided discovery class performed better than those in the other two classes.

The mean difference of treatment modes, guided discovery, simulation and expository strategies shows that there is significant difference among treatment groups as shown in table 4.3.

In order to examine the source(s) of the significant difference among the treatment groups (guided discovery, simulation and expository), Scheffe Post-hoc test was used to determine the source of the significance, the direction and the amount of variation. There was a significant difference at alpha level $p<0.05$ as illustrated in table 4.1.

**Table 4.3: Post Hoc: Mean Difference Pairwise Comparisons of Treatments mode of Guided Discovery, Simulation and Expository Strategies.**

| (I) Treatment | (J) Treatment | Mean Difference (I-J) | Std. Error | Sig.[a] | 95% Confidence Interv | |
|---|---|---|---|---|---|---|
| | | | | | Lower Bound | Upper Bound |
| Guided Discovery | Simulation | 1.951* | .355 | .000 | 1.147 | 2.754 |
| . | Expository | 3.542* | .325 | .000 | 2.763 | 4.341 |
| Simulation | Guided Discovery | -1.951* | .335 | .000 | -2.754 | -1.147 |
| | Expository | 1.591* | .313 | .000 | .842 | 2.342 |
| Expository | Guided Discovery | -3.542* | .325 | .000 | -4.321 | -2.763 |
| | Simulation | -1.591* | .313 | .000 | -2.340 | -.842 |

**Table 4.4: Summary of Mean Difference pairwise Comparison of Treatment mode. Dependent Variable: immediate recall**

| Treatment | Mean | Guided | Simulation | Expository |
|---|---|---|---|---|
| Guided Discovery | 16.501 | | * | * |
| Simulation | 14.550 | * | | * |
| Expository | 12.959 | * | * | |

As shown in table 4.4, students exposed to guided discovery ($\bar{x}$ = 16.501) performed significantly higher than the rest of the two groups. Similarly, students exposed to simulation ($\bar{x}$ = 14.550) significantly performed better than those in expository which is the control group ($\bar{x}$ = 12.942).

**4.2.2 $Ho_2$(a):** There is no significant main effect of study habit on students' immediate recall in geography.

This hypothesis has instructional strategy as independent variable and study habit as moderator variable. The statistical tools used to test this hypothesis was the analysis of co-variance. The result of the hyothesis is presented in Table 4.1

Table 4.1 shows the main effect of study habit on students' immediate recall in Geography $F_{(1,474)}$=0.783, P>0.05. Therefore, we do not reject the hypothesis $Ho_2$(a). The partial eta

squared of 0.002 implies that study habit account for 0.2% of the observed variance in immediate recall in Geography. The mean for poor study habit ($\bar{x}$=14.783) and the mean of good study habit ($\bar{x}$=14.558) shown in Table 4.5 is an indication of no significant effect.

**Table 4.5 Summary of the Mean Difference of poor and good study habit of students' immediate recall in Geography. Dependent Variable: posttest immediate**

| Study habit | Mean | Std Error | 95% Confidence Interval | |
|---|---|---|---|---|
| | | | Lower Bound | Upper Bound |
| Poor Study Habit | 14.783a | .181 | 14.428 | 15.138 |
| Good Study Habit | 14.558a | .180 | 14.205 | 14.910 |

**4.2.3 $Ho_3$(a):** There is no significant interaction effect of treatments (instructional strategy) and study habit on students' immediate recall in Geography.

This hypothesis has instructional strategy as independent variable and study habit as moderator variable.The statistical tools used to test this hypothesis was the analysis of co-variance.the result of the hypothesis is presented in table 4.1

Table 4.1 shows that interaction effect of instructional strategy and study habit on students' immediate recall on Geography is not significant ( $F_{(2,474)} = 0.299, p > 0.05$). Therefore we do not reject the null hypothesis $Ho_2$(a). The partial eta squared of 0.001 implies that interaction effect of treatment and study habit accounts for only 0.1% of the variance in the immediate recall in Geography. This means that study habit does not interact with instructional strategy to influence students immediate recall in Geography. Hence the mean ($\bar{x}$ = 16.605 & 14.788) for poor study habit is greater than the mean ($\bar{x}$ = 16.397 & 14.313) for good study habit in the two treatment groups, table 4.6.

**Table 4.6: Summary of instructional strategies (treatment) and students' poor and good study habits in Geography**

| Treatment | Study Habit | Mean | Std. Error | 95% confidence Interval | |
|---|---|---|---|---|---|
| | | | | Lower Bound | Upper Bound |

| | | | | | |
|---|---|---|---|---|---|
| Guided Discovery | Poor Study Habit | 16.605[a] | .346 | 15.926 | 17.285 |
| | Good study Habit | 16.397[a] | .295 | 15.818 | 16.976 |
| Simulation | Poor Study Habit | 14.788[a] | .298 | 14.202 | 15.373 |
| | Good study Habit | 14.313[a] | .334 | 13.657 | 14.969 |
| Expository | Poor Study Habit | 12.956[a] | .310 | 12.346 | 13.565 |
| | Good study Habit | 12.963[a] | .313 | 12.349 | 13.577 |

**4.3 Dependent variable:** Students' Delayed Recall in Geography

**4.3.1 $Ho_1$(b):** There is no significant main effect of treatment(instructional strategy) on students' delayed recall in Geography.

This hypothesis has instructional strategy as an independent variable and student delay recall in Geography as dependent variable. The statistical tool used to test the hypothesis was analysis of covariance (ANCOVA) .The result of the hypothesis is presented in table 4.7

Table 4.7 shows the main effect of treatment on students' delayed recall in Geography.

**Table 4.7:** Summary of 3x2 Analysis of covariance (ANCOVA) of delayed Recall in Geography by Treatment, and study habit.

**Table 4.7: The mean effect of treatment on students' delayed recall in Geography. Dependent Variable: _delayed recall**

| Source | Type III Sum of Squares | Df | Mean Square | F | Sig. | Partial Eta Squared |
|---|---|---|---|---|---|---|
| Corrected Model | 4796.880[a] | 6 | 799.480 | 7.308 | .000 | .257 |
| Intercept | 3262.791 | 1 | 3262.791 | 111.450 | .000 | .191 |
| pretest | 1267.6060 | 1 | 1267.606 | 43.299 | .000 | .084 |
| teachibmethod | 2400.604 | 2 | 1200.302 | 41.000 | .000 | .148 |
| SHIlevel | 28.566 | 1 | 28.566 | .976 | .324 | .002 |
| Teachibmethod SHL Level * | 10.964 | 2 | 5.482 | .187 | .829 | .001 |
| Error | 13847.518 | 474 | 29.276 | | | |
| Total | 143033.000 | 480 | | | | |
| Corrected Total | 18644.398 | 479 | | | | |

a. R Squared = .257 (Adjusted R Squared = .248)

Significant at $p < 0.05$

**Key**

Teachibmethod = Teaching by method.

SHI Level = Study Habit Inventory.

Table 4.7 shows that the main effect of instructional strategy (treatment) on students' delayed recall in Geography is significant ( $F_{(2,474)} = 28.560$; $p<0.05$). The null hypothesis $Ho_1(b)$ is therefore rejected. The partial eta squared of 0.002 implies that treatment (guided discovery, Simulation and expository) account for 0.2.% of the observed variance in students' delayed recall in Geography.

**Table 4.8: Set of means showing main effect of treatment on students' delayed recall in Geography**

Dependent Variable: delayed recall

| Treatment | Mean | Std. Error | 95% Confidence Interval | |
|---|---|---|---|---|
| | | | Lower Bound | Upper Bound |
| Guided Discovery | 18.370[a] | .453 | 17.480 | 19.260 |
| Simulation | 16.921[a] | .442 | 16.053 | 17.790 |
| Expository | 12.954[a] | .430 | 12.110 | 13.799 |

.

Table 4.8: reveals that the mean score for guided discovery is the highest ($\bar{x}$ =18.370), followed by the mean score for simulation ($\bar{x}$ =16.921) and lastly, the mean score for expository which is the control group ($\bar{x}$ =12.954).This means that the mean for guided discovery is higher than that for simulation; while the mean for simulation is higher than that of expository.

To examine the source of the significant differences among treament groups, Scheffe Post-Hoc Test was used as presented in Table 4.9a.

**Table 4.9(a): Post Hoc: Mean Difference Pairwise Comparisons of Treatment**

Dependent Variable: delayed recall

| (I) Treatment | (J) Treatment | Mean Difference (I-J) | Std. Error | Sig.[a] | 95% Confidence Interval for Difference[a] | |
|---|---|---|---|---|---|---|
| | | | | | Lower Bound | Upper Bound |
| Guided Discovery | Simulation | 1.449* | .654 | .079 | -.117 | 3.015 |
| | Expository | 5.416* | .634 | .000 | 3.898 | 6.934 |
| Simulation | Guided Discovery | -1.449* | .654 | .079 | -3.015 | .117 |
| | Expository | 3.967* | .610 | .000 | 2.505 | 5.429 |
| Expository | Guided Discovery | -5.416* | .634 | .000 | -6.934 | -3.898 |
| | Simulation | -3.967* | .610 | .000 | -5.429 | -2.505 |

Based on estimated means

*The mean difference is significant at the .05 level.

**Table 4.9(b): Summary of Mean Difference Pairwise Comparisons of Treatment Mode.**

Dependent variable: Delayed Recall in Geography.

| Treatment | Mean | Guided Discovery | Simulation | Expository |
|---|---|---|---|---|
| Guided Discovery | 18.370 | | * | * |
| Simulation | 16.821 | * | | * |
| Expository | 12.954 | * | * | |

$p<0.05$

Students exposed to guided discovery strategy performed significantly higher than the rest of the two groups. Similary, students exposed to simulation strategy significantly performed better than students exposed to expository strategy which is the control group.

**4.3.2 $Ho_2$(b):** There is no significant main effect of study habit on students' delayed recall in Geography.

This hypothesis has instructional strategy as the independent variable and student study habit in Geography as moderator variable . The statistical tool used to test the hypothesis is analysis of covariance (ANCOVA). The result of the hypothesis is presented in table 4.7

Table 4.7 shows that the main effect of study habit on students' delayed recall in Geography is not significant $F_{(1,474)} = 0.976$; $p>0.05$. Therefore we do not reject the null hypothesis. The partial eta squared of 0.002 implies that study habit account for 0.2% of the observed variance in delayed recall in Geography.

The mean scores of the good and poor study habit groups on recall however were $\bar{x}$=16.33 and $\bar{x}$=15.84 respectively as shwon in Table 4.10.

**Table 4.10: Summary of mean scores of poor and good study habit as it affects students' performance in Geography.**

| Study Habit | Mean | Std. Error | 95% confidence Interval | |
|---|---|---|---|---|
| | | | Lower Bound | Upper Bound |
| Poor Study Habit | 16.327[a] | .353 | 15.635 | 17.020 |
| Good Study Habit | 15.837[a] | .350 | 15.149 | 16.524 |

It further shows that poor study habit students gained more than good study habit students. Hence the mean $\bar{x}$ =16.327 for poor study habit is greater than the mean $\bar{x}$ = 15.837 for good study habit as shown in table 4.10.

**4.3.3 $Ho_3$(b):** There is no significant interaction effect of instructional strategy (treatment) and study habit on students' delayed recall in Geography.

Table 4.7 shows that there is no significant interaction effect of treatment and study habit on students' delayed recall in Geography $F_{(2,474)}$ = 0.187; p>0.05. Therefore, we do not reject the null hypothesis $Ho_3$(b). The partial eta squared of 0.001 implies that treatment and study habit accounted for 0.1% of the observed variance in delayed recall in Geography.

**Table 4.11: Summary of interactional effect of instructional strategies and means scores of study habit on students' delay recall in Geography**

| Treatment | Study Habit | Mean | Std. Error | 95% confidence Interval | |
|---|---|---|---|---|---|
| | | | | Lower Bound | Upper Bound |
| Guided Discovery | Poor Study Habit | 18.449[a] | .674 | 17.126 | 19.773 |
| | Good study Habit | 18.291[a] | .574 | 17.163 | 19.420 |
| Simulation | Poor Study Habit | 17.369[a] | .583 | 16.222 | 18.515 |
| | Good study Habit | 16.474[a] | .651 | 15.976 | 17.752 |
| Expository | Poor Study Habit | 13.164[a] | .605 | 11.976 | 14.352 |
| | Good study Habit | 12.744[a] | .609 | 11.548 | 13.941 |

## 4.4 Discussion

### 4.4.1. Main effect of instructional strategy on Students' immediate recall in Geography.

The result indicated that there is a significant main effect of instructional strategy on students' immediate recall in Geograpy .In fact guided discovery as an instructional strategy has much more effect on students' immediate recall in Geography than simulation strategy , while expository strategy has the least effect on the students. The results also showed that the means of the treatment groups' guided discovery ($\bar{x}$ = 16.501), and simulation ($\bar{x}$ =14.550) were significantly higher than the mean of the control group (expository strategy) ($\bar{x}$ =12.959). This indicates that guided discovery and simulation strategies are more capable of improving students' immediate recall in Geography than expository strategy.

Guided discovery improved students' immediate recall best, compared to other strategies. This is probably because it is a technique or method that motivates and encourages both students and teachers during classroom interaction. This makes the teacher to strive for the success of the teaching and learning process. By doing so, the teacher provides the students with the opportunity to discover new truths, new rules and methods to tackle problems, as well as new value for themselves. In the study, the teacher provides the students with materials to manipulate, explore and experiment with in order to find out facts and gain knowledge by themselves. In fact, all these are seen as capable of improving the teachers' proficiency and consequently, enhancing students' immediate recall in Geography.

The findings of this study support the view of Gauvanin (2001) and Vygotsky (1987) who found guided discovery as effective in guiding the students to understand concepts and improve in knowledge. It creates opportunity for students to brainstorm in order to come up with good learning strategies. The findings of this study also corroborate Harrys' (2002) findings which highlighted the benefits and challenges of the use of this strategy. Harrys maintained that the guided discovery strategy helps students to be more focused

and sharpened and reinforces their processes of observing and making inferences and predictions. In addition, the method enables students' to construct knowlegde by interacting with others, hence, the significant improvement in performance when the method was used in this study.

Simulation strategy was the next best strategy that improved students' performance (immediate recall) in Geography. This means that simulation improved students' immediate recall in Geography better than the expository strategy which was the control group. This may be because simulation strategy as described by experts, is a scientific strategy that enables students to engage in relevant exercises. Orlich, Harder, Callahan, Trevision and Brown (2007) and Brown (1999) are of the opinion that simulatuion can help students to perform if teachers use ingenuity, knowledge of the subject, initiative and imagination to design an effective small group simulation. The result of the study shows that Orhich et al goals; of simulation as a strategy are not fallacy, and that it reduces complex problems or situations to manageable elements, as well as motivate learners and sensitize them to life goals.

Expository strategy was found to be less effective than the other strategies in improving students'performance (immediate recall) in Geography. This could be due to the limited resources used, in terms of instructional materials to arouse the students' interest. Exposition as a conventional strategy in this study has not actually helped to achieve the much desired improved performance needed by learners (Onwuka 1985). The study also supported Awosolu and Esugboungbe (2002) that learners are just passive recipients of information, and there is very little interaction between learners and the teacher, hence this strategy of teaching may not help to achieve the desired objectives of teaching Geography.

The unique reasons to be adduced to the improvement of students who had guided dicovery strategy as a treatment is the fact that students were given opurtunity to carry all the pratical activites on geographical concepts. Such interaction with geographical materials enable them to use their senses to the fullest and this culminates in better understanding of the subject . The pivot of guided discovery is the ability to answer questions comensurate with their academic level. It gives consideration to good and poor study habit and helps students to understand geographical concepts from the simple to the complex during the teaching process in the classroom. This supported the findings of Okwilagwe(2002), Sharp and Benfield (2005) who stated that for students performance in geography to improve and to actualize the objective of Geography, guided discovery strategy should be adopted . They asserted that as far as this strategy was concerned, it enhances cooperation and interaction among the students, and reduces failure.

### 4.4.2 Main Effect of instructonal strategy on Students' Delayed Recall in Geography

The result indicated that there is a significant effect of treatment on students delayed recall in Geography. Guided discovery strategy emerged as the most effective instructional strategy ($\bar{x}$ = 18.370). This was followed by simulation ($\bar{x}$ =16.921), while expository strategy (control group) had the least mean score ($\bar{x}$ = 12.954). The result also shows that although treatment is significant, each of the treatment conditions (guided discovery, simulation and expository) improves students' delayed recall in Geography significantly. Guided discovery emerged the best in improving students' performance (delayed recall) in geography, probably because the students' had the opportunity of interacting with one another, and with the teacher. This made the teacher and the students to improve in their teaching and learning exercises. The teacher always ensured he updated his knowlegde on the subject matter and the students always asked questions and

discuss with one another during lessons. All these helped in improving students' performance (delayed recall in Geography). Tamir (1995) explained that in guided discovery, the students are provided with materials to manipulate, explore and experiment in order to find out facts and gain knowledge by themselves.

Simulation was the next best strategy that improved students' delayed recall in Geography. This could be because of the enthusiasm the students exhibited when they were introduced to this strategy. Corries and Shia (2001) and Vercker (2003) explained that the learner is an active participant and engages in demonstrating behaviour or previously acquired skills or knowledge. Eggen and Kauchak (2001), also explained that simulation, when used effectively by the teacher, improves human interaction, thereby enchancng performance in the subjec matter. In this study, the teachers that use simulation strategy were able to improve the students interaction, hence, students in simulation class performed better than those in the expository class (control group), even though their performance was not as good as that of those in the discovery strategy group.

The control group (expository) came last ($\bar{x}$=12.954). The reason may be because the method de-emphasized non academically oriented teacher –student interaction, such as conversation about personal concerns (Stevens & Rosenshin 1981).

It was also found that instructional strategy had main effect on students' delayed recalls in Geography. The reasons to be adduced to the findings include a conducive learning atmosphere that is created by the teacher through the scientific strategies, availability of relevant instructional materials, students' involvement and teachers' readiness to clarify any issue raised on some geographical concepts. This finding agrees with that of Emilefo (2009), and Okwilagwe (2002) that the strategy employed by the teacher will improve the students' understanding of geography.

### 4.4.3 Main Effect of Study Habit on students Immediate Recall in Geography.

The results of this study showed that there was no significant main effect of study habit on students immediate recall in Geography. The content, nature and level of understanding of the SS II students in Geography could account for this, because the students need to be guided adequately and tutored on the importance of good study habit. Hassan (1983) and Sanda (2004) as quoted by Agbaje (2010) explained that the activities a learner must carry out to have good study habit to improve in his/her performance include regular class attendance, good note taking, good study environment among others. The findings of this study disagree with the work of Popham and Moore (1980), who, working with 207 undergraduates, used study habit and Borrows Clollege inventory of academic adjustments to find the relationship that exists between study habits and academic performance. The study showed a highly significant relationship. Owolabi (1990) investigated the study habit of 274 Nigerian Secondary School students, the result showed no relationship between study habit and academic performance which is also in line with this study.The findings of this study also agree with Oluwatimilehin and Owoyele (2012) who stated that there was no positive correlation between study habits and academic achievement in core school subjects.

To be adduced to the findings include the way students study teachers' note in their studies.It shows that students improved performance is not as a result of their study habit but the strategy adopted by the teacher. However, one should expect students to have a better understanding of how to study, but in this case, study habit of the students is not related to their performance,it is the teaching methods that have brought about improved performance.

### 4.4.4 Main effect of Study Habit on Students Delayed Recall in Geography.

The result indicated that there was no significant effect of students' study habits on delayed recall in Geography. This means students' study habit does not appear as a

determinant of students performance in delayed recall in Geography. Interestingly, the results indicated that students with poor study habit with a mean of $\bar{x}$=16.327 are more among the participants than those with good study habits ($\bar{x}$=15.837). This study corroborates Briggs, Tosi and Marley (1991) and Driskel (1996) when they found that there were more university students with poor study habit in some parts of America.

The findings of this study are also not in consonance with an earlier research report (Tukur & Musa 2001) and Ugodolumwa (2007) which stated that academic achievement and study habit have positive correlation. These studies also revealed that students with good study habit are not likely to fail in their examination.

Again, it shows that study habit does not contribute to students' performance in Geography. The significant improvement is as a result of the scientific strategies adopted by the teachers. It is therefore essential for geography teachers to use these teaching strategies ( guided discovery and simulation ) effectively to help students improve on their study habit. Since the teaching strategies improved the academic performance of students, they can as well help to make the students more conscious of their academic work and improve their study habit.

### 4.4.5 Interaction Effect of treatment and study habit on Students' Immediate Recall in Geography

The results indicated that there was no significant interaction effect of treatment and study habit on students' immediate recall in Geography. This means that the combination of treatment and study habit had no significance to students' immediate recall in Geography. This is because treatment effect on the students' performance did not change at the different levels of the students' study habits. Good study habit and poor study habits students did not benefit from the treatment. Consequently, students did not improve in immediate recall in guided discovery interaction just like they did not improve in immediate recall in simulation interaction. In other words, we can say that treatment

and study habit did not mutually produce joint effect in students' performance in Geography. The finding supported the claims of other researchers. The results indicated negligible or no relationship between study habit and academic performance, ( Driskell 1996, Farrell – Moskwa 1992, and Owolabi,1990). of the findings other researchers (Sasikala,(2012), Protor, Prevatt Adams, Reaser, & Petscher, 2006) also support this work that treatment and study habits do not produce joint effect on students.

The findings also show that there is no interaction effect of treatment and study habit on students' performance in geography. Emphasis of this finding is that improvement in performance by the students as a result of the treatment is not in any way influenced by students' study habit. It is therefore essential for geography teachers to use the teaching strategies, especially guided discovery, to engender greater performance in geography whether the students have good or poor study habit.

### 4.4.6 Interaction effect of Treatment and study habit on students' Delayed Recall in Geography

The result shows that there was no significant interactional effect of treatment and study habits on students' delayed recall in Geography. This means that treatment and study habit did not mutually combine to produce joint impact on students' delayed recall in Geography. This may mean that the treatment the students' are exposed to may encourage them to challenge each other and improve on their study habits. The findings of this study thus contradict the work of Benike and Harris (1988), MC Reynolds and Church (1993) which state that there is a positive realationship between treatment and study habit of students in their academic performance. The result of this study, however, support the work of Fagbemi (2001) that student performance is more enhanced through student- teacher interaction and not on students' study habit.

The finding is the same for immediate recall. There is no interaction effect of treatment and study habit on students' performance in Geography. Positive change in

students' performance is not influence by interaction of treatment and study habit. Therefore, the improvement observed on students' performance was basically caused by the strength of the treatment of the study.

# CHAPTER FIVE

## SUMMARY OF FINDINGS, IMPLICATIONS AND RECOMMENDATION

This chapter presents the summary of the findings and the educational implications of the study and recommendations. Also presented are the limitations of the study and suggestion for further studies.

### 5.1 Summary of Findings

The study examined the effects of instructional strategy and study habit on Senior Secondary School Students' Performance in Geography. The rationale for the study was to determine the effect of the three instructional strategies and methods on students' performance; that is, immediate recall and delayed recall and to examine which of the insructional strategiesy would be most effective.

A total number of 480 selected SS2 students from three Local Government Areas in Edo State participated in the study. The study examined the theoretical and empirical literature on the variables of the study and it was concluded from the reviewed literature that since there have been the call from geography educators that the teaching and learning of the subject should be linked to the world of learners, researchers should therefore continue to source for ways of making learning of Geography bring out the skills which are embedded in the concept of this important subject.

The study adopted a pre-test and post-test non-randomized control group design using two experimental groups and a control group of 3x2 factorial design. Two validated research instruments namely: Geography Achievement Test (GAT) for pre and post test and study habit inventory (SHI) were used and data obtained were analyzed using Analysis of Covariance (ANCOVA). Three hypotheses were tested at 0.05 level of significance. Two hypotheses were rejected while one hypothesis was accepted. The results presented and discussed in chapter four are summarized as follows.

(1) There was statistically significant main effect of instructional strategy on students' performance in Geography (immediate and delayed recall). Further analysis indicated that only immediate recall in Geography was affected by the treatment after adjusting for the covariates.

(2) There was no statistically significant main effect of study habit on students' performance (immediate and delayed recall) in Geography.

(3) There was no significant interaction effect of treatments and study habit on students' performance (immediate and delayed recall) in Geography.

## 5.2 Educational Implications

The findings of this study have tremendous and meaningful implications for teachers, students, school administrators and policy makers, counselors and educational evaluators who are the major stakeholders in the education industry.

### 5.2.1 Teachers

There is the need for teachers to embrace the use of the guided discovery strategy. Teachers should de-emphasize the use of the expository strategy, which only makes the students passive learners. These findings have created an opportunity for improving the teaching and learning of Geography through the use of guided discovery and simulation strategies to impart knowledge to the learner. Teachers of Geography should come to terms with introducing student-centre learning in the learning of geographical concepts. Teachers' effective teaching skills will be enhanced through this, as teachers are made to study and follow current geographical trends in order to know better than their students, especially those learning the subject as career. .

### 5.2.2 Students

Geography students should avail themselves of the opportunities presented to them with the introduction of the guided discovery teaching strategy to boost their understanding of how to apply geographical concepts to their day to day realities which scholars have identified as a major problem inhibiting academic performance in Geography. They should also demonstrate a positive attitude towards the study of Geography. Guided discovery, with its significant effect ranking highest of all the strategies as seen in its mean gain, provides students with opportunities to draw out certain opinions, ideas and concepts in Geography by themselves, rather than relying on the teacher's authoritative information. This strategy has been shown to be more effective in this study. This means in essence, that even an average student can freely discuss and apply various geographical concepts and theories to his/her daily geographical realities.

Simulation strategy provides students with the opportunities for greater learning, as they positively involve themselves in answering teachers' simulation questions among themselves by exploring and applying their own choice and values to the study of Geography. This will enhance higher academic performance and development of consistent good study habit in Geography.

### 5.2.3 School Administrators and Policy Makers

The outcome of this study should encourage school administrators and policy makers who are the major stakeholders in this enterprise to accommodate the use of guided discovery as a major learning strategy in secondary schools. They should create an enabling environment that will promote the use of guided discovery strategy, especially in the area of allocating appropriate time, preferably double periods on the school time-table. This will give students enough time for interaction during Geography classes.

School administrators should organize and allow geography teachers to attend in-service training on guided discovery and simulation strategies that will in turn, assist the teachers to develop higher professional skills in the teaching and learning process. Educational policy makers should provide educational learning facilities and resources, including well-equipped libraries and cyber cafés that will give students access to books and the internet service during preparation for simulation class.

### 5.2.4 Educational Evaluators

Research revolves around the belief that in order to determine students' performance, students must be encouraged to develop good study habit for learning, and confidence in their own intellectual abilities. The outcome of this research reveals the inadequacy of the use of the age-long traditional lecture method (expository strategy) as the mode of teaching in our secondary schools. This should be a challenge to educational evaluators, who are expected to undertake and sponsor research in the guided discovery strategy as suitable for Nigerian schools, so as to improve teachers' efficiency and effectiveness. Prominent in this research effort should be appropriate training packages for in-service training to expose Geography teachers to the rudiments of the guided discovery strategy.

## 5.3 Conclusion

The findings of the study revealed that students who were exposed to the guided discovery strategy and simulation strategy performed better than those in the control group (expository). Also, guided discovery and simulation strategies have improved and enhanced the performance of Geography students. While using the guided discovery strategy, the teacher actually plays a critical role in providing the structure and opportunities for learners to develop their skills for both learning and teaching. Thus, it

becomes imperative for teachers to begin to think of how they can in everyday lesson, provide the structure and opportunities for learners to do discovery learning.

The results and findings of this research should be acted upon, rather than becoming additional data to the understanding of theories in teaching and learning. It should be a way of ensuring better response to life changes in the real world, outside the classroom environment.

If this learning strategy is employed in schools, and students are encouraged and motivated in the geography class, there is the tendency for the teaching and learning of this subject in secondary schools to inculcate into learners, the lifelong learning skills embedded in the teaching and learning strategies employed in this study.

From the studying perspective, certain conclusions are hereby drawn: (1) there is a general low performance in Geography because the teachers have not been using appropriate scientific methods (guided discovery and simualtions strategies) to teach the subject. This has resulted in poor performance by the students. (2) there is no effect of study habit on students' performance in Geography. This is a reflection of a lack of initiative on the part of the students.

## 5.4 Recommendations

On the basis of the findings of this study, the following recommendations are made:

1. The use of guided discovery strategy should be encouraged in schools for effective teaching and learning of Geography at the Senior Secondary Schools, and at other levels. Teachers of Geography should be ready to incorporate this teaching and learning strategy from firsthand field experience.
2. Facilities and suitable learning environment should be provided, to allow for effective teaching and learning in a learner-centered situations.

3. Teachers should provide the structure and opportunities for learners to engage in discovery learning so as to improve in performance.
4. The research has the potential of increasing awareness and understanding about how Nigerian schools can move forward, towards improving learning capabilities and effectiveness by providing quality learning environment and opportunities to learners at all levels.
5. Considering the gains of the guided discovery strategy, policy makers should inspire classroom instructors to develop a positive disposition towards its use through organized seminars, workshops, conferences and so on. The use of guided discovery and simulation strategies should be maximazed during the teaching and learning of Geography. This will reduce the impact of teachers' negative attitude to change.

## 5.5 Limitation and Suggestion for Further Studies

This study was geographically limited to Senior Secondary School 2 students in three local government areas of Edo Central Senatorial district. There is the need for its replication in other geo-political zones in Nigeria, like the southwest and the southeast which share similar educational policies with the south-south where this study was carried out.

The study was also limited to only two out of the many scientific teaching strategies identified in modern time. Other studies should be carried out using any of the other scientific strategies.

The research was limited to only one mioderator variable - study habit. Further investigation on student performance in Geography could look at other student- teacher and school variables. Insufficient laboratory equipments posed a limitation to the study because most schools were without necessary geographical tools, especially map reading materials.

The current school time-table which gives a single period to Geography in the school curriculum poses a major limitation to this study. The consent of other subject teachers had to be sought because the time allotted for their subjects were encroached upon by the double period used for this study. Findings of this study are also expected to provide avenue for references in future studies.

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## APPENDIX A

## STUDENT'S GEOGRAPHY TEST

The instrument is designed to measure your level of performance in school geography. Feel free to respond. Please tick [ ] as appropriate in spaces column provided.

**Section A**

Name _____

School _____

(1) Gender Male [ ] Female [ ]

(2) Age (as at last birthday) _____years

Subject affiliation: Arts [ ] science [ ] social science [ ] commercial [ ]

**Section B**

Answer all questions. Each question is followed by four options lettered A to D.

Find out the correct option for each question and shade in pencil on your answer sheet, the answer space which bears the same letter as the option you have chosen.

Give only one answer to each question.

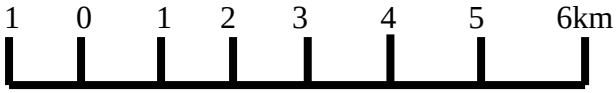
1. The scale of a map shows the relationship between (a) Distances on a map and that in space.

   (b) Two distances on the map (c) Distances on the map and that on ground. (d) Two distances on the ground.

2. A scale of 1: 100,000 is the same as (a) 1cm reps 1km (b) 1cm reps 2km (c) 2cm reps 1km (d) 2cm reps 2km

3. A representative fraction of 1: 25,000 means (a) 1in on the map represents 25,000 miles on the ground (b) 1cm on the map represents 25,000 cm on the ground (c) 1cm on the map represent 25,00km on the ground (d) 1mm on the map represent 25,000km on the ground

4. Primary and secondary divisions are usually found on the (a) R.F scale (b) Linear scale (c) Statement scale (d) Contour map




5. The scale shown below can be written as (a) 1cm reps 1km (b) 1cm reps 2km (c) 1cm reps 4km (d) 1cm reps 5km

6. If a scale of 1: 50,000 is converted to a statement scale, it becomes (a) 1cm reps 1km

(b) 1cm reps 2km (c) 2cm reps 1km (d) 2cm reps 2km

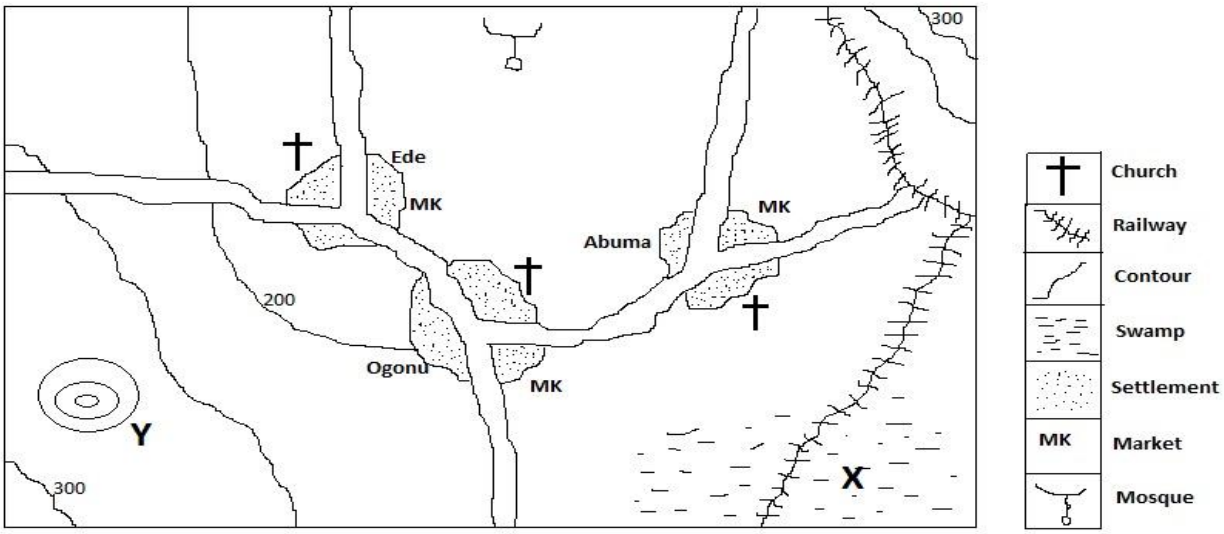
7. Convert 5cm reps 1km to a representative fraction (a) 5/100,00 (b) 5/50,000 (c) 1/20,000 (d) 1/10,000

8. If a scale of 1: 250,000 is changed to statement scale, 1cm on the map would represent (a) 0.25km (b) 2.5km (c) 25km (d) 250km

9. The distance separating two towns on the map is 25cm, what is the actual distance between the towns if the scale on the map is 2cm represents 1km.b (a) 12.5km (b) 6.22km (c) 9.25km (d) 8.75km

10. The scale of a map is 1: 25,000 and the length of a road on the map is 18cm. What is the actual length of the road? (a) 4km (b) 4.5km (c) 5km (d) 5.5km

**Use the map below to answer 11 – 20**




11. What type of scale is shown on the map? (a) Statement scale (b) Linear scale (c) Representative fraction (d) Contour scale

12. The area marked **X** on the map is generally (a) Bordered (b) Flooded (c) Swampy (d) Hilly

13. What feature does the symbol located in the northern part of the map represent? (a) Church (b) Mosque (c) School (d) Hospital

14. If you measure a road passing between Abuma and Ogonu on the map and you got to 20cm, what is the actual length of the road? (a) 10km (b) 8km (c) 3.5km (d) 5km

15. What is the direction of the market from Abuma? (a) South-west (b) South-east (c) North-west (d) North-east

16. The feature marked **Y** is (a) River (b) Island (c) Isolated peak (d) Lake

17. The direction of Abuma from Ogonu is (a) North-west (b) South-west (c) North-east (d) South east

18. Ogonu is a (a) Ghost town (b) Linear settlement (c) Dispersed settlement (d) Nucleated settlement

19. The contour interval on the map is (a) 50m (b) 100m (c) 200m (d) 300m

**20.** Ogonu is likely to be a commercial town because of the presence of (a) Schools (b) Hospital (c) market (d) Industry

21. The Himalayas, the Alps, and the Rockies are examples of (a) Volcanic mountains (b)Fold mountains (c) Block mountains (d) Residual mountains

22. Dykes, Sills and Batholiths are examples of (a) Plutonic igneous rock (b) Extrusive igneous rock (c) Calcareous sedimentary rock (d) Carbonaceous sedimentary rock

23. Which of the following is not an igneous rock? (a) Basalt (b) Granite (c) Marble (d) Gabbro

24. When magma cools and solidifies below the earth the rock produced are termed (a) Sedimentary rocks (b) Plutonic rocks (c) stratified rocks (d) Metamorphic rocks

25. Cemented, rounded pebbles are called (a) Granite (b) Conglomerate (c) Breccia (d) Limestone

26. A volcano that has not erupted for a very long period but has the potential to erupt in future is called. (a) Extinct volcano (b) Dormant volcano (c) Active volcano (d) Distinct volcano

27. Weathering can best be defined as the (a) Gradual disintegration and decay of rocks in situ by climatic factors (b) Accumulation of eroded rocks by particles in a given area to form new rocks (c) Movement of rock debris down slope (d) Actual wearing away of the earth's surface by agents of erosion

28. Which of the following is not an important factor in physical weathering? (a) Frost action (b) Alternate heating and cooling of rocks (c) Accumulation of salt crystals in rock cracks (d) Temperature change

29. Streams flowing outwards and downhill from dome or volcanic cone give rise to

(a) An annular drainage pattern (b) A trellised drainage pattern (c) A consequent drainage pattern (d) A radial drainage pattern

30. One of the features found in the floodplains of a river is (a) Inter-locking spurs (b) Tributaries (c) V-shaped valleys (d) Ox-bow lake

31. An instrument for studying earthquakes is called (a) A seismograph (b) A sextant (c) A theodolite (d) A hygrometer

32. Which of the following rocks is most likely to be weathered by the process of solution?

(a) Slate (b) Graphite (c) Limestone (d) Granite

33. Physical weathering is expected to be most active in the (a) Tropical continental region (b) Hot desert region (c) Warm temperate region (d) Arctic region

34. Which of the following is a feature of extrusive volcanicity? (a) Lapolith (b) Sill (c) Composite cone (d) Batholith

35. Weathering is a term which refers to (a) the effect of weather on natural vegetation (b) the process of rock weathering due to the action of element of weather on each other (c) the effect of the elements of weather on each other (d) the effect of weather on the human life of a geographical region

36. One of the following is not a characteristics feature found in the upper course of a river valley (a) v-shaped valley (b) pot-holes (c) leaves (d) Interlocking spurs

37. _____ is responsible for the formation of fold mountains. (a) Compression (b) Tension (c) Solution (d) Deflation

38. . _____ are built up from materials ejected from fissures in the earth's crust (a) Rocks (b) Volcanoes (c) Minerals (d) Oxygen

39. _____ are the hottest lava about 1000$^{o}$c and are highly fluid (a) Volcanoes (b) Basic lava (c) Acid lava (d) Rocks

40. _____ are highly viscous with a high melting point (a) Volcanoes (b) Acid lava (c) Basic lava (d) Minerals

## APPENDIX B

**Lesson Plan**

**Lesson 1a And 2a**

**Method: Guided Discovery Strategy**

**Topic: Tectonic Processes On Landforms**

**Sub-Topic: Earth Movement-Faulting.**

**Duration: 40 Minutes**

**Instructional Objectives**

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

(a) Mention two types of tectonic processes.

(b) List three features of two different types of tectonic processes

(c) State three landforms that are associated with tectonic processes.

(d) Describe the features that are formed from tectonic processes

**Instructional Materials:**

(a) Samples of Sand, rocks, atlas; globe, pictures and cardboard.

(b) Samples of diagrams showing tectonic features, pieces of cloth.

**Procedure**

**Step I:** The teacher asks the students to explain what they understand by tectonic or internal process on landforms. Then link it to earth movement.

The students are encouraged to find out from their textbooks. The explanations should be written in their notebooks. The teacher also expects response from the students. Then teacher informs the class; tectonic refers to the processes which tend to build up the various features of the earth's crust. The tectonic forces involved in moulding the earth's surface, for example, including those which break, bend and warp the earth's crust, and create depressions and elevations. They are different or distinct from the forces of

gradation, which tend to wear down the surface to a common level. The tectonic processes result to earth's movements. Earth's movements may involve two components namely vertical and lateral displacement of crustal rocks.

**Step II:** The teacher guides the students to explain the term Earth's Movements. The teacher informs the students to list the different tectonic processes that are caused by earth's movement. The tectonic processes are; faulting, folding warping and earthquake. They are free to refer to their textbooks.

**Step III:** The students are encouraged to differentiate between faulting and folding, warping and earthquake.

**Step IV:** The Students ask the teacher some questions. The students are free to help the teacher in answering the questions.

**Summary:** The teacher write summary to act as guide;

A fault is a fracture involving the displacement of the rocks on either side of its relative to one another, in other word; there has been an actual dislocation or movement along the plane of fracture. The movement of the rocks may be vertical or horizontal or a combination of both.

**Classification of faults**

Faults may be classified by the movements which have taken place along them.

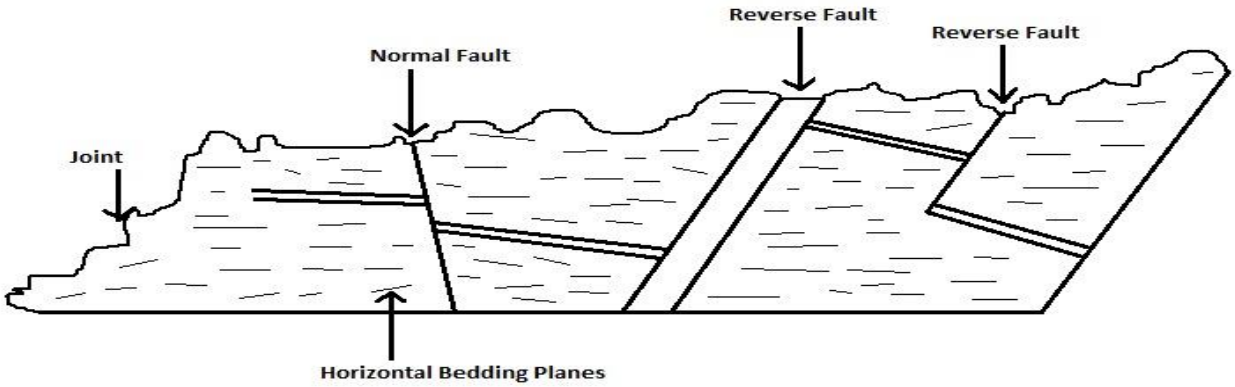
(1) Normal Fault: A normal Fault is one which has both the hading and the down throw in the same direction. They are product of tension.

(2) A reverse fault may form when rocks of the crust are subjected to forces of compression when lateral earth movements occur. They are also called thrust fault.

(3) A tear or lateral fault may be formed when there is a relative horizontal movement of rocks between the two sides of a fault.

**Types of fault**

Landforms produced by fault are a fault scarp, a rift valley, a tilted block and a horst.




**Evaluation:**

(a) Mention two types of tectonic processes.

(b) List three landforms associated with tectonic processes.

(c) Describe the characteristics of a normal fault and a reverse fault.

**Lesson Plan**

**Lesson 3a And 4a**

**Method: Guided Discovery**

**Topic: Tectonic Processes On Landforms**

**Sub-Topic: Folding.**

**Duration: 40 Minutes**

**Instructional Objectives**

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

(a) Mention three types of folding.

(b) List two features of folding

(c) State three characteristics of fold mountains.

(d) List mountains that are formed as a result of folding.

**Instructional Materials**

(1) Samples of pieces of cloth, rocks, pictures of mountains, cardboards and globes.

(2) Samples of landscape features, diagrams of valleys etc.

**Procedure:**

**Step I:** Tell the students to explain what they understand by folding of the earth's crust.

The students are encouraged to find out from their textbooks. The explanation should be written in their textbooks. The teacher also expects responses from the students. The teacher informs the class; folding is the bending of rock strata arising from the effects of lateral forces of compression acting on crustal rocks. The folding of rocks can be seen in the faces of cliffs or railway cuttings. That the layers of rocks are capable of being crumpled into fold is a matter of simple observation.

**Step II:** The teacher guides the students to explain the term folding. The teacher asks the students to list the different folding types. The different folding types are simple folding, asymmetrical folding, over folding, recumbent folding and over thrust folding. They are very free to refer to their textbooks.

**Step III:** The students are encouraged to differentiate between the different types of folding.

**Step IV:** The students ask the teacher some questions. The students are free to help the teacher in answering the questions.

**Summary:** The teacher writes summary as a guide;

The folding of rock is a slow process which takes place over a considerably long period of many thousands of years. Over such a period of time, different types of fold may be formed, depending on the intensity of the forces in action.

**Types Of Folding**

(a) Simple folding

(b) Asymmetrical folding

(c) Overfolding

(d) Recumbent anticline

(e) Over thrust folding

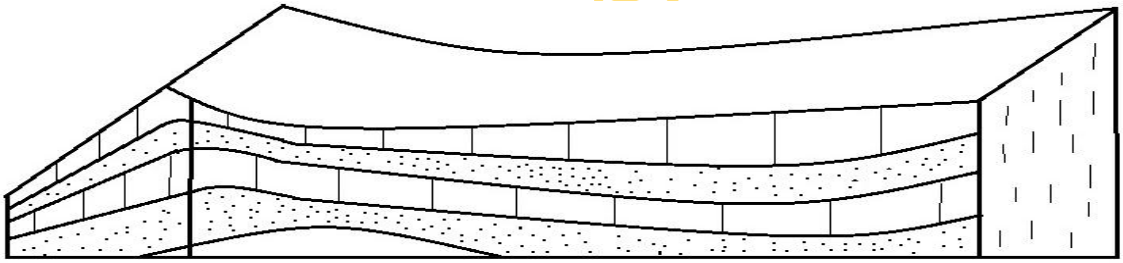
There are three simple geometrical forms of folding:

(1) Where the strata are bent upwards into a symmetrical upfold, called an anticline

(2) Where the strata are bent downwards in a symmetrical manner to form a syncline

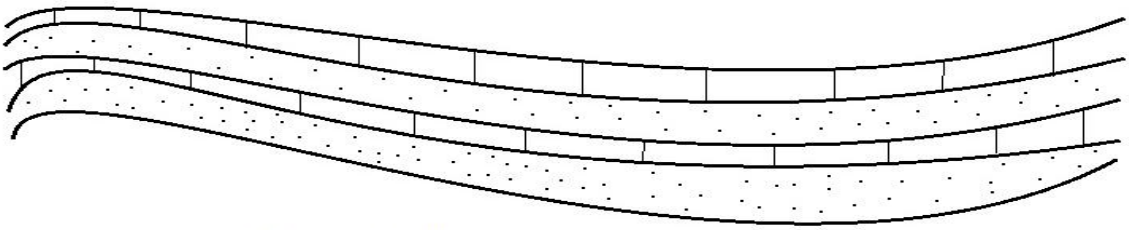
(3) Where horizontal beds dip and then flatten out again, forming a simple flexure known as a monocline.

**TYPES OF FOLD**



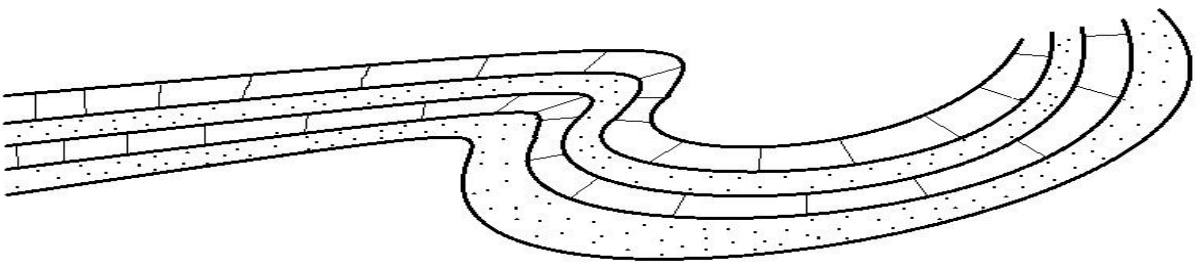
Simple Fold

**SIMPLE FOLD**

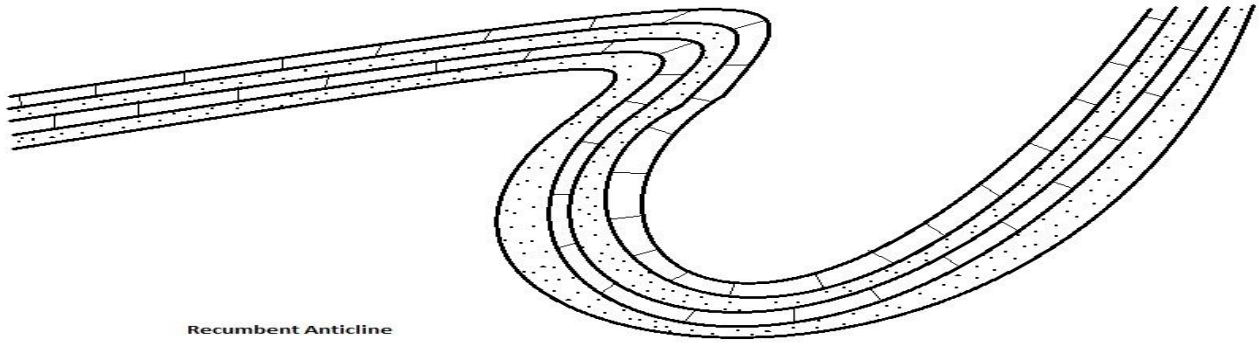


Asymmetrical Fold

**ASYMMETRICAL FOLD**

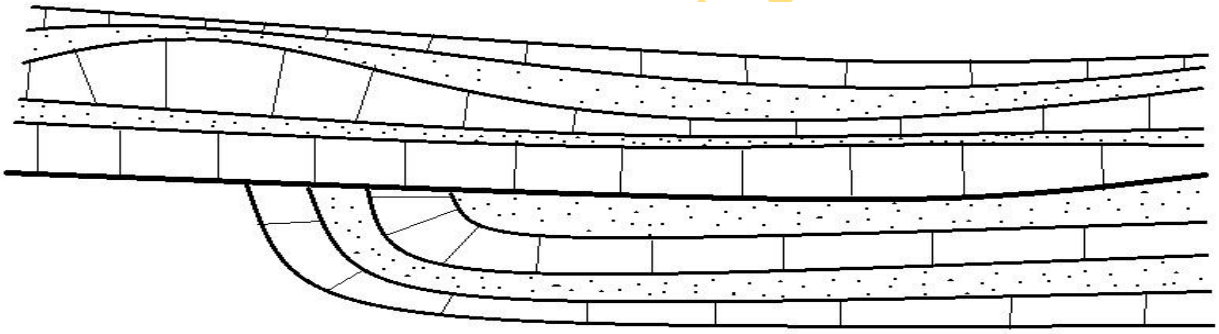


**OVER FOLD**



Recumbent Anticline

**RECUMBENT ANTICLINE**



Over Thrust Fold

**OVER THRUST FOLD**

**EVALUATION:**

(a) Mention three types of folding

(b) List two features of folding

(c) State four characteristics of Fold Mountains.

**Lesson Plan**

**Lesson 5a And 6a**

**Method: Guided Discovery**

**Topic: Tectonic Processes On Landforms**

**Sub-Topic: Vulcanicity Or Vulcanism**

**Duration: 40 Minutes**

**Instructional Objectives**

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

(a) Mention three types of volcano

(b) List two features of volcano

(c) Write out two features of caldera.

(d) List the difference between acid lava and acid.

**Instructional Materials**

(a) Samples of rocks, maps, picture tooth paste, cardboard, oil and water.

(b) Samples of diagrams showing volcanoes

**Procedure**

**Step I:** The teacher asks the students to explain what they understand by vulcanicity. The students are encouraged to find out from their textbooks. The explanations should be written on their notebooks. The teacher also expects responses from the students. Then the teacher teaches the class; vulcanicity involves all the processes through which igneous activities may occur at or near the earth surface. They are those processes in which molten rock (magma), liquids or gaseous material move towards and empty at or near the earth's surface, or forced into the earth's crust.

**Step II:** The teacher guides the students to explain the term vulcanicity. The teacher asks the students to list the different types of volcano. Types of volcano are cinder cones, composite cones, caldera, shield volcanoes or lava cones. The students are free to refer to their textbooks.

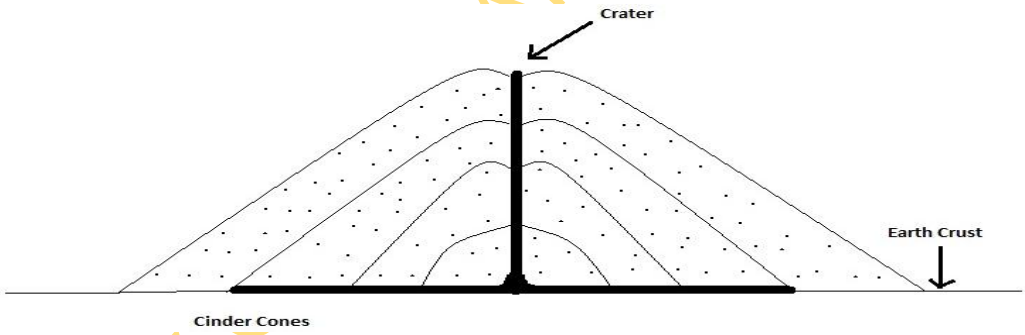
**Step III:** The students are encouraged to differentiate between; composite cones and cinder cones; caldera and shield volcanoes.

**Step IV:** The students ask the teacher some questions. The students are free to help the teacher in answering the questions.

**Summary:** The teacher writes summary to act as guide. Volcanoes are mountains or conical hills with craters form by folding and compression or by uplift or erosion as in the case of ordinary mountains. They are built up by the accumulation of their own eruptive product e.g. lava, bombs, ash and dust.

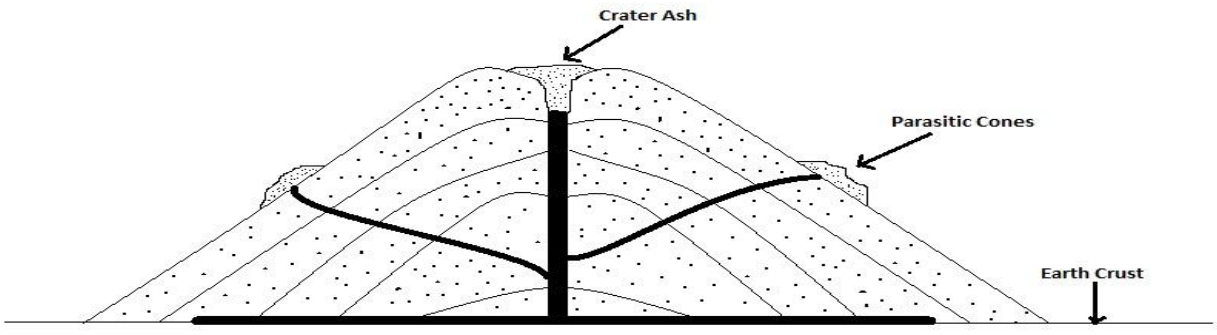
**Types Of Volcano**

(1) Cinder Cones: These are the simplest type of volcano. They result from the explosive eruptions and ejection of a wide range of materials – cider, ash, rock fragments and Lava bombs.



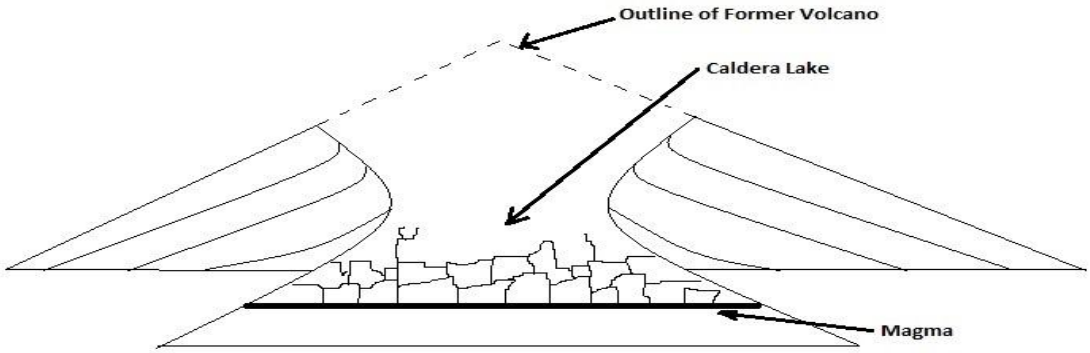

Cinder Cones

(2) Composite Cones: These have formed some of the grandest mountains of the earth. They are built of alternating layers of lava flows, volcanic ashes and cinders through several vents on parasitic cones



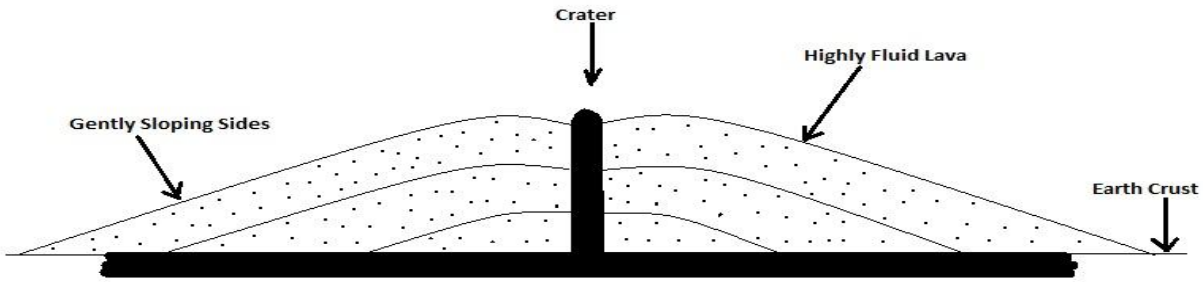

Composite Cone

(3) Caldera: When a composite cone explodes, its top blown off and disintegrates into a mass of rock bombs and ashes. The auter would then become greatly enlarged to form a huge depression known as caldera.



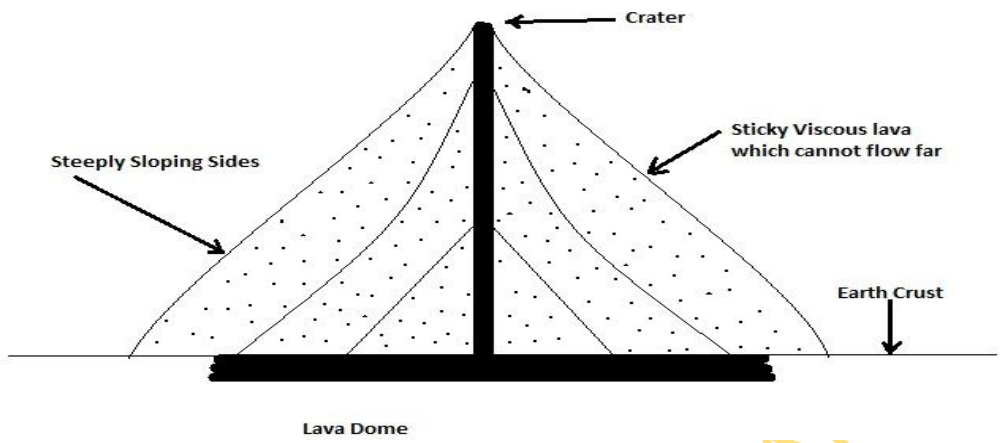

Caldera

(4) Shield volcanoes or Lava cones: These built entirely of basic lava flows which poor out in different directions from a centre vent or group of vent. The lava accumulates to build broad, gently sloping cones with slightly convex sides.




Shield Volcano

(5) Lava domes: These are built up of very viscous or pasty lava which extrude very much like tooth paste from tube. They are steep sided, convex, viscous acid lava around the vent.




**Evaluation:**

(1) Mention three types of volcano.

(2) List two features of volcano.

(3) Write out features of a caldera.

**Lesson Plan**

**Lesson 7a And 8a**

**Method: Guided Discovery**

**Topic: External Processes Of Landforms**

**Sub-Topic: Denudation**

**Duration: 40 Minutes**

**Instructional Objectives**

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

(a) List two processes that are involved in denudation

(b) List the phases of denudation

(c) Explain the phases of denudation

(d) Differentiate between weathering and erosion, transportation and deposition

**Instructional Materials**

(a) Samples of rocks, maps, pictures, cardboard, water and sands.

(b) Samples of diagram of rivers

**Procedure**

**Step I:** The teacher asks the students to explain what they understand by denudation. The students are encouraged to find out from their textbooks. The explanation should be written in their note- books. The teacher also expects responses from the students. Then the teacher teaches the class; denudation is the process of wearing the earth causes a general lowering and leveling out of the surface. It is usually or commonly used to denote all the external processes which wear away rock outcrops and landforms on or immediately below the earth's surface. It involves the processes of rock weathering, erosion, transportation and deposition.

**Step II:** The teacher guides the students to explain the term denudation. The teacher asks the students to list the different phases of denudation. Phases that are involved in denudation processes are weathering, erosion, transportation and deposition

Weathering → Erosion → Transportation → Deposition.

The students are free to refer to their textbooks.

**Step III:** The students are encouraged to differentiate between weathering, and erosion, transportation and deposition. The students were asked to go to the field to see how denudation operates slowly and constantly and to observe how every landscape feature are subjected to changes.

**Step IV:** The students ask the teacher some questions. The students are free to help the teacher in answering the questions.

**Summary:** The teacher writes the summary to act as a guide; denudation is the wearing away of the land by various natural agencies: the sun, the wind, the rain, frost, running water, moving ice and the sea. The processes are carried out in four phases via;

(i) Weathering: The gradual disintegration of rocks by atmospheric or weather forces.

(ii) Erosion: The active wearing away of the earth's surface by moving agents like running water, ice, wind and waves.

(iii) Transportation: The removal of the eroded debris to new positions.

(iv) Deposition: The dumping of the debris in certain parts of the earth, where it may accumulate to form rocks.

The four phases of denudation depend on the nature of the following:

(a) Relief of the land

(b) The structure of the rocks

(c) The local climate and

(d) Interference by man.

**Evaluation:**

(1) List the various natural agencies in denudation.

(2) List the phases of denudation

(3) State the natural factors that denudation depend upon.

(4) State the differences between weathering and erosion.

**Lesson Plan**

**Lesson 9a And 10a**

**Method: Guided Discovery**

**Topic: External Processes Of Landforms**

**Sub-Topic: Denudation**

**Duration: 40 Minutes**

**Instructional Objectives**

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

(a) List the factors controlling the rate of weathering.

(b) State the different types of weathering

(c) List the differences between the types of weathering.

(d) State the major chemical weathering processes

(e) Describe the different ways mechanical weathering takes place.

**Instructional Materials**

(a) Samples of rocks, roots of plants, maps, pictures, cardboard, sands etc.

(b) Samples diagrams, bottles and Ice blocks.

**Procedure**

**Step I:** The teacher asks the students to explain the term weathering. The students are encouraged to find out from their textbooks. The explanation should be written on their notebooks. The teacher also expects responses from the students. The teacher teaches the class: weathering may be defined as the disintegration and decomposition of rocks "in situ" (in place). It is a name of a group of processes which act collectively on the earth or near the earth's surface. The action of weathering in destroying the rocks is dependent on the removal of the previously weathered layer by various agencies of transportation like water, ice and mars wasting. Weathering is the chief sources of supply of material for other agencies of erosion. Weathering changes hard-massive rocks into transportable fragments.

**Step II:** The teacher guides the students to explain the term weathering. The teacher asks the students to list the different types of weathering. Different types of weathering are mechanical or physical weathering, chemical weathering and biological weathering. The students are free to refer to their textbooks.

**Step III:** The students are encouraged to differentiate between these types of weathering-physical or mechanical, chemical and biological. They were asked to go out to the field to look out for the different examples mentioned in the class.

**Step IV:** The students ask the teacher some questions. The students are free to help the teacher in answering the questions.

**Summary:** Weathering itself is the disintegration and decay of solid rock and is caused by climatic factors. Weathering is majorly of three types;

(a) Physical or mechanical weathering,

(b) Chemical weathering

(c) Biological weathering

**Physical or Mechanical Weathering**

The processes of physical weathering are;

(a) Pressure-release (unloading) Pressure-release is due to unloading of rocks. The rocks are removed and expansion of exposed rocks takes place.

(b) Crystallization (freeze-thawing and salt crystals). This refers to the growing of crystal by freezing water which exerts weight (due to fall in temperature) and melting (thawing) due to rise in temperature.

(c) Thermal expansion and contraction or temperature changes

(d) Colloidal plucking

(e) Plants and animals.

**Chemical Weathering**

This type of weathering includes;

(a) Hydration. This is the process whereby some rock minerals take in water and expand.

(b) Hydrolysis: This is the process whereby feldspar (important mineral in igneous rocks) changes or weathers into day after taking in water.

(c) Carbonation: In this process, calcium carbonate takes in water and carbon dioxide and eventually changes to calcium bicarbonate.

(d) Oxidation: Mineral rocks when taking additional oxygen, not only change colors but become liable to other weathering activities.

**Biological Weathering**

Plants and animals have the power to extract nutrients from rocks leading to the disintegration of rocks. Animal burrowing and human earth excavation are examples of weathering.

**Evaluation**

(1) List the different types of weathering.

(2) Name four natural forces that play a role in weathering

(3) Differentiate mechanical weathering from chemical weathering and give examples of each.

(4) State the several ways whereby rock can be weathered in physical form.

**Lesson Plan**

**Lesson 11a**

**Method: Guided Discovery**

**Topic: External Processes Of Landforms**

**Sub-Topic: Mass Movement**

**Duration: 40 Minutes**

**Instructional Objectives**

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

(a) List the different types of mass movement

(b) Describe how forces of gravity and rainwater assist in the mass movement

(c) Distinguish soil creep from landslides.

(d) Locate places where soil creep, solufluation and landslides occurrence have taken place.

**Instructional Materials**

(a) Samples of rocks, pictures, maps, cardboard.

(b) Samples diagrams, water and sand.

**Procedure**

**Step I:** The teacher ask the students to explain the term mass movement. The students are encouraged to find out from their textbooks. The explanation should be written on their notebooks. The teacher expects response from the students. The teacher teaches the class. There is a wide variety of these processes. They are involved in the removal, under gravity, of large portions of weathered debris from the hillsides. The main types of mass movement or mass wasting are soil creep; talus creep, solifluection, mudflow, rockslides, rock slump and rock fall. The last three may be grouped together under the common term-landslides.

**Step II:** The teacher guides the students to explain the term mass movement. The teacher informs the students to list the different types of mass movement or mass wasting. Types of mass movement are soil creep, talus creep, solifluction, mudflow, rock slides rock slump and rock fall. The students are free to refer to their textbooks.

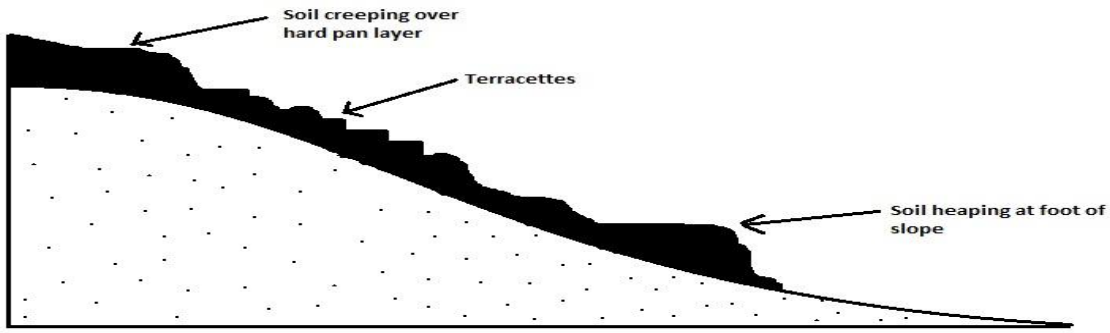
**Step III:** The students are encouraged to differentiate between, the types of mass movements-soil creep and talus creep, solifluction and landslides. The students were asked to go out to look out in the field the different examples of mass wasting mentioned in the class.

**Step IV:** The students ask some questions from the teacher. The students are free to help the teacher in answering the questions.

**Summary:** The movement of weathered materials under the force of gravity is known as mass movement or mass wasting. Such movements may be slow and gradual or sudden depending on the gradient of the slope, the weight of the weathered debris and whether there is any lubricating moisture supplied by vain water. The sudden movement is often catastrophic in their effects.

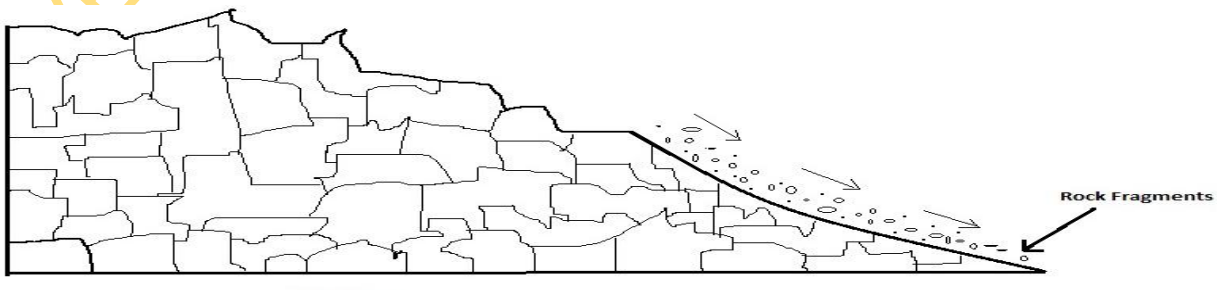
Types of mass movement are;

**(1) Soil Creep:** This is the slow, downward movement of soil and fine particles on very gentle slopes.



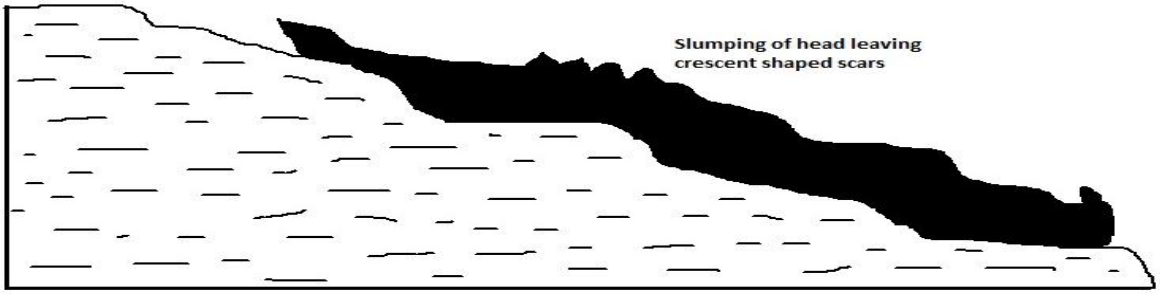

Soil creep

**(2) Talus Creep:** This is another slow, down slope movement of angular rock fragments of different sizes.




Talus Creep

(2) **Mud Flow:** This is a rapid type of mass wasting which involves the slumping of semi-liquid mud accompanied with gravel and boulders



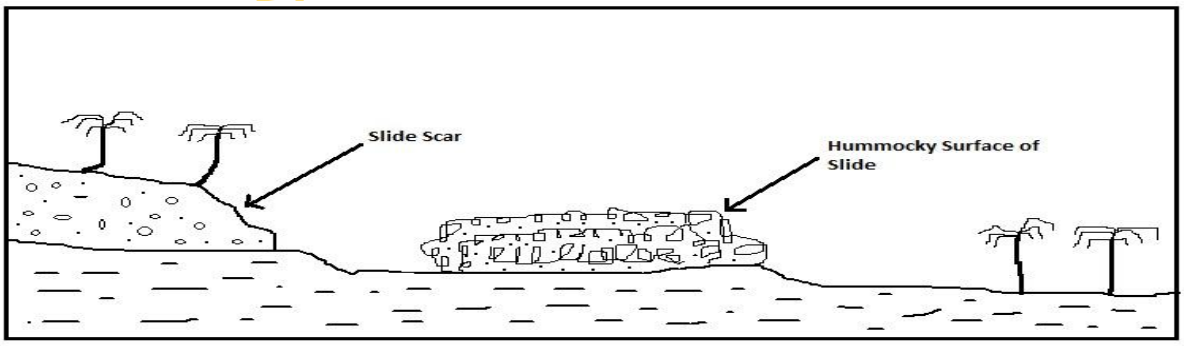

Mud Flow

**(4) Landslides:** These take place when large volumes of loose rock boulders, gravel and soil suddenly move with great speed down slope. There are three main types of landslides;

(a) Rock Slump: This involves the rotational slumping of large rock debris over underlying week rocks.

(b) Rock slide: This involves the sliding of boulders and other debris from steeply dipped scarps or cliffs.

(c) Rock Fall: This refers to the rapid fall of individual boulders and rocks from very steep to vertical cliffs.




Landslide



**Factors Affecting Mass Wasting**

Several factors influence the nature and speed of mass wasting:

(a) Steepness of slopes

(b) Nature of materials

(c) Climatic conditions

(d) Vegetation cover

(e) Human activities

(f) Earthquakes and volcanic eruptions.

**Evaluation**

(1) List the type of mass movements.

(2) List with examples the types of landslides.

(3) State the function which affects mass wasting.

**Lesson Plan**

**Lesson 12a**

**Method:** Guided Discovery

**Topic:** The Work Of A River

**Sub – Topic:** Mechanism Of River Erosion.

**Duration:** 40minutes

**Instructional Objectives**

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

(a) List the process of river erosion.

(b) Describe the functions which river effectiveness depends upon.

(c) State the various ways river performs its work.

(d) Describe river energy, speed and gradation.

**Instructional Materials**

(1) Samples of rocks, pictures, maps, cardboard, sand, clay etc.

(2) Samples of pure water, mud water etc.

**Procedure**

**Step I** The teacher asks the student to explain the term river erosion. The students are encouraged to find out from their textbooks. The explanation should be written on their note books. The teacher expects response from the class. Rivers and their associated streams perform two main functions. They are the major agents of land carving or sculpturing over most of the parts of the earth. They help in draining off the surplus rainwater.

As agent of denudation, river performs three types of work;

(a) Carving and eroding its valley

(b) Transporting the eroded materials and

(c) Depositing the transported loads.

River effectiveness depends on the energy, load, and channel. Energy depends on volume and velocity and speed depends on gradient.Gradiant depends on speed and volume.

**Step II:** The features guide the students to explain the term river erosion. The teacher asks the students to list the different processes of river sculpture. The main processes of river sculpture include; hydraulic action, corrosion or abrasion, solution and attention. The students are free to refer to their textbooks.

**Step III:** The students are encouraged to differentiate between hydraulic action and corrosion or Abrasion, solution and attrition. They were asked to go to the streams to look out for these processes at later date.

**Step IV:** The students ask the teacher some questions. The students are free to help the teacher in answering the questions.

**Summary:**

The processes of river erosion are;

(1) Hydraulic Action: This refers to the force of the flowing water in the river which exerts dragging effect upon the bed of the river and erodes poorly consolidated materials, such as sand, silt and clay. The weight and the force of rushing water can dislodge rocks on the river channel.

(2) Corrosion or Abrasion: Materials carried in suspension or dragged along the river bed erode the bed as well as the side of the channel. Corrosion is chiefly responsible for the development of pot holes along the upper coarse of the river.

(3) Solution; River water, mostly when act is recently replenished by precipitation contain acids which is capable of dissolving some rocks such as limestone along the channel.

(4) Attrition: This involves the breaking up of river loads through collision with themselves and mutual wearing.

**Evaluation:**

(1) List the processes of river erosion

(2) Describe with examples the major way river perform its work.

(3) Describe the characteristics and factors of river effectiveness.

**Lesson Plan**

**Lesson 13a**

**Method:** Guided Discovery

**Topic:** The Work Of A River

**Sub – Topic:** River Transportation.

**Duration:** 40minutes

**Instructional Objectives**

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

(a) List the processes of river erosion

(b) Describe the various Ways River carry its load.

(c) Differentiate the various Ways River carry its load.

**Instructional Materials**

(1) Samples of sand, clay, rocks, pictures, maps and diagrams.

(2) Samples of water-pure water, colour water, water with silt.

**Procedure:**

**Step I:** The teacher asks the students to explain the term river transportation. The students are encouraged to find out from their textbooks. The explanation should be written on their notebooks. The teacher expects response from the students. The teacher teaches the class; the load carried by a river is moved down stream in various ways. Solution, suspension, saltation and traction. By far the amount of river load transported through saltation and traction is lesser than those transported through solution and suspension.

**Step II:** The teacher guides the students to explain the term river transportation. The teacher asks the students to list the different ways river transport it loads; by solution, suspension, saltation and traction. The students are free to refer to their textbooks.

**Step III:** The students are encouraged to differentiate between solution and suspension, saltation and traction. The students were asked to go to look out for this in erosion site after the class.

**Step IV:** The students ask some questions from the teacher. The students are free to help the teacher in answering the questions.

**Summary:**

The processes of river transportation are;

(1) Solution: Water-soluble transported materials like carbonate absorb water and dissolve. They are then carried in form of solution. The solution formed this way is often coloured.

(2) Suspension: Transported materials which are not on the river bed are carried in form of suspension. They are embedded in the water.

(3) Saltation: Increase in velocity of the water often causes heavy materials to be jerked along the river bed. This method is called saltation or surface creep.

(4) Traction: This is the dragging of materials along the bed of the river.

**Evaluation:**

(1) List the various ways river carries its load downstream.

(2) State the major differences between solution and suspension; saltation and traction.

(3) Describe the process of saltation or surface creep as a river transportation process.

**Lesson Plan**

**Lesson 14a And 15a**

**Method:** Guided Discovery

**Topic:** The Work Of A River

**Sub – Topic:** Landforms Along The Course Of A River.

**Duration:** 40minutes

**Instructional Objectives**

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

(a) List the processes by which landform result along the course of a river.

(b) List the course of a river.

(c) List the features that are form at each course of a river.

(d) Describe the features found at each course of a river.

**Instructional Materials**

(1) Samples of sands, rocks, pictures, and maps, cardboard.

(2) Samples of water.

**Procedure**

**Step I:** The teacher asks the students to explain the term course of river. The students are encouraged to find out from their textbooks. The explanation should be written on their notebooks. The teacher expects response from the students. The teacher teaches the class the course of a river can be divided into three distinct parts or phases;

(a) The upper or mountain course or stage

(b) The middle or valley course or stage

(c) The lower or plain course or stage.

**Step II:** The teacher guides the students to explain the term river course. The teacher asks the students to list the stages or courses of a river and the features found at each stage. At the upper course you see V-shape valley, and waterfalls, at the middle course you see meanders and U-shape valley; the lower course you see levees, Ox-bow lakes and delta. The students are free to refer to their textbooks.

**Step III:** The students are encouraged to differentiate between, different courses of a river. The students were made to practice how water flow on its course in the class.

**Step IV:** The students ask the teacher some questions. The students are free to help the teacher in answering the questions.

**Summary:**

**Upper Course or Mountain Course or Stage.** Certain landforms are found at this stage: These are V-Shaped valley. At the upper course of a river, there is a steep gradient. Head ward erosion is prominent. The speed of the river is greater here. The river flow swiftly and is said to be engaged in vertical erosion for valley-Deepings or side ways erosion. The cross-section of the mountain course is a sharp V-shape.

**Waterfalls**: These are features in which water falls or jumps from higher elevation to lower elevation along the course of a river. There several causes of waterfalls e.g. where

there is sharp and well defined edge to a plateau or the presences of a transverse resistant rocks across the river course.

Rapids are formed when there are minor obstructions along the river course making the river to jerk and flow faster.

Cataract results when the height and volume of water is greater than that in a waterfall.

**Middle Course**: This is the section between the upper and lower course of a river. The work of river here is both constructive and destructive. Instead of the river taking a more direct course, the river begins to swing to form meanders. The valley is being widened as well as deepened. Irregularities on the bed of the river cause meanders. Tributaries are longer and more gentle-flowing. The valley is not as steep as in the upper course. It is more of an open "V" shape.

**The Lower Course**: The lower course is that part that stretches into the sea. The works are almost entirely constructive and depositional. The river flows slowly and meanders in great loops over wide area. The features formed here are levees, Ox-bow lakes and delta.

**Evaluation:**

(1) List the courses of a river.

(2) List with examples the landforms at each course of a river.

(3) Describe the landforms at the upper course of a river.

(4) List the difference between the middle and the lower course of a river.

**Lesson Plan**

**Lesson 16a**

**Method:** Guided Discovery

**Topic:** Scale, Bearing And Distance

**Sub – Topic:** Scale And Type Of Scale.

**Duration:** 40minutes

**Instructional Objectives**

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

(a) List the different types of scale

(b) Describe the different types of scale

(c) Calculate scale from a given map

(d) State how to use scale to calculate the distance of a map.

**Instructional Materials.**

(1) Samples of topographical maps, tape, atlas, maps.

(2) Samples of diagrams, cardboard etc.

**Procedure**

**Step I:** The teacher asks the students to explain what they understand by scale. He shows the students example of scale from textbook.

The teacher encourages the students to find out from their textbook. The explanations should be written in their notebooks. The teacher also expects response from the students.

The scale is the relationship between the size of anything on the map and that of the object it represents. You must have dram a plan of your classroom and that of the school compound at one stage or another in your geography class. How was this possible? Note that your exercise book is not big enough to contain the actual size of your classroom and yet you drew your classroom showing possibly the position of the farms, and the teachers table. This was possible because you draw the room smaller than the actual size. Assuming your classroom is 12m long and 6m wide, these measurements and too big for exercise book. Then scale comes in to help. If we draw a line 1cm long to represent 1m then the classroom plan will be 12cm by 6cm. The result gives us a plan of the classroom

drawn to scale. The scale therefore shows the relationship between the size of the classroom on the plan and the actual size on the ground.

**Step II:** The teacher guides the students to explain the term scale. The teacher asks the students to list the different types of scale. The scale are as a statement as a representative fraction and as a linear scale.

**Step III:** The teacher encourages the students to differentiate between these scales. The teacher guides the students to write down in their notebook their observations.

**Step IV:** The students ask the teacher some questions. The students are free to help the teacher in answering the questions.

**Summary:** The teacher writes the summary to act as a guide;

A scale may be indicated by one of three methods.

(1) By a statement, e.g. 2cm represents 1km; 2cm to 100m. this means that 2cm on the map stands for 1km or 100m as the case may be on the actuak ground.

(2) By a representation fraction (a abbreviated E. F> ) e.g. 1/50, oc or 1:50,000. Note that the numerator, which must be one unit stands for the distance on the ground. In the example given, the scale is 2cm to 1km since there are 100,000cm to a kilometer. This method is very useful as it is international and can be understood in any country. If we give a number of kilometers to a centimeter and are asked to find the representative fraction, we should multiply 100,000 by the number of kilometer given. This gives the denominator. The R.F. will be one over the denominator.

For Example:

To find the R.F. for a scale of 2km to 1cm.

1/100,000 x 2 = 1/200,000 or 1:200,000.

If on the other hand, we are given the R.F. and asked to express it as kilometers to the centimeter, we divide the denominator by 100,000, e.g.: to express the R.F.., 1:500,000 as is statement:

500,000/100,000 = 5

Answer = 1cm to 5km.

(3) By a linear scale or scale bars,

fig 18.1 Linear scale or scale bar.


Linear Scale

A linear scale means a line scale. It is a straight line draw as shown above to help in finding out the distance on the map. It is a kind of ruler.

In the example given above any distance as long as this scale on the map is 6 kilometers on the ground. Each large division on this line represents 1 kilometer. There are four such divisions to the right of '0' and one to left of it. Km at the end of the line shown divisions into 100m sections. We must observe that the figure '0' is written at the end of the first division.

The part to the left of the '0' is divided into smaller units. In this case it is divided into ten smaller units. The smaller unit makes it easy to find out more exact distances on the map. If the distance between two points extends as far as two large divisions on the scale, the points extends as far as two large divisions on the scale, the points are 2 kilometers apart on the ground. Whenever, the distance between two points extends to more than a whole number of kilometers, the extra part can be read off at once with the aid of the sub-divided part.

**Evaluation:**

(a) List the different types of scale.

(b) Differentiate between linear scale and representative fraction

**(c)** State the various steps use to calculate the scale of a map.

**Lesson Plan**

**Lesson 17a**

**Method:** Guided Discovery

**Topic:** Direction, Bearing And Distance

**Sub – Topic:** Direction And Bearing.

**Duration:** 40minutes

**Instructional Objectives**

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

(a) List the ways to show direction

(b) List the cardinal points of a compass

(c) State the cardinal direction in the compass

(d) Describe how to get the bearing of an area

**Instructional Materials**

(1) Samples of topographical map, globs, picture, rules, pencil etc.

(2) Cardboard, drawings, tape, and compass.

**Procedure**

**Step I:** The teacher asks the students to explain what they understand by direction and bearing. The students are encouraged to find out from their textbooks. The explanation should be written in their textbooks. The teacher also expects response from the students. The teacher teaches the class;

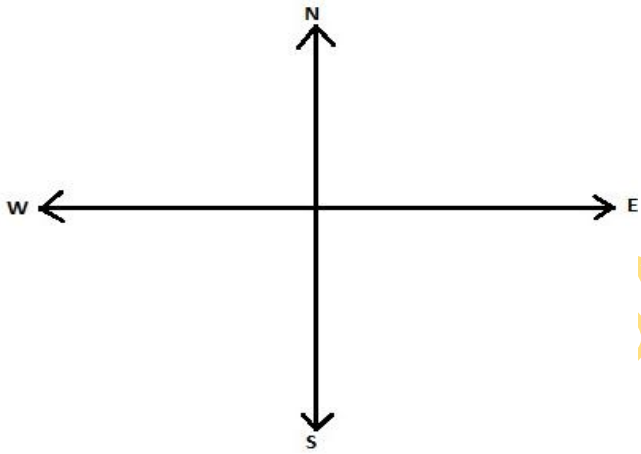
**Direction:**

Maps show direction. It helps us to move from place to place without getting lost: The direction of one place from another is shown.

(a) By means of cardinal or compass points.

(b) By means of angular bearings.

**Compass Points:**




**Step II:** The teacher guides the students to explain the terms direction and bearing. The teacher guides the students to list the different ways to show direction. By means of cardinal point or compass and by means of angular bearings. The Students are free to refer to their textbooks.

**Step III:** The students are encouraged to differentiate between compass points and angular bearings.

**Step IV:** The Students ask the teacher some questions. The students are free to help the teacher in answering the questions.

**Summary:**

How to show the points of the compass.

The cardinal points are East, West, North and South. Halfway between North and East, East and South, South and West, North and West are respectively North-east (NE),

South-east (SE), South-West (SW) and North-West (NW). mid-way between North and North-east is NNE (North-north-east) between NE and East is ENE (East-north-east), between East and South-East is ESE (East-South-east), between south and south-west is SSW (South-south-west), between West and South-west is WSW (west-south-west), between West and North-west is WNW ( West-north-West) and between North and North-west is NNW (North-North-West).

When a map is drawn the direction of North is often indicated by an arrow. However, from this we can tell which the northern part of the map is. This enables us to work out the other directions. When the arrow is not shown the top and bottom edges of the map lie to the north and to the south.

**Bearings:**

Directions are described giving angular bearings and are given in terms of degrees. Using degrees help to have a more accurate means of stating directions. We always start from the north and move in a clockwise direction. Giving North $0^0$ as it bearing, East $90^0$ and a point due south is $180^0$. Then we have the following:

| Compass Points | Corresponding Angular Bearing |
|---|---|
| North | $0^0$ or $360^0$ |
| South | $180^0$ |
| East | $90^0$ |
| West | $270^0$ |
| North – East | $45^0$ |
| North – West | $315^0$ |

At times it is difficult to state the exact direction of one place from another by compass direction. However, such difficulties disappear when degrees are used.

**Evaluation:**

(1) List the different way to show direction

(2) List some compass points and the corresponding angular bearing.

(3) Describe the way to give angular bearing of directions.

**Lesson Plan**

**Lesson 18a**

**Method:** Guided Discovery

**Topic:** Scale, Direction, Bearing And Distance

**Sub – Topic:** Measurement Of Distance.

**Duration:** 40minutes

**Instructional Objectives**

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

(a) List the various way of how to measure distance.

(b) Describe the way to measure distance.

(c) Calculate the distance between two points in a map

(d) Differentiate between the various ways how to calculate distance.

**Instructional Materials**

(a) Samples of topographical map, atlas, globs, picture, thread, meters rule, pins etc.

(b) Samples of cardboard, diagrams, etc.

**Procedure:**

**Step I:** The teacher asks the students to explain what they understand by measurement of distance. The students are encouraged to find out from their textbooks. The explanations are written on their notebooks. The teacher expects response from the students. Then the teacher teaches the students;

**Distance:** In the early part of this lesson, we learnt that a scale shows the relationship between a distance on a map and the actual distance on the ground. So a good knowledge of scale is essential in the measurement of distance on a map.

**Step II:** The teacher guides the students to explain the terms measurement of distance or just distance. The teacher asks the students to list the different ways to measure distance. The students are free to refer to their textbook.

**Step III:** The students are encouraged to differentiate between measuring along irregular course or direct measurement. The students refer to the textbook to understand the measurement.

**Step IV:** The students ask the teacher some questions. The students are free to help the teacher in answering the questions.

**Summary:**

To measure the distance between two points, A and B on a map two things must be considered. These are whether we are finding;

(i) A direction distance between the two points that is as the crow flies or

(ii) Whether we are finding distance along an irregular course, for example along a river or road. Where the distance is direct, we have only to use a ruler, a pair of dividers or a straight edge of paper and measure the distance between the two points, then transfer it to the scale.

However, after measuring a distance on the map and then using either the R.F. or the linear scale we give the answer as kilometers and decimal fractions of a kilometer. If a linear scale is used, we calculate the distance as explained earlier when we discussed linear scale. Where the distance to be measured is an irregular one, for example a winding road or a river, it is best to use a piece of thread. With it we can follow the curves of the

road and the bends in the river. We then transfer all the thread we have used to the scale and read off the distance, using the representative fraction:

Where the linear scale is not given on the map, we must use the representative fraction to calculate distance. It is useful to know that an R>F. of 1:50,000 on a metric scale means 2cm represent 1km

E.g. Assuming you want to calculate the distance between two points A and B on a map with a scale of 1:50,000. The distance between A and B on the map is 18cm.

Then the actual distance on the ground is

18 x 50,000/100,000 = 9km

Or

18cm on a metric map with a scale of 1:50,000 will be 18/2km = 9km

**Evaluation:**

(1) List the different ways of measuring distance

(2) List the items use in measuring distance between two points on a map.

(3) Describe how you would calculate distance using the representative fraction.

**Lesson Plan**

**Lesson 19a**

**Method:** Guided Discovery

**Topic:** Relief, Contours And Their Forms

**Sub – Topic:** Relief Representation

**Duration:** 40minutes

**Instructional Objectives**

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

(a) List the various ways to show relief.

(b) List the types of relief features

(c) State the different relief features and draw the diagram.

(d) Differentiate the relief features in topo maps.

**Instructional Materials**

(a) Samples of topographical maps, picture, thread, graph and pencils.

(b) Samples of cardboard, diagrams, co lour etc.

**Procedure**

**Step I:** The teacher asks the students to explain what they understand by relief representation. The students are encouraged to find out from the textbooks. The explanations should be written on their notebooks. The teacher also expects response from the students. Then the teacher teaches the class;

The surface of the earth is not all on the same level. The surface changes in shape and height from one place to another. Some parts are higher than others. This difference in height is what we call relief. Knowledge of relief helps us to understand and explain various facts in physical and human geography. A relief map for instance helps us to understand why people live in one place and not in another or why a certain road should follow a particular course and not another.

**Step II:** The teacher guides the students to explain the term relief. The teacher asks the students to list the different ways to represent relief. These are spot, heights, contours, form lines, Hachure.

**Step III:** The students are encouraged to differentiate between spot height and contours, form lines and hachure, hill shading and layer tints. The students were asked to go to the field to see how some of these topographical features are represented on the earth surface.

**Step IV:** The students ask the teacher some questions from the teacher. The students are free to help the teacher in answering the questions.

**Summary:**

Various methods are used to show relief on a map. These are:

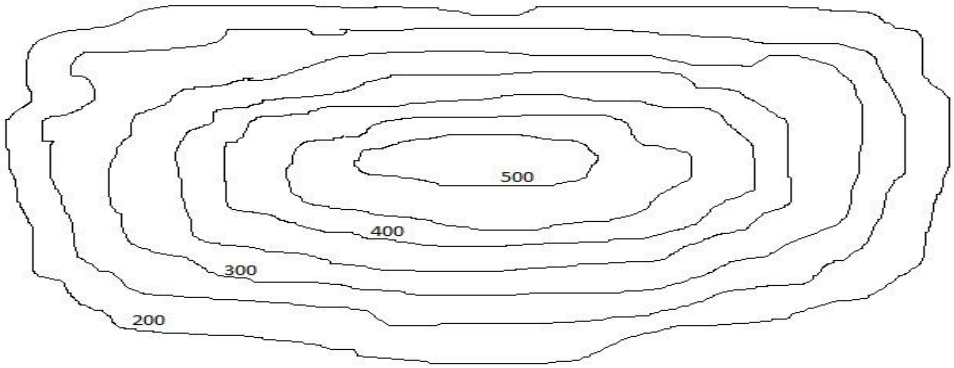
**(1) Spot Heights:**

These are shown with data which have certain figure beside them. E.g. 500 .260. These means that the height of the ground at these dots is 500m and 260m above sea level respectively.

**(2) Contours:**

A contour is a line draw on a map to join places of equal height above sea level. Thus a 200m contour line joins all places which are 200m above sea level. The land above it is over 200m while the land below it is lower than 200m.

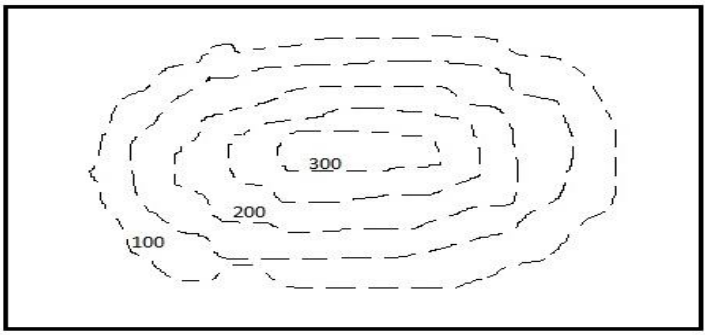
Contours show not only the height and the slope but also the form of the land. Isohyp (equal height) is another word for contour.




Contours

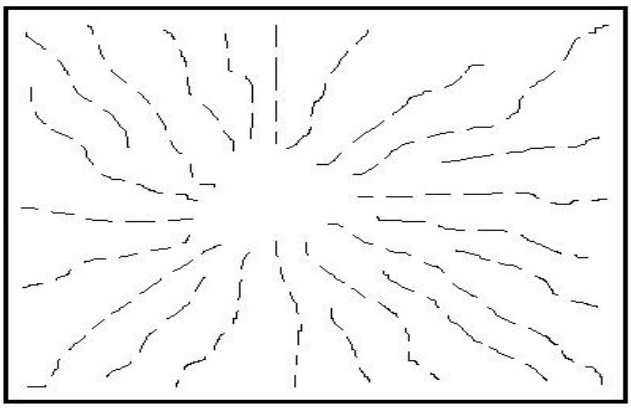
**(3) From-Line:**

These are used where the land has not accurately surveyed. They are very much like contour and they are mere approximations of heights. They are printed in broken lines.




**(4) Hachures:**

These are short lines drawn on a map to show the direction which water would take when flowing from high to low ground. If the slope are steep the lines are thick and close together. On gentle slopes they are thin and wider apart while flat ground is not shade at all.



**(5) Hill Shading:**

Hill shading helps to give an impression of the form of the line without giving actual heights. Hill shading is usually done in colour, brown or grey, and it appears that a light is shining from the north-east corner of the map.

**(6) Layer tints:**

On physical maps tints or different shades of colour are used to denote land between two different heights. Usually green is used for lowlands, brown for high, pink for very high land and finally white for mountains. The colouring makes it possible to see the distribution of high and low land at a glance.

**Contours:**

A contour line is drawn on a map to represent a certain definite height on the land, and it separates all land above that height from the land below that height. Along 100m contour for example, the land is everywhere precisely 100m in height above sea level.

However, there are terms we need to know before studying a detailed study of contours and their forms.

**(1) Ordnance Survey (O.S.):**

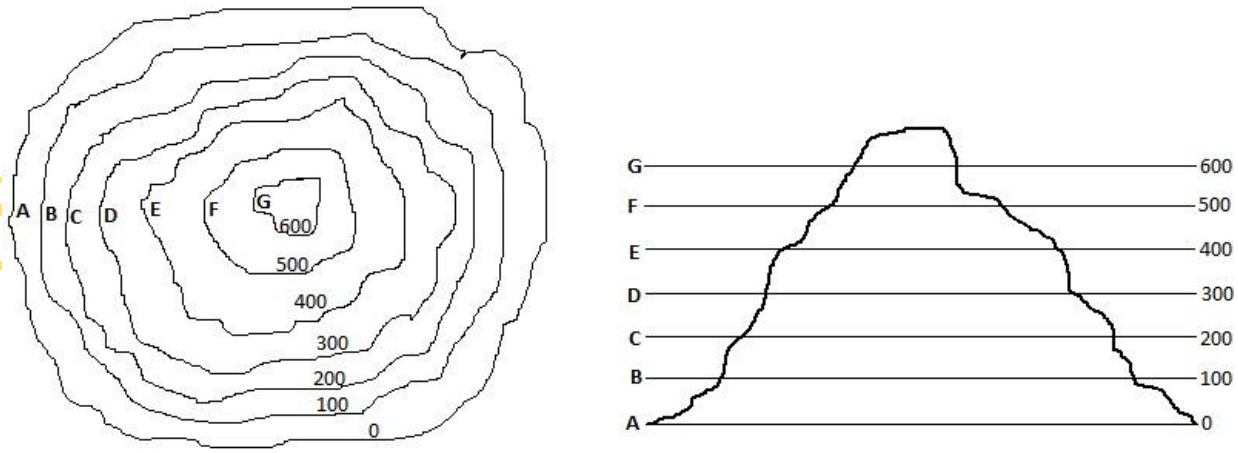
This is an accurate and detailed geographical survey made for the government by the survey department. When the survey has been made they produce ordance survey maps or ordnance map.

**(2) Sea Level:**

This is the average height between high and low tide or the line where land and sea meet. It is also referred to as the Datum level or ordnance Datum (O.D). from this all heights are calculated. It is marked zero on the map.

**(3) Vertical Interval (V.I.):**

This is the difference between two heights on a map. For example, if a spot 'A' is 100m high and 'B' is 25m high, the vertical interval is 150m.




Vertical Internal height shown on a hill with contour lines

**Evaluation:**

(1) List the various methods that are use to show relief on a map.

(2) State how relief could help us to explain various facts in physical and human geography.

(3) List the major differences between contours and spot height

**Lesson Plan**

**Lesson 20a**

**Method:** Guided Discovery

**Topic:** Relief, Contour And The Forms

**Sub – Topic:** Relief Representation.

**Duration:** 40minutes

**Instructional Objectives**

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

(a) List the different relief features

(b) List the differences between the relief features.

(c) Describe the relief features on topographical maps.

(d) List the factors that create these features on the earth surface.

**Instructional Materials**

(a) Samples of topographical maps, thread, pencils, pictures and graphs

(b) Samples of diagrams, cardboard, colours etc.

**Procedure:**

**Step I:** The teacher asks the students to explain what they understand by the term relief features. The students are encouraged to find out from their textbook and notebooks. The explanation should be written on their notebooks. The explanation should be written on

their notebook. The teacher expects response from the students. Then the teacher teaches the class the meaning of contour forms, and how it results in gradual slope and slope, conical peak and a saddle. Then a spur and a valley.

**Step II:** The teacher guide the students to explain the terms relief features. The teacher asks the students to list different types of relief features. The students are free to refer to their textbooks.

**Step III:** The students are encouraged to differentiate between relief features; gentle or gradual slope and steep slope, conical peak and a saddle, spur and a valley. The students were asked to go out to the field to look out for these features.

**Step IV:** The students ask the teacher some questions. The students are free to help the teacher in answering the questions.

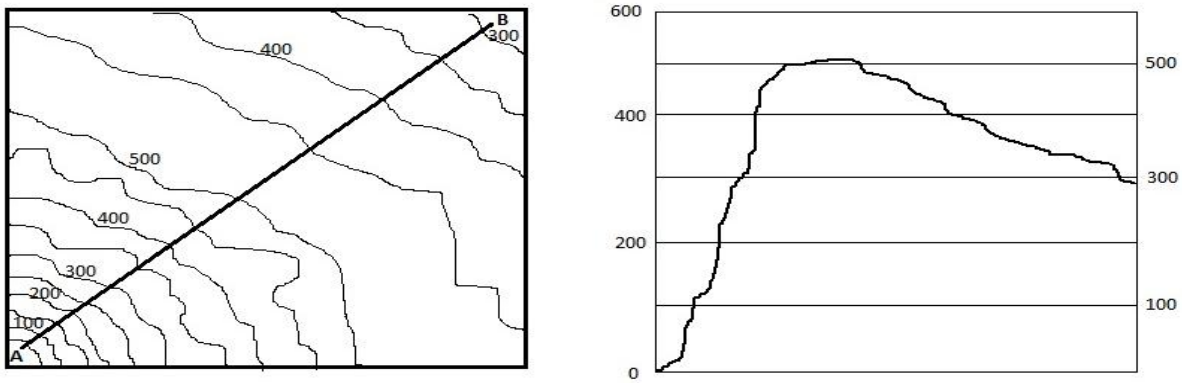
**Summary:**

**(4) Contour Forms.**

On the earth surface we pass over hills and valleys, plains and plateau. However, some of the hills may be difficult to climb and if we were cycling we would be forced to walk up them. Others present no difficulty. In descending a hill, the difficulty varies with the steepness of the hillside or valley.

Contour lines sometimes approach each other gradually, i.e. at an equal distance apart. In such a case the slope is uniform. It is also said to be gradual or gentle.

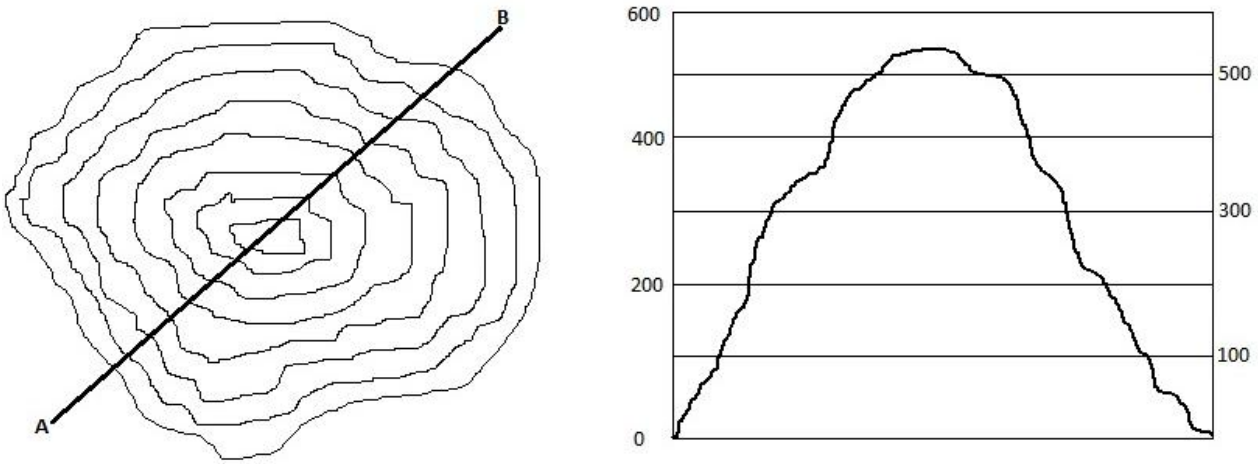
When contour lines approach each other sharply, i.e. when they are very close together, the slope is steep.




A Steep and Gentle Slope

**(5) A conical peak:**

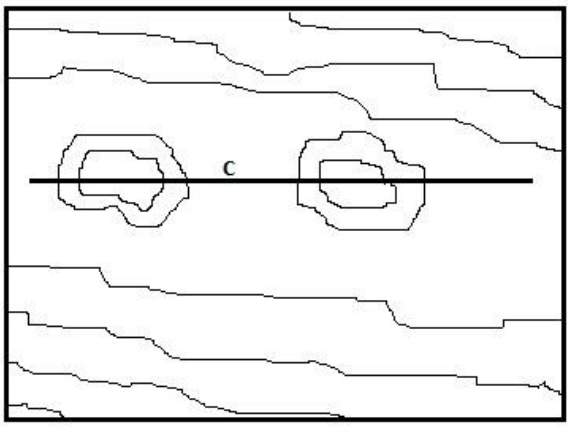
Here the contours are more or less concentric with two or more ring contours. The hill which may be isolated usually stands out of relatively level land. In this case, the ground rises towards the centre, which often shows a rounded top. However, the summit of a peak is represented by a ring contour with no other contour inside it.

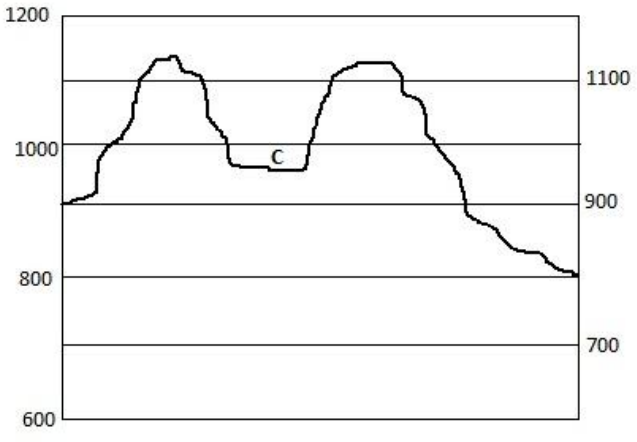



A Conical Peak

**(6) A Saddle, Pass or Col:**

This is a gap or opening between hills. It is represented by at least one contour surrounding the contours indicating the hills. The term saddle is restricted to an opening between hills. While 'pass' or 'col' is used for one between higher lands. Saddle affords the easiest passage across the hills.



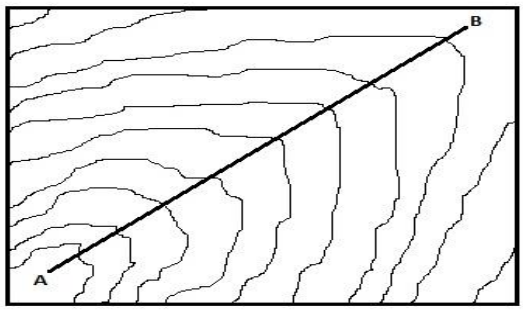



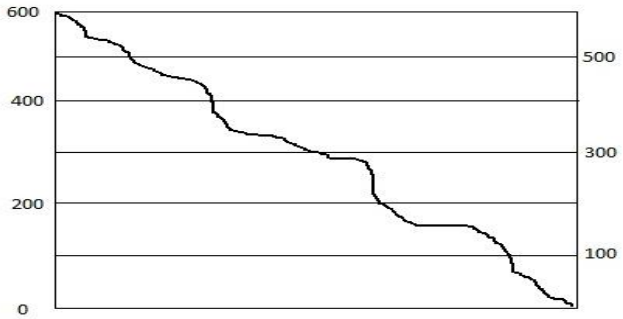

A Saddle

A model and a representation in contour of a saddle.

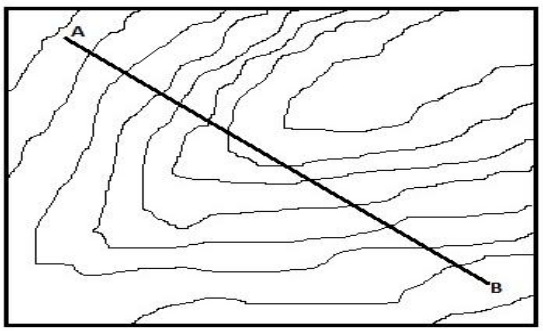
**(7) A spur and a valley:**

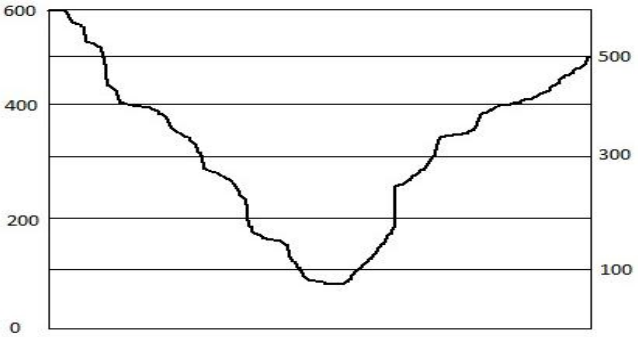
A spur is sometimes shown as a 'v' and a valley as an inverted 'v'. However, they can be shown in exactly the same way. What always decides which is the numbering? In a spur the numbering increases from the outside inwards while the exact opposite in the case in a valley.To put it in another way, the apex of the v in the spur points toward low land and that of the valley points towardshighland.




A Spur




A Valley

**Evaluation:**

(1) List all the relief features in this section.

(2) With good diagram differentiate between a spur and a valley

(3) State the major differentiates between a conical will and a saddle.

**Lesson Plan**

**Lesson 21a**

**Method:** Guided Discovery

**Topic:** Relief, Contour And Their Forms

**Sub – Topic:** Relief Representation

**Duration:** 40minutes

**Instructional Objectives**

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

(a) List the topographical features in this lesson

(b) State the differences between the topographical features

(c) Draw the diagrams of these topographical features.

(d) State the differences between convex and concave slope.

**Instructional Materials**

(a) Samples of topographical features, pencils, colour, ruler and pictures.

(b) Samples diagrams, cardboard, thread and pins.

**Precedure:**

**Step I:** The teacher asks the students to explain what they understand by the term relief representation. The students are encouraged to find out from their textbooks. The explanation should be written down on their note books. The teacher expects response from the students.

**Step II:** The teacher guides the students to explain the term relief properly. The teacher teaches the students to list the different relief features in this lesson. They are convex slope, concave slope, a ridge, an undulating hill, isolated hill etc. the students are free to refer to their textbooks.

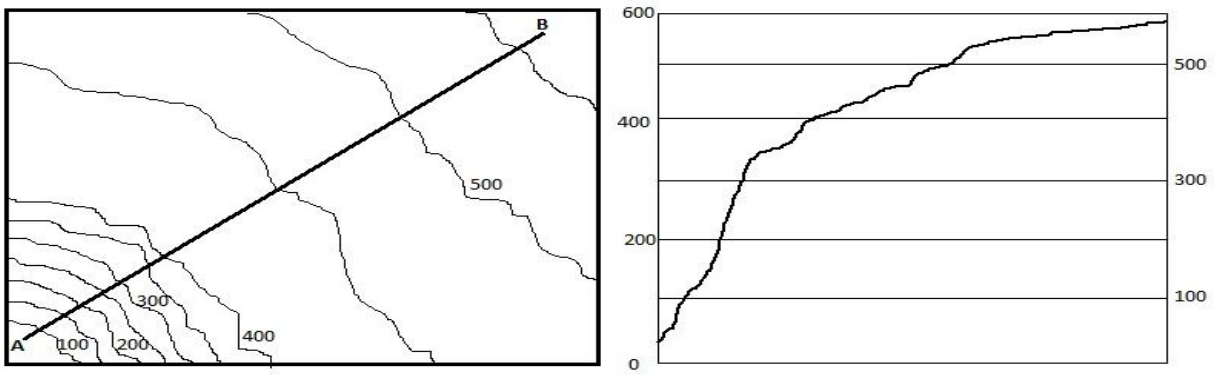
**Step III:** The students are encouraged to differentiate between the types of topographical features. The students were asked to go out to the field to look out for the features.

**Step IV:** The students are free to help the teacher in answering the questions.

**Summary:**

**Convex Slope:**

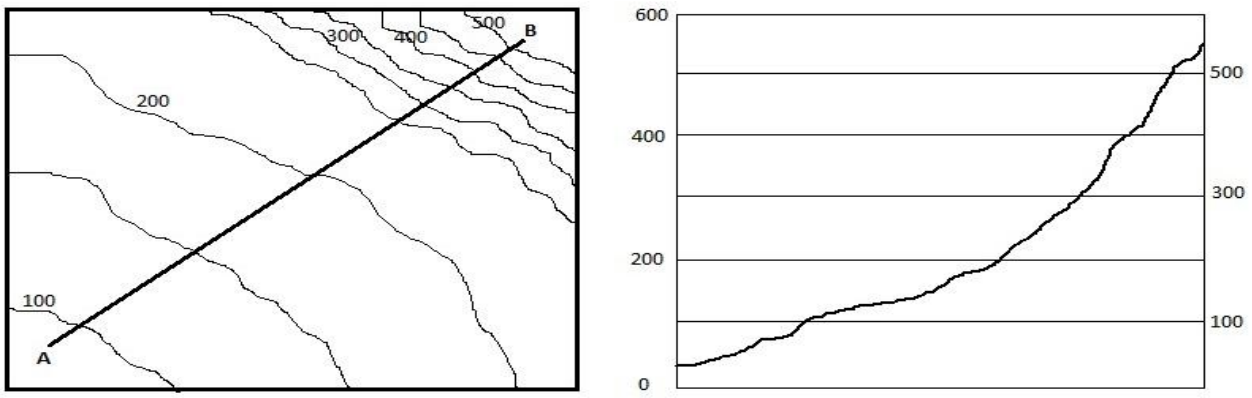
A slope is convex if the contours are first close together and then widen as the land rises. As shown in the fig. 19.9, the slope is accidently steep at first, but it becomes gentler on higher round.




A Convex Slope

**Concave Slope:**

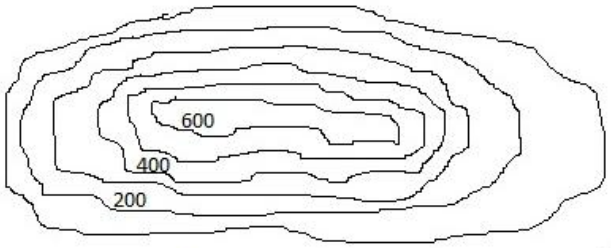
A slope is concave if the contours on the lower section of the land are more widely spaced, but they come closer together as higher ground is reached. The higher section of the slope is steeper. See fig. 19.10.



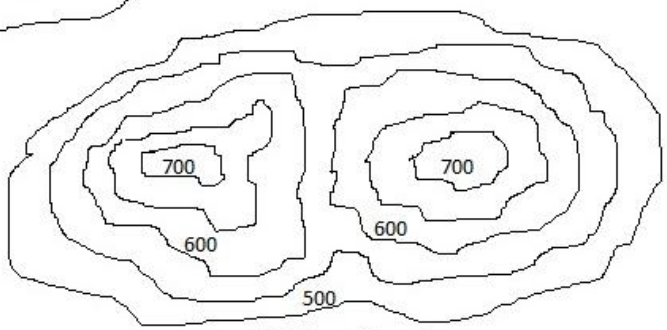

A Concave Slope

**A ridge:**

This is a long narrow hill and is represented by oval-shaped contour lines. When it is of considerable height it is called a 'range' hence we have a range of mountains.



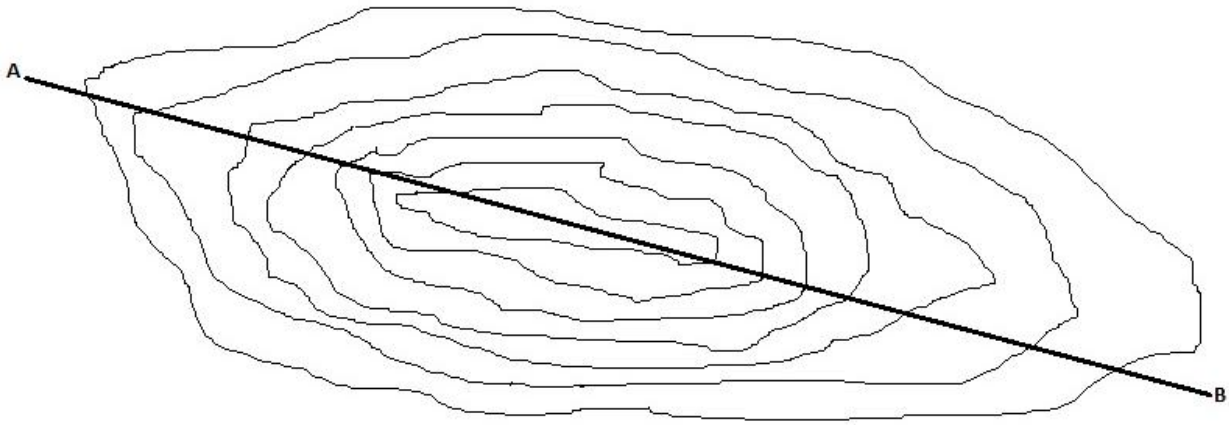

A Ridge




A Ridge with a col

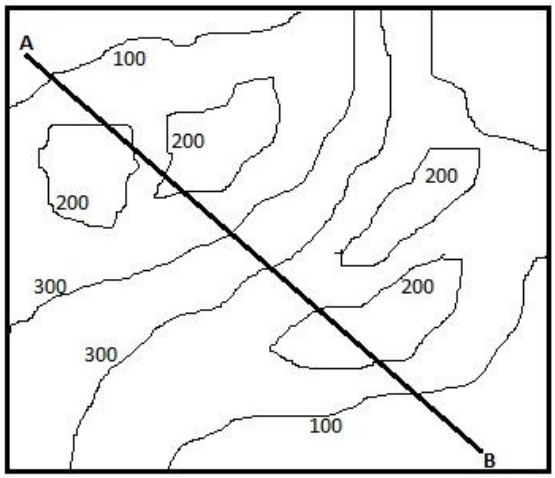
**An Escarpment:**

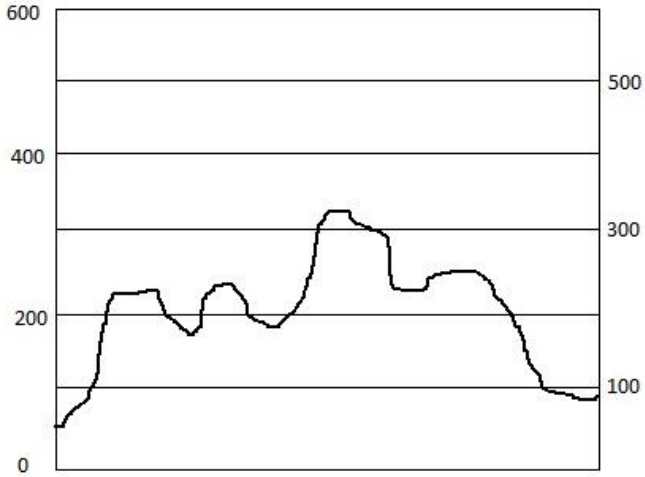
A ridge in which one side slopes gently while the opposite side slope steeply. The side is known as the scarp slope or scarp. The long and gentle slope on the opposite side is usually called dip slope.




**An Undulating Region:**

A plain or region with no steep slopes but with the land rising and falling evenly is described as undulating.




Contours representing undulating land

**An Isolated Hill:**

A hill which, as the name implies, stand isolated or apart from the rest of the highlands in the region.

**Evaluation:**

(1) List the different types of relief features in this lesson

(2) List the major differences between a convex slope and a concave slope.

(3) State with diagrams, the differences between undulating region and isolated Hill.

**Lesson Plan**

**Lesson 22a**

**Method:** Guided Discovery

**Topic:** Sections, Gradient And Intersivibility.

**Sub – Topic:** Drawing A Cross Section

**Duration:** 40minutes

**Instructional Objectives**

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

(a) Draw a cross section using graphs.

(b) State the functions of a sectional drawing

(c) Describe the features that are expose by section drawing.

**Instructional Materials**

(1) Samples of topographical maps, graph sheet, pencil, eraser, cardboard.

(2) Samples of diagrams, pictures, colour etc.

**Procedure:**

**Step I:** The teacher asks the students to explain what they understand by the term cross section. The students are encouraged to find out from their textbooks. The explanation should be written in their notebooks. The teacher expects response from the students. The teacher asks the class the meaning of section in the study of topographical maps.

**Step II:** The teacher guides the students to explain the term, cross section. The teacher informs the class to list the steps involve in drawing a cross section. The students are free to refer to their textbooks.

**Step III:** The students are encouraged to differentiate between the different areas within cross section in the graphs.

**Step IV:** The students ask the teacher some questions. The students are free to help the teacher in answering the questions.

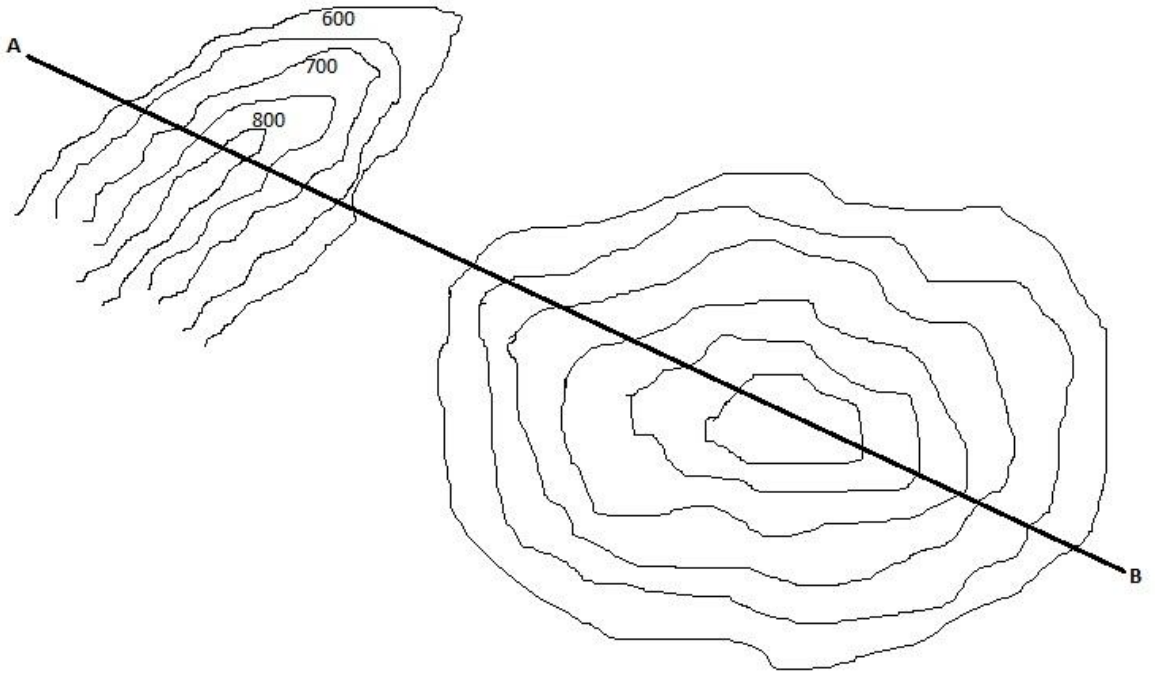
**Summary:**

A section shows contours as an elevation. Section enables a person to visualize the shape and nature of the land. When a section is drawn we imagine what the region would look if we were to travel in a straight line from one spot to another. In drawing a section, it is always wise to choose a scale. This scale is known as the Vertical Scale (V.S) or scale of Height and is always highly exaggerated, unlike the horizontal scale. Care should be taken when choosing the vertical scale so as not to give a fantastic notion of the landscape. Suggested scales are 2mm or 3mm to represent the vertical interval.

Section Line:

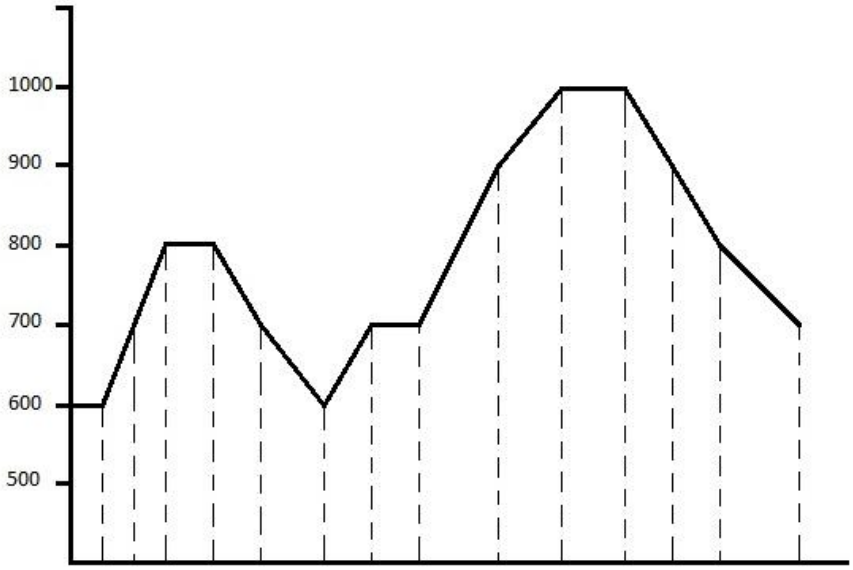
This is a straight line which joins the two points on a map between which a section is to be drawn. How to draw a section.

(A)




(B)

V.S 2mm=100m




**Method of drawing a section.**

(a) Draw a section line X to Y.

(b) Lay a straight edge of paper along the section line.

(c) Mark on it the points where the section line crosses the contours with their appropriate heights.

(d) Where the section line crosses the same contour line consecutively, make a mark or to indicate a highland or depression respectively.

(e) Transfer the paper to the horizontal lines and mark off the heights with dots on the horizontal lines which correspond to them.

(f) Join up the dots and complete the sectional.

**Evaluation:**

(a) List the steps involve in drawing a section.

(b) Describe a cross section.

(c) Differentiate between a section and intersivibility.

**Lesson Plan**

**Lesson 23a**

**Method:** Guided Discovery

**Topic:** Section, Gradient And Intersivibility

**Sub – Topic:** Gradient.

**Duration:** 40minutes

**Instructional Objectives**

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

(a) List the steps involve in calculating gradient.

(b) Calculate the gradient of a landscape.

(c) State the reasons for calculating gradient

**Instructional Materials**

(1) Samples of topographical maps, pencils, pen, thread, pins and eraser.

(2) Samples of diagram, Pictures, cardboard etc.

**Procedure:**

**Step I:** The teacher asks the students to explain what they understand by the term gradient. The students are encouraged to find out from their textbooks. The explanation should be written on their notebooks. The teacher expects response from the students. The teacher asks the class to explain all the steps involve in calculation of gradient

**Step II:** The teacher guides the students to explain the term gradients. He asks the students to list all what we must know to enable students find gradient between two point.

**Step III:** The students are encouraged to differentiate between vertical interval (VI) and horizontal equivalent (HE). The students were asked to measure out all these in their maps.

**Step IV:** The students ask the teacher some questions. The students are free to help the teacher in answering the questions.

**Summary:**

Gradient in contour refers to the slope of the land. We learnt earlier that when contour lines are close together the slope is steep. Similarly when they are farther apart slope is gradual. Gradient are always expressed as fractions with one unit as the numerator.

To find the gradient between two points on the map we must know

(a) The heights of the two places;

(b) The horizontal distance between them.

The gradient then is the difference between the two heights divided by the distance between them. In other words it is the vertical interval (V.I) over the horizontal equivalent (H.E.).

**Example:**

Find the average gradient between two towns, A and B, whose heights above sea level sea level are 120 and 370 respectively.

The distance between the two towns is 10km.

Height at town A … 120m

Height at town B … 370m

Difference between the heights, i.e. V.I 250m

Difference between the two towns. i.e. H.E. = 10km

:. Gradient = V.I./H.E. = 250/10,000 = 1/40

We read this as one in forty. This means that there is a rise of 1m for every 40m covered.

**Evaluation:**

(a) List the steps involve in the calculation of gradient.

(b) State the Major differences between vertical interval and horizontal equivalent.

(c) Describe the various areas one can use or apply measuring gradient.

**Lesson Plan**

**Lesson 24a**

**Method:** Guided Discovery

**Topic:** Sections, Gradient And Intersivibility

**Sub – Topic:** Intersivibility

**Duration:** 40minutes

**Instructional Objectives**

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

(1) State whether one place is visible from another place in the same landscape.

(2) State from the graph whether an area is concave slope or is convex slope.

(3) List the intervening obstacles between two places on the map as shown in the graph.

**Instructional Materials**

(1) Samples of topographical map, pictures, globs and cardboard.

(2) Samples of diagrams, ink, pencils, ruler and eraser.

**Procedure:**

**Step I:** The teacher asks the students to explain what they understand by the term intersivibility. The students are encouraged to find out from their textbooks. The explanation should be written on their notebooks. The teacher expect response from the students. The teacher teaches the class it is good to know whether one place is visible from another when reading a map. The students are free to refer to their textbooks, for detail.

**Step II:** The teacher guides the students to explain the term intersivibility. The teacher asks the students the steps to know whether an area is visible from another area or not. The students are free to refer to their textbooks and previous notes for easy understanding.

**Step III:** The students are encouraged to differentiate between intersivibility and sectional drawing, uniform and uneven slopes. The students also were made to go out to the field to examine the landscape.

**Step IV:** The students ask the teacher some questions. The students are free to help the teacher in answering the questions.

**Summary:**

**Intersivibility:**

When reading a map, it helps to know whether one place is visible from another. This can be found out by;

i) An examination of the contours and the types of slopes concerned. The slope may be even or uniform, convex or concave. In an even slope the contour lines are of equal distance apart. The contours of a convex slope are close together at the lower level but get farther apart as one ascends the slope. A concave slope has the contour lines closer together at the higher level but wider at the base. XY is concave while YZ is convex.

When the slope is convex, as in YZ the top of the hill is not visible from the foot of the hill. But, when it is concave, as in XY the top is visible from the bottom.

However, it is important to know whether there is intervening obstacles between two positions on a map. A place is visible or invisible depending on whether there is or not an intervening obstacle. This obstacle is created by land in form of hill.

**Evaluation:**

(a) List the ways to know whether there is or are intervening obstacles in a map between two towns in map.

(b) State the various ways to draw the graph the expose contours showing concave and convex slope.

## Appendix C

**Lesson Plan**

**Lesson 1b And 2b**

**Method: Simulation Strategy**

**Topic: Tectonic Processes On Landforms**

**Sub-Topic: Earth Movement-Faulting.**

**Duration: 40 Minutes**

**Instructional Objectives**

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

(a) List different types of tectonic processes.

(b) Mention different types of tectonic processes

(c) State the landforms that are associated with tectonic processes.

(d) Describe the features that are formed from tectonic processes.

**Instructional Materials**

(a) Samples of sand, rocks, atlas, globes, coloured pictures and cardboard.

(b) Samples of colour diagrams showing tectonic features, pieces of cloth

**Procedure**

**Step I:** The teacher show the students some pictures of tectonic features like crack walls, landslides, then locate the spots or places on the maps and pictures where they have seen those features.

The students are encouraged to find out also from their textbooks. The teacher demonstrates with the piece of cloth how movement in the earth crust could happen and folding or fault takes place. Teacher asks the students to take down points inform of questions till after demonstration. Then before response from the students, the teacher ensures that they all understand features in the pictures and maps. The teacher teaches the

class tectonic refer to the processes which tend to build up the various features of the earths crust. It involves the mouldings the earth surface. The teacher uses the pictures and maps of land that break, bend and warp the earths crust, create depressions and elevations for further explanations. Then shows the picture of forces of gradation which tend to wear down the surface to a common level. He shows the vertical and lateral displacement of crustal rocks which are involved in the two components of earth movement.

**Step II:** The teacher guides the students to explain with examples earth's movements. The teacher asks the students to list from their observations the different tectonic processes; the list will be done by referring to the student textbooks to get the accurate names of the tectonic processes faulting, folding, warping and earthquake.

**Step III:** The students are encouraged through interaction with other students to sort out the differences in the tectonic features; faulting and folding, warping and earthquake.

**Step IV:** The students are put in groups to express in their words the basic points on the topic and to ask each other some questions. The teacher moves round the groups to ask questions and also help the students in answering the questions. For effectiveness and proper class management, a class should not be more than two or three groups.

**Summary:** The teacher establishes a common knowledge base for all the students and motivates all the learners to develop analytical processes.

A fault is a fracture involving the displacement of the rocks on earth crust.

**Classification of fault:**

(1) Normal fault

(2) Reverse fault

(3) Tear or lateral fault

**Diagram showing types of fault.**

**Land forms produced by fault:**

(a) A fault scarp

(b) A rift valley

(c) A tilted block and a horst.

**Evaluation/Exercise**

(1) Name the three major types of fault.

(2) Complete the statement; tectonic processes are;

(1) ……...

(2)……

(3)…….....

(3) List the differences between a normal fault and reverse fault

(4) The teacher asks the students to read up all they have done on the topic earth's movement and make a complete and comprehensive note.

**Lesson Plan**

**Lesson 3b And 4b**

**Method: Simulation**

**Topic: Tectonic Processes On Landforms**

**Sub-Topic: Folding**

**Duration: 40 Minutes**

**Instructional Objectives**

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

(a) Mention different types of folding

(b) List the characteristics feature of folding

(c) Describe with examples the mode of formation of folding

(d) State the mountains that form as a result of folding

**Instructional Materials**

(1) Samples of pieces of cloths, rocks, pictures of mountains, cardboard and globs.

(2) Samples of landscape features, diagrams of valleys.

**Procedure**

**Step I:** The teacher shows the students some pictures of folding and fold mountains. The teacher locates the places where they are found on the map.He shows the diagrams of fold mountains and folding.

The students are encouraged to find out from their textbooks. The teacher demonstrates to the students with pieces of cloth how fold mountains are formed. Then asks the students to take down points inform of questions till after demonstration. Before response from the students, the teacher ensures that they all understand the features in the pictures and maps. The teacher teaches the class; folding is the bending of rock strata arising from the effect of lateral forces of compression acting on crustal rocks. Folding of rock can be seen in the faces of cliffs or railway cuttings.

**Step II:** The teacher guides the students to explain with examples folding. The teacher asks the students to list from their observations the different folding processes. The listing will be done by referring to the student's textbooks to get the accurate names of the folding and fold mountain.

**Step III:** The students are encouraged through interactions with other students to sort out the differences in folding; simple folding, asymmetrical folding, overfold, recumbent anticline and over thrust fold.

**Step IV:** The students are put in groups to express in their own words the basic points on the topic and to ask each other some questions. The teacher moves round the group to ask questions and also helps the students in answering the questions. For effectiveness and proper class management, a class should not be more than two or three groups.

**Summary:** The teacher establishes a common knowledge base for all the students and motivates all of them to develop analytical processes. Folding of rock is a slow process. It depends on the intensity of the forces in action.

**Types of folding**

(a) Simple folding

(b) Asymmetrical folding

(c) Overfold

(d) Recumbent anticline

(e) Over thrust fold

Three simple geometrical forms of folding

(a) Anticline

(b) Syncline

(c) Monocline

Diagram of types of fold

**Evaluation/Exercise**

(1) List the different types of folding

(2) Locate fold mountains in the world and name places where they are found

(3) Complete the statement; simple geometrical form of folding are;

(1)……

(2)……

(3)……

(4) State the characteristics of folding and their mode of formation

(5) The teacher instructs the class to read up all they have done on the topic; folding and make a complete and comprehensive note.

(6) The teacher asks the students to read up all what they have done on the topic; volcanism and make a complete and comprehensive note

**Lesson Plan**

**Lesson 5b And 6b**

**Method: Simulation**

**Topic: Tectonic Processes On Landforms**

**Sub-Topic: Vulcanicity Or Vulcanism**

**Duration: 40 Minutes**

**Instructional Objectives**

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

(a) List the types of volcano

(b) Describe the features of volcano

(c) Explain the formation of volcano

(d) Draw the diagram of types of volcano

(e) List the different between acid lava and basic lava.

**Instructional Materials**

(a) Samples of rocks, maps, pictures, tooth paste, cardboard, oil, bottle, water and ashes

(b) Samples of diagrams showing volcanoes.

**Procedure**

**Step I:** The teacher shows the students some pictures or photographs of volcanic mountains. The students locate the places on the map where these features are found. The teacher also exhibits the diagrams of volcano.

The students are encouraged to find out from their textbooks. The teacher demonstrates to the students with ashes and bottle how lava escape from the vent to the earth's surface and accumulate to form volcanic mountain. He informs the students to take down points inform of questions till after the demonstration. Before response from the students, the teacher ensures that they all understand the features in the pictures and maps. The teacher teaches the class vulcanicity involves all the processes through which igneous activities may occur at or near the earth surface.It is the processes in which molten rock or magma, liquids or gaseous material reach the surface of the earth.

**Step II:** The teacher guides the students to explain with examples volcanism. The teacher asks the students to list from their observations the different volcanic processes. The listing will be done from the students textbooks.

**Step III:** The students are encouraged through interaction with other students to sort out the differences in volcano activities; composite cones and cinder cones; caldera and shield volcanoes or lava cones. The students are free to refer to their textbooks.

**Step IV:** The students ask the teacher some questions. The students are free to help the teacher in answering the questions. The students are shared in groups so as to interact properly

**Summary:** The teacher writes the summary to act as a guide. Volcanoes are mountains or conical hills with craters from which molten rock (magma), gases and steam are blown out. They are not form by folding and compression or by uplift or erosion as in the case of ordinary mountains.

**Types of volcano**

(1) Cinder cones

(2) Composite cones

(3) Caldera

(4) Shield volcanoes

(5) Lava domes

**Evaluation/Exercise**

(1) List the difference between acid and basic lava with good examples.

(2) With the aid of suitable diagrams describe how each of the following are form (a) Caldera, (b) Composite cone

(3) The following terms are in one way or another connected with volcanoes and other tectonic processes. Choose one from each sections A,B, and C, define the term and write short note about them

| **Section A** | **Section B** | **Section C** |
|---|---|---|
| Ash | Lava plain | Volcano |
| Acid lava | lava domes | cinder cone |
| Crater | caldera lake | Parasitic cones |

(4) The teacher asks the students to read up all what they have done on the topic volcanism and make a complete and comprehensive note.

**Lesson Plan**

**Lesson 7b And 8b**

**Method: Simulation**

**Topic: External Processes On Landforms**

**Sub-Topic: Denudation**

**Duration: 40 Minutes**

**Instructional Objectives**

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

(a) List the processes that are involves in denudation

(b) List the phases of denudation

(c) Explain the processes and phases of denudation

(d) Differentiate between weathering and erosion, transportation and deposition.

**Instructional Materials.**

(a) Sample of rocks, Maps, Picture, Cardboard, Water and sand.

(b) Samples of diagram of rivers

**Procedure**

**Step I:** The teacher shows the students some pictures and diagrams of denudation. The students are made to locate the areas on the maps where the features are found. The teacher goes round the class to make sure the students locate areas of erosion and deposition on the map.

The students are encouraged to find out from their textbooks. The teacher demonstrates to the students how denudation processes take place. Before response from the students, the teacher ensures that all the students understand the processes in the maps. The teacher asks the class;

What is denudation?

Denudation is the process of wearing out of the earth caused a general lowering and leveling out of the surface. It is note thus:

Weathering → Erosion → Transportation → Deposition → Denudation.

**Step II:** The teacher guides the students to explain with examples of denudation processes. The listing of the processes of denudation will be done by the students by

referring to their textbooks. The teacher goes round to ensure the listing and the arrangement of the processes.

**Step III:** The students are encouraged through interaction with other students to sort out the differences in the denudation processes; weathering, erosion, transportation and deposition.

**Step IV:** The students are shared in groups to express in their own words the basic points on the topic and to ask each other some questions. The teacher moves round the class to ask questions and also helps the students in answering the questions. For effectiveness and proper class management there should not be more than two or three groups in the class.

**Summary:** The teacher establishes a common knowledge base for all the students and motivates all the learners. Denudation is the wearing away of the land by various natural agencies- the sun, the wind, the rain, frost, running water, moving ice and the sea. The phases are

(1) Weathering

(2) Erosion

(3) Transportation

(4) Deposition

The four phases of denudation depend on the nature of the following.

(a) Relief of the land

(b) The structure of the rock

(c) The local climate and

**(d)** Interference by man.

**Evaluation/Exercise**

(1) List the various natural agencies in denudation.

(2) List the natural factors that denudation depend upon

(3) Re-arrange the following denudation processes in order: Transportation → Erosion → Weathering → Deposition

(4) State the differences between weathering and erosion.

(5) The teacher asks the students to read up all they have done on the topic denudation and make complete and comprehensive note.

**Lesson Plan**

**Lesson 9b And 10b**

**Method: Simulation**

**Topic: External Processes On Landforms**

**Sub-Topic: Weathering**

**Duration: 40 Minutes**

**Instructional Objectives**

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

(a) List the factors controlling the rate of weathering.

(b) State the different types of weathering

(c) List the differences between the types of weathering.

(d) State the major chemical weathering processes.

(e) Describe the different ways mechanical weathering takes place.

**Instructional Materials.**

(1) Samples of rocks, roots of plants, maps, pictures, cardboard, sands etc.

(2) Samples diagrams, bottles and ice block.

**Procedure**

**Step I:** The teacher exhibits some photographs and drawing of weathering processes. The students locate the places on the map areas that liable to weathering processes.

The students are encouraged to find out from their textbooks. The teacher demonstrates to the students using pieces rock and water how weathering of rock can take place. The teacher SKS the students to take down points in form of questions till after the demonstration. Before response from the students, the teacher ensures that they all understand the different processes as shown in the maps and diagrams. The teacher teaches the class; weathering may be defined as the disintegration and decomposition of rocks in "situ" (in place). It is a name of group of processes which act collectively on the earth or near the earth surface.

**Step II:** The teacher guides the students to explain the term weathering with examples. The teacher asks the students to list from their observations the different denudation processes. The listing will be done from their textbooks.

**Step III:** The students are encouraged through interactions with other students to sort out the difference in the denudation processes; weathering and erosion, transportation and deposition. The students are free to refer to their textbooks.

**Step IV:** The students ask the teacher some questions. The students are free to help each other and the teacher in answering the questions. The students are in groups of two or three.

**Summary:** The teacher writes summary to act as a guide; Weathering is the disintegration and decay of solid rock and is caused by climatic factors. Weathering is majorly of three types:

(a) Physical or Mechanical Weathering

(b) Chemical Weathering

(c) Biological Weathering

(a) Physical weathering processes.

(i) Pressure-release (unloading)

(ii) Crystallization

(iii) Temperature change

(iv) Colloidal plucking

(v) Plants and animals

(b) Chemical weathering processes

(i) Hydration

(ii) Hydrolysis

(iii)Carbonation

(iv) Oxidation

(c) Biological Weathering processes

(i) Man Construction

(ii) Plants and animal burrowing

**Evaluation/Exercise**

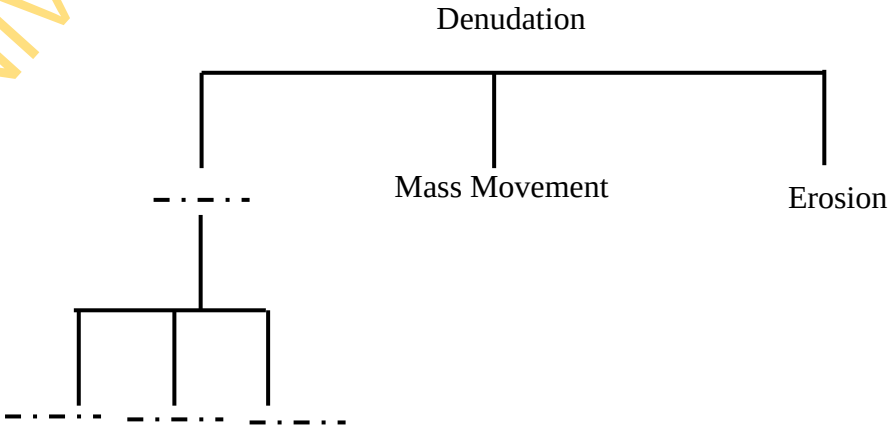
(1) List the different types of weathering

(2) Name four natural forces that place a role in weathering

(3) Differentiate mechanical weathering from chemical weathering and give examples of each

(4) State the several ways where by rock can be weathered in physical form

(5) Complete the following figure



(6) The teacher asks the students to read up all what they have done on the topic weathering and make a complete and comprehensive note.

**Lesson Plan**

**Lesson 11b**

**Method: Simulation**

**Topic: External Processes On Landforms**

**Sub-Topic: Mass Moverment**

**Duration: 40 Minutes**

**Instructional Objectives**

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

(a) List the different types of mass movement

(b) Describe how forces of gravity and rain water assist in the mass movement or mass wasting

(c) Distinguish soil creep from landslides

(d) Locate places where, soil creep, solufluction and landslides occurrences have taken place.

**Instructional Materials.**

(a) Samples of rocks, pictures, maps and cardboard.

(b) Samples diagram, water and sand.

**Procedure**

**Step I:** The teacher shows the students some pictures and photographs of some mass movement processes. The students locate these features on the maps and as they recognize then on the map.

The students are encouraged to find out from their textbooks. The teacher demonstrates to the students using pieces rock and water how weathering of rock can take place. The teacher asks the students to take down points in form of questions till after the demonstration. Before response from the students, the teacher ensures that they all understand the different processes as show in the maps and diagrams. The teacher teaches the class; Mass movements are involved in the removal of under force of gravity of large portions of weathered debris from the hillsides. The main types of mass movement are soil creep, talus creep, solifluction, mudflow, rockslides, rock slump and rock fall.

**Step II:** The teacher guides the students to explain the term mass movement with examples. The teacher asks the students to list the different type of mass movement as they observe it in the maps and diagrams of mass movement processes. The students are free to refer to their textbooks.

**Step III:** The students are encouraged through interactions with other students to sort out the difference in the mass movement processes, soil creep, mudflow, talus creep, solufluction, rockslides and rock slump

**Step IV:** The students are shared in groups to express in their own words the basic points on the topic and to ask each other some questions. The teacher move round the class to ask questions and also helps the students in answering the questions. For effectiveness and proper class managements,the groups in a class should not be more than two or three groups.

**Summary:** The teacher establishes a common knowledge base for all the students and motivates all the learners. Mass movement or mass wasting is the when a weathered materials are under the force of gravity. Such movement may be slow and gradual or sudden, depending on the gradient of the slope, the weight of the weathered debris and whether there is any lubricating moisture supplied by rain water.

**Types Of Movement Are**

(1) Soil Creep

(2) Talus Creep

(3) Mudflow

(4) Land slides:

(a) Rock Slump

(b) Rock Slide

(c) Rock Fall

**Factors Affecting Mass Wasting**

(a) Steepness of slopes

(b) Nature of materials

(c) Climatic conditions

(d) Vegetation cover

(e) Human activities

(f) Earthquakes and volcanic eruptions

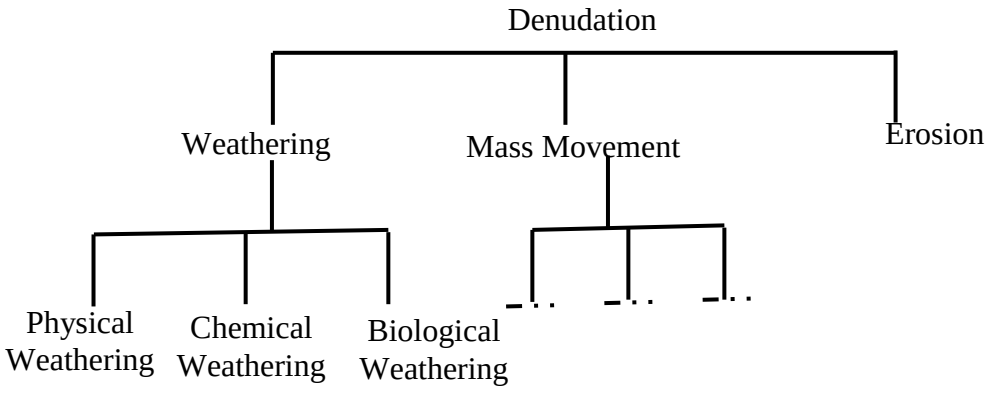
**Evaluation/Exercise**

(1) List the types of mass movement

(2) List with examples types of landslides

(3) State the factors which affect mass wasting

(4) Complete the following figures



(5) The teacher asks the students to read up what they have done on the topic mass movement and make a comprehensive note.

**Lesson Plan**

**Lesson 12b**

**Method: Simulation**

**Topic: The Work Of A River**

**Sub-Topic: Mechanism Of River Erosion**

**Duration: 40 Minutes**

**Instructional Objectives**

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

(a) List the processes of river erosion.

(b) Describe the factors which river effectiveness depend upon

(c) State the various ways river perform its work

(d) Describe river energy, speed and gradation

**Intructional Materials**

(1) samples of rocks, pictures, maps, cardboard, sand, clay etc.

(2) Samples of pure water, mud water etc.

**Procedure**

**Step I:** The teacher asks the students to explain what they understand by the term river erosion, after showing them the pictures and diagrams of areas of erosion. The students locate these erosional areas in the map and recognize them properly.

The students are encouraged to find out from their textbooks. The teacher demonstrates to the students using pieces rock and water how weathering of rock can take

place. The teacher asks the students to take down points in form of questions till after the demonstration. Before response from the students, the teacher ensures, that they all understand the term and different processes that are involved in erosion, as shown on the maps and diagrams. The teacher teaches the class rivers and their associated streams perform two main functions, land carving or sculpturing and they help in draining off surplus rain water.

Three types of work perform by a river.

(a) Carving and eroding its valley

(b) Transporting the eroded materials

(c) Depositing the eroded materials.

**Step II:** The teacher guides the students to explain the term river erosion, with examples. The teacher asks the students to list the different processes sculpture or carving as they observed in the maps and diagrams of river movement. The students are free to refer to their textbooks.

**Step III:** The students are encouraged through interactions with other students to sort out the differences in the river erosive processes; hydraulic action and corrosion or abrasion, solution and attrition. The students had the opportunity to visit streams in their neighborhood at later date.

**Step IV:** The students are put in groups to express in their own words the basic points on the topic and to ask each other some questions. The teacher moves round the class to ask some questions and also helps the students in answering the questions. For effectiveness and proper class management there should not be more than two or three groups in a class.

**Summary:** The processes of river erosion are;

(1) Hydraulic action.

(2) Corrosion or abrasion

(3) Solution

(4) Attrition

These are the processes by which it does it's erosive work.

**Evaluation/Exercise**

(1) List the processes of river erosion

(2) Describe with examples the major way river perform its work

(3) Describe the characteristics and factors of river effectiveness

(4) Fill in the missing words in the space left out in the following statements.

(a) The weight and the _____of rushing water can dislodged rocks on the river_____. This process is called_____

(b) When certain acids is capable of dissolving some _____such as limestone along the river_____. The process is called_____

(5) The teacher asks the students to read up what they have done on the topic, river erosion and make complete and comprehensive note.

**Lesson Plan**

**Lesson 13b**

**Method: Simulation**

**Topic: The Work Of A River**

**Sub-Topic: River Transportation**

**Duration: 40 Minutes**

**Instructional Objectives**

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

(a) List the processes of river erosion.

(b) Describe the various Ways River carry its load.

(c) Differentiate the various way river carry its load

(d) State the characteristics of river transportation

**Instructional Materials.**

(1) Samples of sand, clay, rocks, pictures, maps and diagrams.

(2) Samples of water-pure water, colour water mud water and water with silt.

**Procedure:**

**Step I:** The teacher shows the students some pictures and diagrams of the various ways river transport its load. The students have to locate and tourch all the spots on the maps and pictures to experience it.

The students are encouraged to find out from their textbooks. The teacher demonstrates to the students the touching and other activities before they take down points in form of questions. Before response from the students, the teacher ensures that they all students understand the different river transportation processes as they could see in the maps and diagrams. The teacher teaches the class the load carried by a river is moved downstream in various ways. Solution, suspension, saltation and traction.

**Step II:** The teacher guides the students to explain what they understand by river transportation with examples. The teacher asks the students to list the different types of river transportation as they observe in the maps and diagrams. The students are free to refer to their textbooks.

**Step III:** The students are encouraged through interactions with each other to sort out the differences in the transportation processes of a river- solution and suspension, saltation and traction.

**Step IV:** The students are put in groups to express in their own words the basic points on the topic and to ask each other some questions. The teacher moves round the class to ask

questions and also help the students in answering the questions. For effectiveness and proper class management, a class should not be more than two or three groups.

**Summary**

The processes of river transportation are;

(1) Solution

(2) Suspension

(3) Saltation

(4) Traction

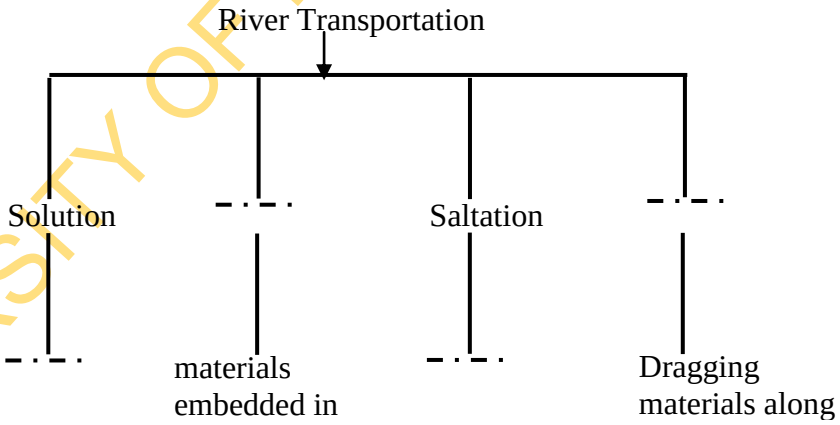
**Evaluation/Exercise**

(1) List the various ways river carry its load downstream.

(2) State the major difference between Solution and suspension, saltation and traction

(3) Describe the processes of saltation or surface creep as a river transportation process.

(4) Complete the following figure;




(5) The teacher asks the students to read up all what they have done on the topic, river transportation and make a complete and comprehensive note.

**Lesson Plan**

**Lesson 14b And 15b**

**Method: Simulation**

**Topic: The Work Of A River**

**Sub-Topic: Land Forms Along The Course Of A River**

**Duration: 40 Minutes**

**Instructional Objectives**

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

(a) List the processes by which land form result along the course of a river

(b) List the course of a river

(c) List the features that are form at each course of a river

(d) Describe the features found at each course of a river.

**Instructional Materials.**

(1) Samples of sands, rocks, pictures, maps, cardboard etc.

(2) Samples of water, mud water, silt water etc.

**Procedure**

**Step I:** The teacher shows the students some pictures, maps and diagrams of all features found at the course of a river. The students have to locate and touch all the spots in the maps to experience what they learning.

The students are encouraged to find out also from their textbooks. The teacher demonstrates the touching and other activities to the students before they take down points in form of questions. Before response from the students, the teacher ensures that they all understand the different river courses and also the features associated with them. The teacher teaches class the course of a river is;

(a) The upper or mountain course or stage

(b) The middle or valley course or stage

(c) The lower or plain course or stage

**Step II:** The teacher guides the student to explain what they understand by river courses with examples. The teacher asks the students to list the different types of river courses as they observe in the maps and diagrams. The students also list the stages or courses of a river and the features at each stage. The students are free to refer to their textbooks.

**Step III:** The students are encouraged through interactions with each other to sort out the differences in the courses of a river. The students observe and practice water flow on a surface like a river.

**Step IV:** The students are put in groups to express in their own words the basic points on the topic and to ask each other some questions. The teacher moves round the class to ask questions and also help the students in answering the questions. For effectiveness and proper class management, a class should not be more than two or three groups.

**Summary**

Land forms at the upper course of a river.

(a) V-shaped valley

(b) Water falls

(c) Rapids

(d) Cataract

(e) River capture

Landforms at the middle course of a river.

(a) V-shaped valley.

(b) Meanders

(c) River cliffs and slip-off slopes

(d) Interlocking spurs

Land forms at the lower course of a river;

(a) Flood plain

(b) Ox-bow lakes

(c) Delta

**Evaluation/Exercise**

(1) List the courses of a river

(2) List with examples the landforms at each course of a river

(3) Describe the landforms at the upper course of a river

(4) List the differences between the middle and lower course of a river

(5) Complete the following statement or fill to gap

(i) Constructive and destructive work of a river is along _____course _____valley is form at the upper course of a river.

(ii) River capture is found at the course of a river

(iii) Ox-bow lake is found at the _____course of a river

(iv) At _____course the valley is being widered as well as deepened.

**Lesson Plan**

**Lesson 16b**

**Method: Simulation**

**Topic: Scale, Bearing And Distance**

**Sub-Topic: Type Of Scale**

**Duration: 40 Minutes**

**Instructional Objectives**

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

(a) List the different types of scale

(b) Describe the different type of scale

(c) Calculate the scale of a given map

(d) State how to use scale to calculate the distance of a given map.

**Instructional Materials.**

(1) Samples of topographical maps, tape, atlas maps

(2) Diagrams, ruler, pencils and cardboard.

**Procedure**

**Step I:** The teacher shows the students some diagrams and drawing of scale. The different calculations of scale and how to convert one scale to another. The students are encouraged to find out from their textbooks. The teacher asks the students to take down note or points inform of questions till after demonstration. Then before response from the students, the teacher ensures that they all understand the different types of scale from the pictures and diagrams.

**Scale:**The scale is the relationship between the size of anything on the map and that of the object it represents. You must have drawn a plan of your classroom and that of the school compound at one stage or another in your geography class. How is this possible. Note that your exercise book is not big enough to contain the actual size of your box and yet you draw your classroom showing possibly the position of the farms, and the teacher's table. This was possible because you drew the room smaller than the actual size. Assuming your classroom is 12m long 6m wide, these measurements are too big for exercise book. Then scale comes in to help. If we draw a line 1cm long to represent 1m then the classroom plan will be 12cm by 6cm. The result gives us a plan of the classroom drawn to scale. The scale therefore shows the relationship between the size of the classroom on the plan and the actual size on the ground.

**Summary:**

A scale may be indicated by one of three methods.

(1) By a statement, e.g. 2cm represent 1km or 100m as the case may be on the actual ground.

(2) By a representation fraction (abbreviated E.F.) e.g. 1/50,000 or 1:50,000.

Note that the numerator, which must always be one unit stands for the distance on the ground. In example given, the scale is 2cm to 1km since there are 100,000cm to a kilometer. This method is very useful as it is international and can be understood in any country.

If we give a number of kilometers to a centimeter and are asked to find the representative fraction, we should multiply 100,000 by the number of kilometer given. This gives the denominator. The R.F. will be one over the denominator.

For Example:

To find the R.F. for a scale of 2km to 1cm.

1/100,000 x 2 = 1/200,000 or 1:200,000.

If on the other hand, we are given the R.F. and asked to express it as kilometers to the centimeter, we divide the denominator by 100,000, e.g.: to express the R.F., 1:500,000 as is statement:

500,000/100,000 = 5

Answer = 1cm to 5km.

(3) By a linear scale or scale bars,

**Linear scale or scale bar**.

A linear scale means a line scale. It is a straight line drawn as shown above to help in finding out the distance on the map. It is a kind of ruler.

In the example given above any distance as long as this scale on the map is 6 kilometers on the ground. Each large divisions on this line represents 1 kilometer. There

are four such divisions to the right of 'o' and one to the left of it. Km at the end of the line shows that the large divisions represent kilometers and m at the left shows divisions into 100m sections. We must observed that the figure 'o' is written at the end of the first division.

The part to the left of the 'o' is divided into smaller units. In this case, it is divided into ten smaller units.

The smaller unit makes it easy to find out more exact distances on the map. If the distance between two points extend as far as two large divisions on the scale, the points extends as far as two large divisions on the scale, the points are 2 kilometers apart on the ground. Whenever, the distance between two points extends to more than a whole number of kilometers, the extra part can be read off at once with the aid of the sub-divided part.

**Step II:** The teacher guides the students to explain with examples types of scale. The teacher asks the students to list from their observations the different scales. The work will be done by referring to their textbooks. The types of scale are as a statement, as a representative fraction and as a linear scale or bar scale.

**Step III:** Students are encouraged through interactions to sort out the differences in the scales. A statement and representative fraction, linear scale and a statement scale.

**Step IV:** The students are put in groups to express their own words the basic points on the topic and to ask each other some questions. The teacher move round each group to ask some questions and also help the students in answering the question for effectiveness and proper class management, a class should not be more two or three groups.

**Summary:** The teacher writes a brief summary on the chalkboard, which students can read further;

**Evaluation/Exercise:**

(a) Complete the statement: There are _____types of scale

(b) List the types of scale you study in the class

(c) Describe the usefulness of scale in map reading and in every day life.

(d) Express the following as statements:

(i) 1:100,000

(ii) 1:50,000

(iii) 1:25,000

(iv) 1:12,500

(e) The teacher instructs the class to read up all they have done on the topic and make a complete and a comprehensive note.

**Lesson Plan**

**Lesson 17 B**

**Method: Simulation**

**Topic: Direction, Bearing And Distance**

**Sub-Topic: Direction And Bearing**

**Duration: 40 Minutes**

**Instructional Objectives**

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

(a) List the way to show direction.

(b) List the cardinal points

(c) State the cardinal direction in the compass points

(d) Describe how to get the bearing of an area

**Instructional Materials.**

(1) Samples of topographical map, globs, picture, ruler and pencil etc.

(2) Cardboard, drawings tape, and compass.

**Procedure:**

**Step I:** The teacher shows the students some pictures of compass and tape. The teacher helps the students to locate all these things in the textbooks.

The students are encouraged to find out from their textbooks. The teacher demonstrates to the students how to recognize direction and position of an area from compass. Then he teaches the students to take down points inform of questions till after demonstration. Before response from the students, the teacher ensures that they all understand the way to draw compass point and know directions.

**Direction:**

Maps show direction. They help us to move from place to place without getting lost.

The direction of one place from another is shown.

(a) By means of cardinal or compass points.

(b) By means of angular bearings.

(c) Compass points:

**Step II:** the teacher guides the students to explain with examples direction and bearing. The teacher asks the students to list from their observations the different ways to calculate bearing. The students listing will be done referring to their textbooks.

**Step III:** The students are encouraged through interactions with other students to sort out the way to draw and calculate bearing; direction and bearing , compass or needle points and bearing.

**Step IV:** The students are put in groups to express in their own words the basic points on the topic and to ask each other some questions. The teacher moves round the group to ask questions and also help the students in answering the questions. For effectiveness and proper class management, a class should not be more than two or three groups.

**Summary**

How to shows the points of the compass.

The cardinal points are East, West, North and South. Halfway between North and East, East and South, South and West, North and West are respectively North-east (NE), South-east (SE), South-West (SW) and North-West (NW). mid-way between North and North-east is NNE (North-north-east) between NE and East is ENE (East-north-east), between East and South-East is ESE (East-South-east), between south and south-west is SSW (South-south-west), between West and South-west is WSW (west-south-west), between West and North-west is WNW ( West-north-West) and between North and North-west is NNW (North-North-West).

When a map is drawn, the direction of North is often indicated by an arrow. However, from this we can tell which the northern part of the map is. This enables us to work out the other directions. When the arrow is not shown on the top and bottom edges of the map lie to the north and to the south.

**Bearings:**

Directions are described giving angular bearings and are given in terms of degrees. Using degrees help to have a more accurate means of stating directions. We always start from the north and move in a clockwise direction. Giving North $0^0$ as it bearing, East $90^0$ and a point due south is $180^0$. Then we have the following:

| **Compass Points** | **Corresponding Angular Bearing** |
|---|---|
| North | $0^0$ or $360^0$ |
| South | $180^0$ |
| East | $90^0$ |

| | |
|---|---|
| West | $270^0$ |
| North – East | $45^0$ |
| North – West | $315^0$ |

At times it is difficult to state the exact direction of one place from another by compass direction. However, such difficulties disappear when degrees are used.

**Evaluation/Exercise**

(a) List the four cardinal points

(b) Draw the sixteen cardinal points

(c) Write out the compass point and three corresponding angular bearing complete it below

| **Compass point** | **angular bearing** |
|---|---|
| North | _____or_____ |
| South | $180^0$ |
| _____ | $90^0$ |
| West | _____ |
| North-East | $45^0$ |
| _____ | $315^0$ |

**Lesson Plan**

**Lesson 18 B**

**Method: Simulation**

**Topic: Direction, Bearing And Distance**

**Sub-Topic: Direction And Bearing**

**Duration: 40 Minutes**

**Instructional Objectives**

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

(a) List the various way of how to ensure distance

(b) Describe the way to measure distance

(c) Calculate the distance between two points in a map

(d) Differentiate between the various way how to calculate distance.

**Instructional Materials.**

(a) Samples of topographical map, atlas, globs, pictures, thread, metre rule, pencils.

**(b)** Samples of cardboard, diagram, ink etc.

**Procedure**

**Step I:** The teacher shows the students some pictures or photographs and diagrams of how to measure distance. The students are encouraged to find out from their textbooks. The teacher demonstrates to the students how to measure distance on the ground. The teacher asks the students to take down points inform of questions till after the demonstration. Before response from the students, the teacher ensures that they all understand the feature in the maps and diagrams.

**Distance:**

In the early party of this lesson, we learnt that a scale shows the relationship between a distance on a map and the actual distance on the ground. So a good knowledge of scale is essential in the measurement of distance on a map.

**Step II:** The teacher guides the students to explain with examples. The steps to measure distance. The listing will be done from the students textbooks.

**Step III:** The students are encouraged through interactions with other students to sort out the differences in distance measurement. The students are free to refer to their textbooks.

**Step IV:** The students are put in groups so as to interact and share ideas. The students ask some questions from the teacher. The students are free to help the teacher in answering the questions.

**Summary:**

To measure the distance between two points, A and B on a map two things must be considered. These are whether we are finding;

(iii) A direction distance between the two points that is as the crow flies or

(iv) Whether we are finding distance along an irregular course, for example along a river or road. Where the distance is direct, we have only to use a ruler, a pair of dividers or a straight edge of paper and measure the distance between the two points, then transfer it to the scale.

However, after measuring a distance on the map and then using either the R.F. or the linear scale we give the answer as kilometers and decimal fractions of a kilometers. If a linear scale is used, we calculate the distance as explained earlier when we discussed linear scale. Where the distance to be measured is an irregular one, for example a winding road or a river, it is best to use a piece of thread. With it we can follow the curves of the

road and the bends in the river. We then transfer all the thread we have used to the scale and read off the distance.

**Using the representative fraction:**

Where the linear scale is not given on the map, we must use the representative fraction to calculate distance. It is useful to know that an R>F. of 1:50,000 on a metric scale means 2cm represent 1km

E.g. Assuming you want to calculate the distance between two points A and B on a map with a scale of 1:50,000. The distance between A and B on the map is 18cm.

Then the actual distance on the ground is

18 x 50,000/100,000 = 9km

Or

18cm on a metric map with a scale of 1:50,000 will be 18/2km = 9km

**Evaluation/Exercise:**

(1) List the different ways of measuring distance

(2) List the items use in measuring distance between two points on a map

(3) Calculate the distance of a point A and B with distance apart in the map 15m and a scale of 1:50,000.

(4) Choose the correct answer from the following 10cm on a metric map with a scale of 1:50,000 will be;

(a) 50 x 2km = 100km

(b) 10 x 2km = 20km

(c) 10/2km = 5km

(d) 50,000 x 2km = 100,000km

(e) The teacher ask the students to read up

**Lesson Plan**

**Lesson 19 B**

**Method: Simulation**

**Topic: Relief, Contours And Their Forms**

**Sub-Topic: Relief Representation**

**Duration: 40 Minutes**

**Instructional Objectives**

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

(a) List the various ways to show relief features

(b) List the type of relief features

(c) State the different relief in topographical map

**Instructional Materials.**

(a) Samples of topographical maps, picture, thread, graph and pencils.

(b) Samples of cardboard, diagrams, colours.

**Procedure**

**Step I:** The teacher show the students some pictures and diagrams of relief features. The students are made to locate the areas on the topographical maps where the features are located. The teacher go round the class to make sure the students locate areas of spot heights, contours etc.

The students are encouraged to find out from their textbooks. Before response from the students, teacher demonstrates to the students how to recognize relief features. Teacher ensures that all the students understand the method to recognize relief features.

The surface of the earth is not all on the same level. The surface changes in shape and height from one place to another. Some parts higher than others. This difference in height is what we call relief. Knowledge of relief helps us to understand and explain

various facts in physical and human geography. A relief map for instance help us to understand why people live in one place and not in another or why a certain road should follow a particular course and not another.

**Step II:** The teacher guides the students to explain with examples the different relief features. The listing of the relief features will be done by the students by referring to their textbooks. The teacher goes around the class to ensure that the listing is well done.

**Step III:** The students are encouraged through interaction with other students to sort out the relief features and study their differences.

**Step IV:** The students are put in groups to express in their own words the basic points on the topic and to ask each other some questions. The teacher move round the class to ask some questions and also helps the students in answering the questions. For effectiveness and proper class management a class should not be more than two or three groups.

**Summary**

Various methods are used to show relief on a map. These are:

**(1) Spot Heights:**

These are shown with data which have certain figure beside them. E.g. 500 .260. These means that the height of the ground at these dots is 500m and 260m above sea level respectively.

**(2) Contours:**

A contour is a line draw on a map to join places of equal height above sea level. Thus a 200m contour line joins all places which are 200m above sea level. The land above it is over 200m while the land below it is lower than 200m.

Contours show not only the height and the slope but also the form of the land. Isohyp (equal height) is another word for contour.

**(3) From-Line:**

These are used where the land has not accurately surveyed. They are very much like contour and they are mere approximations of heights. They are printed in broken lines.

**(4) Hachure:**

These are short lines drawn on a map to show the direction which water would take when flowing from high to low ground. If the slope are steep the lines are thick and close together. On gentle slopes they are thin and wider apart while flat ground is not shade at all.

**(5) Hill Shading:**

Hill shading helps to give an impression of the form of the line without giving actual heights. Hill shading is usually done in colour, brown or grey, and it appears that a light is shining from the north-east corner of the map.

**(6) Layer tints:**

On physical maps tints or different shades of colour are used to denote land between two different heights. Usually green is used for lowlands, brown for high, pink for very high land and finally white for mountains. The colouring makes it possible to see the distribution of high and low land at a glance.

**Contours:**

A contour line is drawn on a map to represent a certain definite height on the land, and it separates all land above that height from the land below that height. Along 100m contour for example, the land is everywhere precisely 100m in height above sea level.

However, there are terms we need to know before studying a detailed study of contours and their forms.

**(1) Ordnance Survey (O.S.):**

This is an accurate and detailed geographical survey made for the government by the survey department. When the survey has been made they produce ordance survey maps or ordnance map.

**(2) Sea Level:**

This is the average height between high and low tide or the line where land and sea meet. It is also referred to as the Datum level or ordnance Datum (O.D). From this all heights are calculated. It is marked zero on the map.

**(3) Vertical Interval (V.I.):**

This is the difference between two heights on a map. For example, if a spot 'A' is 100m high and 'B' is 25m high, the vertical interval is 150m.

**Evaluation/Exercise:**

(1) List the various methods that are use to show relief on a map.

(2) State how relief could help us to explain various fats in physical and human geography.

(3) List the major differences between contours and spot height.

(4) List the four reasons why contours are used and is most effective way of showing relief

(1)_____

(2)_____

(3)_____

(4)_____

**Lesson Plan**

**Lesson 20 B**

**Method: Simulation**

**Topic: Relief, Contours And Their Forms**

**Sub-Topic: Relief Representation**

**Duration: 40 Minutes**

**Instructional Objectives**

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

(a) List the different relief features.

(b) List the differences between the relief features

(c) Describe the relief features on topographical maps

(d) List the factors that create these features on the earth surface.

**Instructional Materials.**

(a) Samples of topographical maps, thread, pencils, picture and graphs

(b) Samples of diagrams, cardboard, colour etc.

**Procedure:**

**Step I:** The teacher exhibit some photographs and drawing of relief features: The students locate these features on the topographical maps

The students are encouraged to find out from their textbooks. The teacher demonstrates to the students using papers and the cardboard drawing as examples. The teacher asks the students to take down points in form of questions till after the demonstration. Before response from the students, the teacher ensures that they understand the different features as shown in the maps and diagrams.

**Step II:** The teacher guide the students to explain all the features with examples as shown on the topographical features. The teacher asks the students to list from their observations, the different topographical features. The listing will be done from their textbooks.

**Step III:** The students are encouraged through interactions with other students to sort out the differences in the features. These features are contour forms, gradual and steep slope, conical hills, spur and valley. The students are free to refer to their textbooks.

**Step IV:** The students ask some questions form the teacher. The students are put in groups so that they have the opportunity to interact well and learn from each other. The students are free to help each other and the teacher in answering the questions.

**Summary:**

(4) Contour Forms.

On the earth surface we pass over hills and valleys, plains and plateau. However, some of the hills may be difficult to climb and if we were cycling we would be forced to walk up them. Others present no difficulty. In descending a hill, the difficulty varies with the steepness of the hillside or valley.

Contour lines sometimes approach each other gradually, i.e. at an equal distance apart. In such a case the slope is uniform. It is also said to be gradual or gentle.

When contour lines approach each other sharply, i.e. when they are very close together, the slope is steep.

A gradual slope A steep slope.

**(5) A conical peak:**

Here the contours are more or less concentric with two or more ring contours. The hill which may be isolated usually stands out of relatively level land. In this case, the ground rises towards the centre, which often shows a rounded top. However, the summit of a peak is represented by a ring contour with no other contour inside it.

A conical peak.

**(6) A Saddle, Pass or Col:**

This is a gap or opening between hills. It is represented by at least one contour surrounding the contours indicating the hills. The term saddle is restricted to an opening between hills. While 'pass' or 'col' is used for one between higher lands. Saddle affords the easiest passage across the hills.

A model and a representation in contour of a saddle.

**(7) A spur and a valley:**

A spur is sometimes shown as a 'v' and a valley as an inverted 'v'. However, they can be shown in exactly the same way. What always decides which is the numbering? In a spur the numbering increases from the outside inwards while the exact opposite in the case in a valley. To put it in another way, the apex of the v in the spur points towards low land and that of the valley points towards highland.

**Evaluation/Exercise:**

(1) List the different types of topographical features.

(2) Differentiate between a spur and valley

(3) Label the features below;

(4) The Teacher asks the students to read up all what they have done on the topic; relief representation and make complete and comprehensive note.

**Lesson Plan**

**Lesson 21 B**

**Method: Simulation**

**Topic: Relief, Contours And Their Forms**

**Sub-Topic: Relief Representation**

**Duration: 40 Minutes**

**Instructional Objectives**

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

(a) List the topographical features in this lesson

(b) State the differences between the topographical feature

(c) Draw the diagrams of these topographical features

(d) State the differences between convex and concave slope.

**Instructional Materials.**

(a) Samples of topographical features, pencil, colour, ruler and pictures

(b) Samples diagrams, cardboard, thread and pins

**Procedure:**

**Step I:** The teacher shows the students and explains to them the term relief representation. The students locate these features on the maps as they are able to recognize them on the map.

The students are encouraged to find out from their textbooks. The teacher demonstrates to the students to take down points in form of questions. Before response from the students the teacher ensure that they all understand the different features as in the topographical maps.

**Step II:** the teacher guides the students to explain the features. The teacher asks the students to list the different features as they observe them in the maps. The students are also free to refer to their textbooks for more detail.

**Step III:** The students are encouraged through interaction with other students to sort out the differences in the topographical features like convex and concave slopes.

**Step IV:** The students are put in groups to express in their own words the basic points on the topic and to ask each other some questions. the teacher moves round the class to ask questions and also helps the students in answering the questions. For effectiveness and proper management, a class should be more than two or three groups.

**Summary**

**Convex Slope:**

A slope is convex if the contours are first close together and then widen as the land rises. As shown in  the slope is accidently steep at first, but it becomes more gentle on higher round.

**Concave Slope:**

A slope is concave if the contours on the lower section of the land are more widely spaced, but they come closer together as higher ground is reached. The higher section of the slope is steeper.

**A ridge:**

This is a long narrow hill and is represented by oval-shaped contour lines. When it is of considerable height it is called a ‘range’ hence we have a range of mountains.

**An Escarpment:**

A ridge is when one side slopes gently while the opposite side slope steeply. The side is known as the scarp slope or scarp. The long and gentle slope on the opposite side is usually called dip slope.

A model to show a scarp slope and a dip slope.

**An Undulating Region:**

A plain or region with no steep slopes but with the land rising and falling evenly is described as undulating.

Contours representing Undulating land.

**An Isolated Hill:**

A hill which, as the name implies, stand isolated or apart from the rest of the highlands in the region.

**Evaluation/Exercise**

(1) List the different types of relief features in this lesson

(2) List the major differences between concave and convex slopes

(3) State with diagrams and good examples the major difference between undulating region and isolated hill.

(4) Complete the following statements:

(a) The apex of a _____points towards low land while that of a _____points toward highland.

(b) The easiest place to cross a mountain is through a _____

(c) It is easier to reach the crest of a ridge from the _____than from the slope, although the mean a longer journey.

**Lesson Plan**

**Lesson 22 B**

**Method: Simulation**

**Topic: Section,Gradient And Intersivibility**

**Sub-Topic: Drawing A Cross Section**

**Duration: 40 Minutes**

**Instructional Objectives**

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

(a) Draw a cross section using graphs

(b) State the functions of a sectional drawing

(c) Describe the features that are expose by section drawing

**Instructional Materials.**

(1) Samples of topographical maps, graph sheet, pencils, eraser, cardboard etc.

(2) Samples of diagrams, pictures, colour etc.

**Procedure**

**Step I:** The teacher shows the students some areas in the topographical map and in the pictures where section can be drawn. The students are encouraged to find out from their textbooks. The students locate areas on the map and note how to draw out properly. The students are encouraged to find out from their textbooks. The teacher demonstrates to the students and asks the students to take down points in form of questions. Before response from the students, the teacher ensure that they all understand the term and the different processes that are involved in drawing a cross section.

**Step II:** The teacher guides the students to explain the term with examples. The teacher asks the students to list all the steps involved in the drawing. The students are free to refer to their textbooks.

**Step III:** The students are encouraged through interactions with each other to sort out the differences that may arise in the drawing. The students carry out the drawing by immitating the teachers own on the cardboard

**Step IV:** The students are put in groups to express in their own words the basic points on the topic and to ask each other some questions. The teacher move round the class to ask some questions and also to help the students in answering the questions. For effectiveness and proper class management, a class should not be more than two or three groups

**Summary**

A section shows contours as an elevation. Section enables a person to visualized the shape and nature of the land. When a section is drawn, we imagine what the region would look if we were to travel in a straight line from one spot to another. In drawing a section, it is always wise to choose a scale. This scale is known as the Vertical Scale (V.S) or scale of Height and is always highly exaggerated, unlike the horizontal scale. Care should be taken when choosing the vertical scale so as not to give a fantastic notion of the landscape. Suggested scales are 2mm or 3mm to represents the vertical interval.

**Section Line:**

This is a straight line which joins the two points on a map between which a section is to be drawn.

How to draw a section.

(A)

(B)

V.S 2mm=100m

Method of drawing a section.

(g) Draw a section line X to Y.

(h) Lay a straight edge of paper along the section line.

(i) Mark on it the points where the section line crosses the contours with their appropriate heights.

(j) Where the section line crosses the same contour line consecutively, make a mark or to indicate a highland or depression respectively.

(k) Transfer the paper to the horizontal lines and mark off the heights with dots on the horizontal lines which correspond to them.

(l) Join up the dots and complete the sectional.

**Evaluation/Exercise**

(a) List the steps involve in drawing a cross section

(b) Describe a cross section

(c) Differentiate between a section and intersivibility

(d) Describe intersivibility

(e) List factors on a contour map would help you to know whether two places are intervisible;

(1)_____

(2)_____

(3)_____

(4)_____

**Lesson Plan**

**Lesson 23 B**

**Method: Simulation**

**Topic: Section, Gradient And Intersivibility**

**Sub-Topic: Gradient**

**Duration: 40 Minutes**

**Instructional Objectives**

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

(a) List the steps involve in calculating gradient

(b) Calculate the gradient of a landscape between two points

(c) State the reasons for calculating gradient

**Instructional Materials.**

(1) Samples of topographical maps, graph sheet, pencils, eraser, cardboard etc.

(2) Samples of diagrams, pictures, colour etc.

**Procedure**

**Step I:** The teacher shows the students paper where gradient have been calculated. The teacher mark and locate areas in the map where gradients can be calculated.

The students are encouraged to find out from their textbooks. The teacher demonstrates how to calculate gradients to the students before they take down points in form of questions. Before response from the students, the teacher ensures that they all understand the different steps involve in the calculation.

**Step II:** The teacher guides the students to explain what they understand by gradient. The teacher asks the students to list the different steps in calculating gradient. The students are free to refer to their textbooks.

**Step III:** The students are encouraged through interactions with each other to sort out the difference that may arise in calculating gradient.

**Step IV:** The students are put in groups, to create opportunity for interactions and to express in their own words the basic point on the topic and to ask each other questions. The teacher move round the class to ask questions and also helps the students in answering the questions. The groups were just two for proper class management.

**Summary:**

Gradient in contour refers to the slope of the land. We learnt earlier that when contour lines are close together the slope is steep. Similarly when they are farther apart slope is gradual. Gradients are always expressed as fractions with one unit as the numerator.

To find the gradient between two points on the map we must know

(c) The heights of the two places;

(d) The horizontal distance between them.

The gradient then is the difference between the two heights divided by the distance between them. In other words it is the vertical interval (V.I) over the horizontal equivalent (H.E.).

**Example:**

Find the average gradient between two towns, A and B, whose heights above sea level sea level are 120 and 370 respectively.

The distance between the two towns is 10km.

Height at town A … 120m

Height at town B … 370m

Difference between the height, i.e. V.I 250m

Difference between the two towns. i.e. H.E. = 10km

:. Gradient = V.I./H.E. = 250/10,000 = 1/40

We read this as one in forty. This means that there is a rise of 1m for every 40m covered.

**Evaluation/Exercise**

(a) List the steps involve in the calculation of gradient

(b) State the major difference between vertical interval and horizontal equivalent

(c) Describe the various areas one can use or apply gradient

(d) List two each of the practical use of gradients to the following

(a) Tourist (1) _____

(2)_____

(b) A road engineer (1)_____

(2) _____

(c) A geologist (1)_____

(2)_____

**Lesson Plan**

**Lesson 24 B**

**Method: Simulation**

**Topic: Section, Gradient And Intersivibility**

**Sub-Topic: Intersivibility**

**Duration: 40 Minutes**

**Instructional Objectives**

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

(1) State whether one place is visible form another place in the same landscape

(2) State from the graph whether an area is concave slope or is convex slope

(3) List the intervening obstacles between two places on the map as shown in the graph

**Instructional Materials**

(1) Samples of topographical maps, pictures, globes and cardboard.

(2) Samples of diagrams, ink pencils ruler and eraser.

**Procedure**

**Step I:** The teacher shows the students some pictures, maps and diagrams of all features to recognize all the steps to draw a section that expose the landscape. The students locate the features and touch all the points in the map as a mark of recognizing and understanding the topic.

The students are encouraged to find out from their textbooks. The teacher demonstrates how to draw a section, to expose the landscape to the students, before they take down points in form of questions. Before response from the students, the teacher ensures that they all understand all the steps involve in intersivibility.

**Step II:** The teacher guides the students to explain what they understand by intersivibity. The teacher asks the students to list all the stages involve in intersivibility. The students are free to refer to their textbooks.

**Step III:** The students are encouraged through the interactions with each other to sort out the difference between intersivibility and cross section

**Step IV:** The students are put in groups to express in their own words the basic points on the topic to ask each other some questions. The teacher moves round the class to ask questions and also help students in answering the questions

**Summary**

**Intersivibility:**

When reading a map, it is a help know whether one place is visible from another. This can be found out by;

i) An examination of the contours and the types of slopes concerned. The slope may be even or uniform, convex or concave. In an even slope the contour lines are of equal distance apart. The contours of a convex slope are close together at the lower level but get farther apart as one ascends the slope. A concave slope has the contour lines closer together at the higher level but wider at the base. XY is concave while YZ is convex.

When the slope is convex, as in YZ the top of the hill is not visible from the foot of the hill. But, when it is concave, as in XY the top is visible from the bottom.

However, it is important to know whether there is intervening obstacles between two positions on a map. A place is visible or invisible depending on whether there is or not an intervening obstacle. This obstacle is created by land in form of hill.

**Evaluation/Exercise**

(a) List the steps to know whether there is or are there intervening obstacles in a map between two towns in a map.

(b) State the various ways to draw the graph the expose contours showing concave and convex slope.

(c) Complete the following:

(i) When contour points towards the highland, the slope is _____

(ii) When contour points towards the lowland, the slope is _____

(iii) When contours are close together at the bottom of the mountain , the slope is _____

(iv) When contours are close together at the top of the mountain and space below, the slope is _____

## Appendix D

**Lesson Plan**

**Lesson 1c And 2c**

**Method: Expository Strategy**

**Topic: Tectonic Processes On Landforms**

**Sub-Topic: Earth Movement-Faulting.**

**Duration: 40 Minutes**

**Instructional Objectives**

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

(e) List different types of tectonic processes.

(f) Mention different types of tectonic processes

(g) State the landforms that are formed from tectonic processes.

**Procedure**

**Revision:** The teacher asks the following questions from the previous lesson.

(2) What is a sedimentary rock?

(3) With the aid of diagrams, explain the difference in appearance and formation of sima and sial.

(4) For each of the following:

(i) a residual mountain

(ii) a structure of the earth

(a) Draw a simple diagram to show its characteristics features

(b) Explain its origin

(c) Name and locate a region where such a feature may be found.

**Presentation**

**Step I:** The feature introduces the topic by explaining what is earth's and what are faulting, folding, warping and earthquake, and all that are involved in internal process on landforms. The teacher gives the class a detail explanation and definitions of the concepts.

**Step II:** The teacher writes out a list of what cause fault in the landscape, and classifies faults. The teacher also asks the students to lists the different tectonic process that is caused by earth's movement.

**Step III:** The teacher further lists some other causes and types of fault that can be seen in a landscape. Landscapes produced by fault are a fault scarp, a rift valley, a tilted block and a horst.

A fault is a fracture involving the displacement of the rocks on either side of its relative to one another, in other words, there has been an actual dislocation or movement along the plane of fracture. The movement of the rocks may be vertical or horizontal or a combination of both.

**Classification of faults**

Fault may be classified by the movements which have taken place along them.

(4) Normal Fault: A normal fault is one which has both the heading and the down throw in the same direction. They are product of tension.

(5) A reverse fault may form when rocks of the crust are subjected to forces of compression when lateral earth movements occur. They are also called thrust fault.

(6) A tear or lateral fault may be form when there is a relative horizontal movement of rocks between the two sides of a fault.

**Types of fault**

Landforms produced by fault are a fault scarp, a rift valley, a tifted block and a horst.

**Step IV:** Questions are by the students and the teacher answer the questions. The teacher gives detail answer and normally read from book and notes.

**Summary / Evaluation**

To ensure thorough understanding the teacher builds up chalkboard summary. The teacher ask the students the following questions

(1) Define a fault.

(2) Give examples of fault

(3) Define the following, normal fault, reverse fault and tear fault.

(4) Give examples of each of the fault.

**Assignments:**

In the next lesson, define the following terms:

(a) A rift valley

(b) A horst

(c) Fold mountain

**Lesson Plan**

**Lesson 3c And 4c**

**Method: Expository**

**Topic: Tectonic Processes On Landforms**

**Sub-Topic: Folding**

**Duration: 40 Minutes**

**Instructional Objectives**

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

(a) Mention different types of folding

(b) List the features of folding

(c) Describe the mode of formation of folding

(d) State the mountains that are form as a result of folding.

**Procedure**

**Revision:** The teacher asks the following questions from the previous lesson.

(a) What is fault?

(b) With good diagram describe a fault

(c) List types of fault and give the characteristic feature of one

**Presentation**

**Step I:** The teacher introduces the topic by explaining what is folding and the associated features. The teacher defines the term with further explanation.

**Step II:** The teacher writes out a list of what causes folding. That folding is caused by forces of compression and tension acting on crustal rocks. The teacher asks the students where folding can be seen faces of cliffs, roads and railway cuttings.

**Step III:** The teacher further lists some of the various types of folding; simple folding, asymmetrical folding, over fold, recumbent folding and over thrust fold.

The folding of rock is a slow process which takes place over a considerably long period of many thousands of years. Over such a period of time, different types of fold may be formed, depending on the intensity of the forces in action.

**Types Of Folding**

(a) Simple folding

(b) Asymmetrical folding

(c) Over fold

(d) Recumbent anticline

(e) Over thrust fold

There are three simple geometrical forms of folding:

(1) Where the strata are bent upwards into a symmetrical upfold, called an anticline

(2) Where the strata are bent downwards in a symmetrical manner to form a syncline

(3) Where horizontal beds dip and then flatten out again, forming a simple flexure known as a monocline.

**Step IV:** Questions are asked by the students and the teacher answers the questions. The teacher gives detail answers and normally reads from textbook and note.

**Summary/ Evaluation**

To ensure thorough understanding and build up the chalkboard summary, the teacher ask the students the following questions.

(1) Define fold mountains or folding

(2) Give examples of folding

(3) List types of fold mountains

(4) Give example of each of the folding

**Assignment:**

In the next lesson define, volcanic mountain and volcanic rock.

**Lesson Plan**

**Lesson 5c And 6c**

**Method: Expository**

**Topic: Tectonic Processes On Landforms**

**Sub-Topic: Vulcanicity Or Vulcanism**

**Duration: 40 Minutes**

**Instructional Objectives**

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

(a) List the types of volcano

(b) Describe the features of volcano

(c) Explain the formation of volcano

(d) Draw the diagram of types of volcano

(e) List the different between acid lava and basic lava.

**Procedure**

**Revision:** The teacher ask the following questions from the previous lesson

(1) Describe any type of fold mountains.

(2) Explain the features of folding

(3) List the differences between simple fold and over fold lava

(4) Draw a simple diagram to show the characteristics features of

(a) Asymmetrical Fold

(b) Over thrust Fold.

**Presentation**

**Step I:** The teacher introduces the topic by explaining what is volcanism and volcanic features. The teacher gives the class a detail explanation and definitions of concepts.

**Step II:** The teacher writes out a list of what causes volcanism and the different types of fold mountains. Volcanoes are cinder cones, composite cones, caldera, shield volcanoes or lava cones.

**Step III:** The teacher further lists some of the various types of volcanic mountains and their associated features.

Volcanoes are mountains or conical hills with craters form by folding and compression or by uplift or erosion as in the case of ordinary mountains. They are built up by the accumulation of their own eruptive product e.g. lava, bombs, ash and dust.

**Types Of Volcano**

(1) Cinder Cones: These are the simplest type of volcano. They result from the explosive eruptions and ejection of a wide range of materials – cider, ash, rock fragments and Lava bombs.

(2) Composite Cones: These have formed some of the greatest mountains of the earth. They are built of alternating layers of lava flows, volcanic ashes and cinders through several vents on parasitic cones

(3) Caldera: When a composite cone explodes, its top blown off and disintegrates into a mass of rock bombs and ashes. The outer would then become greatly enlarged to form a huge depression known as caldera.

(4) Shield volcanoes or Lava cones: These built entirely of basic lava flows which poor out in different directions from a centre vent or group of vent. The lava accumulates to build broad, gently sloping cones with slightly convex sides.

(5) Lava domes: These are built up of very viscous or pasty lava which extrude very much like tooth paste from tube. They are steep sided, convex, viscous acid lava around the vent.

**Step IV:** Questions are asked by the students and the teacher answers the questions. The teacher gives detail answers and normally reads from textbook and note.

**Summary/Evaluation**

To ensure thorough understanding and building up the chalkboard summary, the teacher ask the students the following questions.

(1) What are acid lava and basic lava?

(2) List the basic difference between basic lava and acid lava

(3) State the characteristics of composite cone

(4) With good diagram list, the basic features of a caldera

**Assignment**

(1) In the nest lesson; define and explain the shield volcano and cinder cones.

(2) Define the processes of denudation.

**Lesson Plan**

**Lesson 7c And 8c**

**Method: Expository**

**Topic: External Processes Of Landforms**

**Sub-Topic: Denudation**

**Duration: 40 Minutes**

**Instructional Objectives**

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

(a) List the processes that are involve in denudation

(b) List the phases of denudation

(c) Explain the phases or stages of denudation

(d) Differentiate between weathering and erosion, transportation and deposition.

**Procedure**

**Revision:** The teacher asks the following questions on the previous lesson.

(1) What is volcanism?

(2) Describe the mode of formation of volcanic mountain

(3) List the major difference between lava cones and calderal

(4) Differentiate a caldera lake form ordinary lake

**Presentation**

**Step I:** The teacher introduces the topic by explaining what denudation is, and what are weathering, erosion, transportation and deposition. The teacher teaches the class through a detail explanation and gives all the definitions.

**Step II:** The teacher writes out a list of the processes that are involved in denudation. The teacher writes and explains on the chalkboard the processes; weathering → erosion → transportation → deposition → denudation

**Step III:** The teacher further lists all the processes that take place at each phases of denudation. thus;

Denudation is the wearing away of the land by various natural agencies the sun, the wind, the rain, frost, running water, moving ice and the sea. The processes are carried out in four phases via;

(1) Weathering: The gradual disintegration of rocks by atmospheric or weather forces.

(2) Erosion: The active wearing away of the earth's surface by moving agents like running water, ice, wind and waves.

(3) Transportation: The removal of the eroded debris to new positions.

(4) Deposition: The dumping of the debris in certain parts of the earth, where it may accumulate to form rocks.

The four phases of denudation depend on the nature of the following:

(a)Relief of the Land

(b)The structure of the rocks

(c)The local Climate and

Interference by man.

**Step IV:** Questions are asked by the students and the teacher answers the questions. The teacher gives detail answers and normally read textbook and note.

**Summary/Evaluation**

To ensure thorough understanding and build up the chalkboard summary, the teacher asks the students the following questions.

(1) List the various natural agencies in denudation.

(2) List and describe the phases of denudation

(3) State the differences between weathering and erosion.

(4) State the differences between transportation and deposition.

**Assignment**

In the next lesson define the following;

(a) Weathering

(b) Erosion

(c) Deposition

**Lesson Plan**

**Lesson 9c And 10c**

**Method: Expository**

**Topic: External Processes Of Landforms**

**Sub-Topic: Weathering**

**Duration: 40 Minutes**

**Instructional Objectives**

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

(a) List the factors controlling the rate of weathering

(b) State the different types of weathering

(c) List the differences between the types of weathering

(d) State the major chemical weathering processes

(e) Describe the different ways mechanical weathering takes place.

**Procedure**

**Revision:** The teacher asks the following questions from the previous lesson.

(1) Define the term denudation

(2) Describe the various natural agencies in denudation

(3) List the differences between weathering and erosion

(4) List the different ways erosion carry its load

(5) State the differences between transportation and deposition

**Presentation**

**Step I:** The teacher introduces the topic by explaining what is weathering. The teacher teaches the class the meaning of weathering and gives the definition.

**Step II:** The teacher writes out a list of processes that are involved in weathering. The teacher writes and explains on the chalkboard. Weathering takes place in different forms; Mechanical, or Physical, Chemical and biological.

**Step III:** The teacher further lists all the factors that are responsible for weathering and the different processes that are involved in weathering. The chalkboard account thus;

Weathering itself is the disintegration and decay of solid rock and is caused by climatic factors. Weathering is majorly of three types;

(d) Physical or Mechanical Weathering,

(e) Chemical weathering

(f) Biological weathering

**Physical or Mechanical Weathering**

The processes of physical weathering are

(f) Pressure-release (unloading) Pressure-release is due to unloading of rocks. Rocks are removed and expansion of exposed rocks take place.

(g) Crystallization (freeze-thawing and salt crystals). This refers to the growing of crystal by freezing water which exerts weight (due to fall in temperature) and melting (thawing) due to rise in temperature.

(h) Thermal expansion and contraction or temperature changes

(i) Colloidal plucking

(j) Plants and animals.

**Chemical Weathering**

This type of weathering include

(e) Hydration. This is the process whereby some rock minerals take in water and expand.

(f) Hydrolysis: This is the process whereby feldspar (important mineral in igneous rocks) changes or weathers into day after taking in water.

(g) Carbonation: In this process, calcium carbonate takes in water and carbondioxide and eventually changes to calcium bicarbonate.

(h) Oxidation: Mineral rocks when taking additional oxygen, not only change colour but become liable to other weathering activities.

**Biological Weathering**

Plants and animals have the power to extract nutrients from rocks leading to the disintegration of rocks. Animal burrowing and human earth excavation are examples of weathering.

**Step IV:** Questions are asked by the students and the teacher answers the questions. The teacher gives detail answers and normally read textbook and note.

**Summary/Evaluation:**

To ensure thorough understanding and build up the chalkboard summary, the teacher asks the students the following questions.

(1) List the types of weathering

(2) Describe the various ways physical weathering takes place.

(3) List the various chemical weathering processes.

(4) Define biological weathering and state how man is involves in biological weathering.

**Assignment**

In the next lesson define and state the processes that involve in the following

(a) Mass movement or mass wasting

(b) Differentiate between weathering and mass wasting or mass movement

**Lesson Plan**

**Lesson 11c**

**Method: Expository**

**Topic: External Processes Of Landforms**

**Sub-Topic: Mass Movement**

**Duration: 40 Minutes**

**Instructional Objectives**

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

(a) List the different types of mass movement

(b) Describe how forces of gravity and rain-water assist in the mass movement.

(c) Distinguish soil creep from landslides

(d) Locate places where soil creep, solufluction and landslide took place

**Presentation**

**Step I:** The teacher introduces the topic by explaining to the students what mass movement is. The teacher teaches the class the different mass movement and gives the definitions.

**Step II:** The teacher write out a list of all the factors that are responsible for mass movement or mass wasting. The teacher writes and explains on the chalkboard. The main types of mass movement are soil creep, talus creep solufluction, mudflow, rockslides, rock slump and rock fall.

**Step III:** The teacher further lists the processes that take place at each stage of mass movement. The chalkboard note thus;

The movement of weathered materials under the force of gravity is known as mass movement or mass wasting. Such movement may be slow and gradual or sudden, depending on the gradient of the slope, the weight of the weathered debris and whether there is any lubricating moisture supplied by rain water. The sudden movement is often catastrophic in their effects.

Types of mass movement are;

**(1) Soil Creep:** This is the slow, downward movement of soil and fine particles on very gentle slopes.

**(2) Talus Creep:** This is another slow, down slope movement of angular rock fragments of different sizes.

**(3) Mud flow:** This is a rapid type of mass wasting which involves the slumping of semi-liquid mud accompanied with gravel and boulders.

**(4) Landslides:** These take place when large volumes of loose rock boulders, gravel and soil suddenly move with great speed down slope. There are three main types of landslides;

**(a) Rock Slump:** This involves the rotational slumping of large rock debris over underlying week rocks.

**(b) Rock slide:** This involves the sliding of boulders and other debris from steeply dipped scarps or cliffs.

**(c) Rock Fall:** This refers to the rapid fall of individual boulders and rocks from very steep to vertical cliffs.

**Factors Affecting Mass Wasting**

Several factors influence the nature and speed of mass wasting:

(g) Steepness of slopes

(h) Nature of materials

(i) Climatic conditions

(j) Vegetation cover

(k) Human activities

(l) Earthquakes and volcanic eruptions.

**Step IV:** Questions are asked by the students and the teacher answers the questions. The teacher gives detail answers and normally reads textbook and note.

**Summary/Evaluation**

To ensure thorough understanding and build up the chalkboard summary, the teacher asks the students the following questions.

(1) List and describe all types of mass movements.

(2) List with good examples types of landslides.

(3) State the factors which affect mass wasting or movement.

(4) Define mass movement or mass wasting.

**Assignment**

In the next lesson, define and explain the followings

(a) Soil Creep

(b) Rock Fall

(c) The Stages of a river

**Lesson Plan**

**Lesson 12c**

**Method: Expository**

**Topic: The Work Of A River**

**Sub-Topic: Mechanism Of River Erosion**

**Duration: 40 Minutes**

**Instructional Objectives**

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

(a) List the processes of river erosion

(b) Describe the factors which river effectiveness depend upon.

(c) State the various ways river perform its work

(d) Describe river energy, speed and gradation.

**Presentation**

**Step I:** The teacher introduces the topic by explaining to the students what river erosion is. The teacher teaches the class the different ways river does its erosive work.

**Step II:** The teacher writes out a list of the entire different ways river perform its work. The three types of work of a river are carving and eroding its valley; transporting the eroded materials and depositing the transported loads. Teacher writes and explains on the chalkboard thus; the processes of river sculpture include hydraulic action, corrosion or abrasion, solution and attrition.

**Step III:** The teacher further lists the processes of erosive power and give a detail explanation on the chalkboard thus;

The processes of river erosion are

**(1) Hydraulic Action:** This refers to the force of the flowing water in the river which exerts dragging effect upon the bed of the river and erodes poorly consolidated materials, such as sand, silt and clay. The weight and the force of rushing water can dislodge rocks on the river channel.

**(2) Corrosion or Abrasion:** Materials carried in suspension or dragged along the river bed erode the bed as well as the side of the channel. Corrosion is chiefly responsible for the development of pot holes along the upper coarse of the river.

**(3) Solution;** River water, mostly when act is recently replenished by precipitation contain acids which is capable of dissolving some rocks such as limestone along the channel.

**(4) Attrition:** This involves the breaking up of river loads through collision with themselves and mutual wearing.

**Step IV: Q**uestions are asked by the students and the teacher answers the questions. The teacher gives detail answers and normally reads textbook and note.

**Summary/Evaluation**

To ensure clear understanding and building up the chalkboard summary, the teacher ask the students the following questions.

(1) List the processes of river erosion

(2) Describe with examples the major way river perform its work.

(3) Describe the characteristics and factors of river effectiveness.

**Assignment:**

In the nest lesson, define and give the characteristics of the following

(a) Suspension and Traction

(b) Saltation and solution

(c) Hydraulic action and Attrition.

**Lesson Plan**

**Lesson 13c**

**Method: Expository**

**Topic: The Work Of A River**

**Sub-Topic: River Transportation**

**Duration: 40 Minutes**

**Instructional Objectives**

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

(a) List the processes of a river erosion

(b) Describe the various ways river carry its load.

(c) Differentiate the various ways river carry its load.

**Presentation**

**Step I:** The teacher introduces the topic by explaining to the students what is rive transportation. The teacher teaches the students the various ways river transport its load, and also give the type of load carry at each level.

**Step II:** The teacher writes a list of all the various ways the river carry its load downstream. There are four major ways river transport its loads. These are solution, suspension, saltation and traction.

**Step III:** The teacher further lists all the processes of transportation. Also he give list of the types and ways the river carry its load. The chalkboard summary was given thus;

The processes of river transportation are

**(1) Solution:** Water-soluble transported materials like carbonate absorb water and dissolve. They are then carried in form of solution. The solution formed this way is often coloured.

**(2) Suspension:** Transported materials which are not on the river bed are carried in form of suspension. They are embedded in the water.

**(3) Saltation:** Increase in velocity of the water often cause heavy materials to be jerked along the river bed. This method is called saltation or surface creep.

**(4) Traction:** This is the dragging of materials along the bed of the river.

**Step IV:** Questions are asked by the students and the teacher answers the questions. The teacher gives detail answer and normally reads textbook and note.

**Summary/Evaluation**

For thorough understanding and build up the chalkboard summary, the teacher asks the students the following questions.

(1) List the various methods river carry its load downstream.

(2) State the major differences between solution and suspension, saltation and traction.

(3) Describe in detail the process of saltation or soil creep as a river transportation process.

**Assignment**

In the next lesson describe the followings, if possible with diagrams;

(a) Traction

(b) Features of the upper course of a river.

**Lesson Plan**

**Lesson 14c and 15c**

**Method: Expository**

**Topic: The Work Of A River**

**Sub-Topic: River Transportation**

**Duration: 40 Minutes**

**Instructional Objectives**

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

(a) List the processes by which landform result along the course of a river.

(b) List the features that are form at each course of a river.

(c) Describe the features found at each course of a river.

**Presentation**

**Step I:** The teacher introduces the topic by explaining to the students what landforms along the river course are. The teacher teaches the class the different features found at each course of a river.

**Step II:** The teacher write out a list of all the features at each course or stage of a river. The teacher writes and explains on the chalkboard. River courses are divided into three distinct parts or phases; the upper or mountain course or stage, the middle or valley course or stage and the lower or plain course or stage.

**Step III:** The teacher further lists the courses and the landforms at each course. Thus the river courses are

Upper course or mountain course or stage certain landforms are found at this stage: These are V-Shaped valley. At the upper course of a river, there is a steep gradient. Headward erosion is prominent. The speed of the river is greater here. The river flow swiftly and is

said to be engaged in vertical erosion for valley-deeping or side ways erosion. The cross-section of the mountain course is a sharp V-shape.

**Waterfalls:** These are features in which water falls or jumps from higher elevation to lower elevation along the course of a river. There are several causes of waterfalls e.g. where there is sharp and well defined edge to a plateau or the presences of a transverse resistant rocks across the river course.

Rapids are formed when there are minor obstructions along the river course making the river to jerk and flow faster.

Cataract results when the height and volume of water is greater than that in waterfalls.

**Middle course:** This section between the upper and lower course of a river. The work of river here is both constructive and destructive. Instead of the river taking a more direct course, the river begins to swing to form meanders. The valley is being widened as well as deepened. Irregularities on the bed of the river cause meanders. Tributaries are longer and more gentle-flowing. The valley is not as steep as in the upper course. It is more of an open "V" shape.

**The lower course:** The lower course is that part that stretches into the sea. The works are almost entirely constructive and depositional. The river flows slowly and meanders in great loops over wide area. The features formed here are levees, Ox-bow lakes and delta.

**Step IV:** Questions are asked by students and the teacher gives detail answer and normally reads textbook and note.

**Summary/Evaluation**

To ensure thorough understanding and build up the chalkboard summary, the teacher asks the students the following questions.

(1) List the courses or stages of a river

(2) List with good examples the features at each course of a river

(3) Describe the landforms at the upper course of a river

(4) List the major differences between the middle and the lower course of a river.

**Assignment**

In the next lesson, describe and explain with good diagrams the followings

(a) All landforms at the lower course of a river

(b) What is meant by constructive and destructive work of a river at the middle course

**Lesson Plan**

**Lesson 16c**

**Method: Expository**

**Topic: Scale, Searing And Distance**

**Sub-Topic: Types Of Scale**

**Duration: 40 Minutes**

**Instructional Objectives**

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

(a) List the different types of scale

(b) Describe the different types of scale

(c) Calculate the scale of a given map

(d) State how to use scale to calculate the distance of a given map.

**Procedure**

**Revision:** The teacher asks the following questions from the previous lesson.

(1) List the courses of a river

(2) State the functions of a delta and at what stage of the river do you have it.

(3) Describe using your topographical map the usefulness of a river to man.

(4) List the features found at the upper course or stage of a river and differentiate these from those of the lower course.

**Presentation:**

**Step I:** The teacher introduces the topic by explaining to the students the term scale. Types of scale are as a statement, as a representative fraction and as a linear scale. The teacher gives detail explanations.

**Step II:** The teacher write out the processes involved in the calculation and draws types of scale. The teacher also teaches the students all the steps involved in map drawing and way to calculate scale.

Maps are representation or drawing on a flat surface of the whole or part of the earth. Maps are used to show physical, political or any other features on the earth surface.

Map reading is the ability to understand the language of a map. That is ability to recognize the signs and symbols used; to describe a piece of country; to explain how and why it has been developed in a particular way and appreciate the difficulties that such development entail.

**Scale**

The scale is the relationship between the size of anything on the map and that of the object it represents. You must have drawn a plan of your classroom and that of the school compound at one stage or another in your geography class. How as this possible? Note that your exercise book is not big enough to contain the actual size of your school and yet you draw your classroom showing possibly the position of the farms, and the teachers' table. This was possible because you drew the room smaller than the actual size. Assuming your classroom is 12m long 6m wide, these measurements are too big for exercise book. Then scale comes in to help. If we draw a line 1cm long to represent 1m then the classroom plan will be 12cm by 6cm. the result gives us a plan of the classroom

drawn to scale. The scale therefore shows the relationship between the size of the classroom on the plan and the actual size on the ground.

**Methods:**

A scale may be indicated by one of three methods.

(4) By a statement, e.g. 2cm represent 1km or 100m as the case may be on the actual ground.

(5) By a representation fraction (abbreviated E.F.) e.g. 1/50,000 or 1:50,000.

Note that the numerator, which must always be one unit stands for the distance on the ground. In example given, the scale is 2cm to 1km since there are 100,000cm to a kilometer. This method is very useful as it is international and can be understood in any country.

If we give a number of kilometers to a centimeter and are asked to find the representative fraction, we should multiply 100,000 by the number of kilometer given. This gives the denominator. The R.F. will be one over the denominator.

For Example:

To find the R.F. for a scale of 2km to 1cm.

1/100,000 x 2 = 1/200,000 or 1:200,000.

If on the other hand, we are given the R.F. and asked to express it as kilometers to the centimeter, we divide the denominator by 100,000, e.g.: to express the R.F., 1:500,000 as is statement:

500,000/100,000 = 5

Answer = 1cm to 5km.

(6) By a linear scale or scale bars,

**Linear scale or scale bar**.

A linear scale means a line scale. It is a straight line drawn as shown above to help in finding out the distance on the map. It is a kind of ruler.

In the example given above any distance as long as this scale on the map is 6 kilometres on the ground. Each large divisions on this line represents 1 kilometre. There are four such divisions to the right of 'o' and one to the left of it. Km at the end of the line shows that the large divisions represent kilometers and m at the left shows divisions into 100m sections. We must observed that the figure 'o' is written at the end of the first division.

The part to the left of the 'o' is divided into smaller units. In this case, it is divided into ten smaller units.

The smaller unit make it easy to find out more exact distances on the map. If the distance between two points extends as far as two large divisions on the scale, the points extend as far as two large divistions on the scale, the points are 2 killometres apart on the ground. Whenever, the distance between two points extend to more than a whole number of kilometers, the extra part can be read off at once with the aid of the sub-divided part.

**Step III:** The teacher encourages the students to differentiate between these scale. The teacher give a detail of all the processes involve in scale construction,

**Step IV:** Questions are asked by the students and the teacher answer the questions. The teacher gives detail answer and normally reads from books and note.

Summary/Evaluation

To ensure thorough understanding and build up the chalkboard summary, the teacher asks following questions.

(1) What is scale?

(2) List the relationship between scale and map.

(3) Describe the various scale with diagrams.

**Assignment:**

In the next lesson, define the following terms:

(a) Maps

(b) Linear scale

(c) Small Scale

(d) Large scale

**Lesson Plan**

**Lesson 17c**

**Method: Expository**

**Topic: Direction, Bearing And Distance**

**Sub-Topic: Direction And Bearing**

**Duration: 40 Minutes**

**Instructional Objectives**

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

(a) List the ways to slow direction

(b) List the cardinal points of compass

(c) State the cardinal direction in the compass

(d) Describe how to get the bearing of an area.

**Precedure:**

**Revision:** The teacher asks the following question from the previous lesson.

(a) List the types of scale

(b) Describe how linear scale differ from scale as a statement

(c) State how to construct bar scale and how it differ from scale as a fraction.

**Presentation**

**Step I:** The teacher introduces the topic by explaining what is direction and bearing. The teacher defines the term with further explanations.

**Step II:** The teacher writes out a list of the directions and how to construct the cardinal points. That is four cardinal points, and the sixteen cardinal points. The teacher writes out the corresponding angular bearing.

**Step III:** The teacher further lists some of the various types of directions and how to calculate bearing of a place.

**Direction:**

Maps show direction. They help us to move from place to place without getting lost;

The direction of one place from another is shown.

(d) By means of cardinal or compass points.

(e) By means of angular bearings.

(f) Compass points:

**Step IV:** Questions are asked by the students and the teacher answers the questions. The teacher gives detail answers and normally reads from textbooks and note.

**Summary/Evaluation:**

To ensure thorough understanding and build up the chalkboard summary, the teacher asks the students the following question.

(1) List the different way to show direction

(2) Give or write out some compass points with their corresponding angular bearing.

(3) Describe the way to give angular bearing of direction

How to show the points of the compass.

The cardinal points are East, West, North and South. Halfway between North and East, East and South, South and West, North and West are respectively North-east (NE), South-east (SE), South-West (SW) and North-West (NW). mid-way between North and North-east is NNE (North-north-east) between NE and East is ENE (East-north-east), between East and South-East is ESE (East-South-east), between south and south-west is SSW (South-south-west), between West and South-west is WSW (west-south-west), between West and North-west is WNW ( West-north-West) and between North and North-west is NNW (North-North-West).

When a map is drawn the direction of North is often indicated by an arrow. However, from this we can tell which is the northern part of the map. This enables us to work out the other directions. When the arrow is not shown on the top and bottom edges of the map lie to the north and to the south.

**Bearings:**

Directions are described giving angular bearings and are given in terms of degrees. Using degrees help to have a more accurate means of stating directions. We always start from the north and move in a clockwise direction. Giving North $0^0$ as it bearing, East $90^0$ and a point due south is $180^0$. Then we have the followings

| **Compass Points** | **Corresponding Angular Bearing** |
|---|---|
| North | $0^0$ or $360^0$ |
| South | $180^0$ |
| East | $90^0$ |
| West | $270^0$ |
| North – East | $45^0$ |
| North – West | $315^0$ |

At times it is difficult to state the exact direction of one place from another by compass direction. However, such difficulties disappear when degrees are used.

**Assignment:**

In the previous lesson, define and explain the followings

(1) Angular bearing

(2) Compass points

(3) Cardinal point

(4) Magnetic compass

(5) True North

**Lesson Plan**

**Lesson 18c**

**Method: Expository**

**Topic: Scale, Direction, Bearing And Distance**

**Sub-Topic: Measurement Of Distance**

**Duration: 40 Minutes**

**Instructional Objectives**

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

(a) List the various ways of how to measure distance

(b) Describe the way to measure distance

(c) Calculate the distance between two points in a map.

(d) Differentiate between the various way of how to calculate distance

**Procedure:**

**Revision:** The teacher asks the following questions from the previous lessons.

(1) List the various ways to measure distance.

(2) Describe the ways to calculate distance.

(3) Calculate the distance between two points in a map and relate it to actual ground.

**Presentation:**

**Step I:** The teacher introduces the topic by explaining what distance is. The teacher teaches the class through a detail explanation and gives all the definitions.

**Step II:** The teacher writes out a list of the various ways of how to calculate distance. Distance by direct measurement, distance by representative fraction.

**Step III:** The teacher further lists some of various ways to calculate distance. Give a detail account of distance measurement and relates it to actual situation on ground.

**Distance:**

In the early part of this lesson, we learnt that a scale shows the relationship between a distance on a map and the actual distance on the ground. So a good knowledge of scale is essential in the measurement of distance on a map.

To measure the distance between two points, A and B on a map two things must be considered. These are whether we are finding;

(v) A direction distance between the two points that is as the crow flies or

(vi) Whether we are finding distance along an irregular course, for example along a river or road. Where the distance is direct, we have only to use a ruler, a pair of dividers or a straight edge of paper and measure the distance between the two points, then transfer it to the scale.

However, after measuring a distance on the map and then using either the R.F. or the linear scale we give the answer as kilometers and decimal fractions of a kilometers. If a linear scale is used, we calculate the distance as explained earlier when we discussed linear scale. Where the distance to be measured is an irregular one, for example a winding road or a river, it is best to use a piece of thread. With it we can follow the curves of the

road and the bends in the river. We then transfer all the thread we have used to the scale and read off the distance.

Using the representative fraction:

Where the linear scale is not given on the map, we must use the representative fraction to calculate distance. It is useful to know that an R>F. of 1:50,000 on a metric scale means 2cm represent 1km

E.g. Assuming you want to calculate the distance between two points A and B on a map with a scale of 1:50,000. The distance between A and B on the map is 18cm.

Then the actual distance on the ground is

18 x 50,000/100,000 = 9km

Or

18cm on a metric map with a scale of 1:50,000 will be 18/2km = 9km

**Step IV:** Questions are asked by the students and the teacher answers the questions. The teacher gives detail answers and normally reads from textbook and note.

**Summary/Evaluation:**

To ensure thorough understanding and build up the chalkboard summary, the teacher asks the students the following questions.

(1) Define distance in map reading.

(2) List the way to calculate distance along irregular object

(3) Describe how to calculate distance using representative fraction

**Assignment:**

(1) IN the next lesson, define and explain relief.

(2) Describe how to draw contours in topographical map.

**Lesson Plan**

**Lesson 19 C**

**Method: Expository**

**Topic: Relief, Contours And Their Forms**

**Sub-Topic: Relief Representation**

**Duration: 40 Minutes**

**Instructional Objectives**

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

(a) List the various ways to show relief

(b) List the types of relief features

(c) State the different relief features and draw the diagram

**Procedure:**

**Revision:** The teacher asks the students the following questions from the previous lesson.

(1) Explain with diagram how calculate distance in an irregular surface.

(2) Describe how you would calculate distance using the representative fraction.

(3) Calculate the distance between two points A & B with 20m apart on a scale of 1:50,000.

**Presentation:**

**Step I:** The teacher introduces the topic by explaining what relief features are. Relie feactures are spot height, contours, form line, hachives. The teacher teaches the classs through a detail explanation, and gives all the definitions of these features.

**Step II:** The teacher writes out a list of all these features and explains them to the students with their diagrams.

**Step III:** The teacher further lists some other features with the diagrams and describe how they can be recognized on the landscape. These features are

The surface of the earth is not all on the same level. The surface changes in shape and height from one place to another. Some parts higher than others. This difference in height is what we call relief. Knowledge of relief helps us to understand and explain various facts in physical and human geography. A relief map for instance helps us to understand why people live in one place and not in another or why a certain road should follow a particular course and not another.

Various methods are used to show relief on a map. These are:

**(1) Spot Heights:**

These are shown with data which have certain figure beside them. E.g. 500 .260. These means that the height of the ground at these dots is 500m and 260m above sea level respectively.

**(2) Contours:**

A contour is a line draw on a map to join places of equal height above sea level. Thus a 200m contour line joins all places which are 200m above sea level. The land above it is over 200m while the land below it is lower than 200m.

Contours show not only the height and the slope but also the form of the land. Isohyp (equal height) is another word for contour.

**(3) From-Line:**

These are used where the land has not accurately surveyed. They are very much like contour and they are mere approximations of heights. They are printed in broken lines.

**(4) Hachure:**

These are short lines drawn on a map to show the direction which water would take when flowing from high to low ground. If the slope are steep, the lines are thick and close together. On gentle slopes they are thin and wider apart while flat ground is not shade at all. .

**(5) Hill Shading:**

Hill shading helps to give an impression of the form of the line without giving actual heights. Hill shading is usually done in colour, brown or grey, and it appears that a light is shining from the north-east corner of the map.

**(6) Layer tints:**

On physical maps tints or different shades of colour are used to denote land between two different heights. Usually green is used for lowlands, brown for high, pink for very high land and finally white for mountains. The colouring makes it possible to see the distribution of high and low land at a glance.

**Contours:**

A contour line is drawn on a map to represent a certain definite height on the land, and it separates all land above that height from the land below that height. Along 100m contour for example, the land is everywhere precisely 100m in height above sea level.

However, there are terms we need to know before studying a detailed study of contours and their forms.

**(1) Ordnance Survey (O.S.):**

This is an accurate and detailed geographical survey made for the government by the survey department. When the survey has been made they produce ordance survey maps or ordnance map.

**(2) Sea Level:**

This is the average height between high and low tide or the line where land and sea meet. It is also referred to as the Datum level or ordnance Datum (O.D). from this all heights are calculated. It is marked zero on the map.

**(3) Vertical Interval (V.I.):**

This is the difference between two heights on a map. For example, if a spot 'A' is 100m high and 'B' is 25m high, the vertical interval is 150m.

**Step IV:** Questions are asked by the students and the teacher answers the questions. The teacher gives detail answers and normally reads from books and note.

**Summary/Evaluation:**

To ensure thorough understanding and build up the chalkboard summary, the teacher asks the students the following questions.

(1) With good diagrams, describe the following features.

(a) Spot height

(b) Contours

(c) Hachure

(2) With good examples and diagrams differentiate between form line abd Hachures.

**Assignment:**

In the next lesson, define the following terms;

(1) Hachure

(2) Contours.

**Lesson Plan**

**Lesson 20 C**

**Method: Expository**

**Topic: Relief, Contours And Their Forms**

**Sub-Topic: Relief Representation**

**Duration: 40 Minutes**

**Instructional Objectives**

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

(a) List the different relief features

(b) (b) List the differences between the relief features

(c) Describe the relief features on topographical maps.

(d) List the factors that create these features on the earth surface

**Precedure:**

**Revision:** The teacher asks the following questions from the previous lesson.

(1) Differentiate between a spot height and a contour

(2) (2) With good diagram describe Hachure

(3) Describe how geography students would recognize form lines in a landscape.

**Presentation**

**Step I:** The teacher introduces the topic by explaining these relief features; contour forms, steep and gentle or gradual slope, conical hill, spur and valley. The teacher teaches the class through a detail explanations and definitions.

**Step II:** The teacher writes out a list of all these features that can be on the landscape. The teacher also teaches the class how to recognize some of these features on the earth surface, and their major differences.

**Step III:** The teacher further lists these topographical features and how they are related. These features are many and they are seen in all landscapes.

**(4) Contour Forms.**

On the earth surface, we pass over hills and valleys, plains and plateau. However, some of the hills may be difficult to climb and if we were cycling we would be forced to walk up them. Others present no difficulty. In descending a hill the difficulty various with the steepness of the hillside or valley.

Contour lines sometimes approach each other gradually, i.e. at an equal distance apart. In such a case the slope is uniform. It is also said to be gradual or gentle. See fig. 19.5a.

When contour lines approach each other sharply, i.e. when they are very close together, the slope is steep.

A gradual slope A steep slope.

(5**) A Conical Peak:**

Here the contours are more or less concentric with two or more ring contours. The hill which may be isolated, usually stands out of relatively level land. In this case, the ground rises towards the centre, which often show a rounded top. However, the summit of a peak is represented by a ring contour with no other contour inside it.

A conical peak.

(6) **A Saddle, Pass or Col**:

This is a gap or opening between hills. It is represented by at least one contour surrounding the contours indicating the hills. The term saddle is restricted to an opening between hills. while ‘pass’ or ‘col’ is used for one between higher lands. Saddle affords the easiest passage across the hills.

A model and a representation in contour of a saddle.

**(7) A spur and a valley:**

A spur is sometimes shown as a 'v' and a valley as an inverted 'v'. However, they can be shown in exactly the same way. What always decides which is the numbering. In a supur the numbering increases from the outside inwards while the exact opposite in the case in a valley. To put it in another way, the apex of the v in the spur points towards low land and that of the valley points towards highland.

**Step IV:** Questions are asked by the students and the teacher answer the questions. The teacher gives detail answers and normally reads from book and note.

**Summary/Evaluation:**

To ensure thorough understanding and build up the chalkboard summary, the teacher asks the students the following questions.

(1) List the different types of topographical features

(2) Differentiate between a spur and a valley

(3) With good diagram, describe the features a conical hill.

(4) The teacher asks the students to read up all what they have done on this topic and make complete and comprehensive notes.

**Lesson Plan**

**Lesson 21c**

**Method: Expository**

**Topic: Relief, Contours And Their Forms**

**Sub-Topic: Relief Representation**

**Duration: 40 Minutes**

**Instructional Objectives**

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

(a) List the topographical feactures studied in this lesson.

(b) State the differences between the topographical features

(c) Draw the diagrams of these topographical features

(d) State the differences between convex and concave slope

**Procedure:**

**Revision:**

The teacher asks the students the following questions from the previous lesson.

(a) Describe a conical hill

(b) State the differences between a spur and valley

**(c)** Describe how gentle or gradual slope differs from steep slope.

**Presentation**

**Step I:** The teacher introduces the topic by explaining what these features are and how to recognize them on topographical map. The teacher defines all the features and gives detail explanation of each of them.

**Step II:** The teacher writes out a list of all the features and with their mode of formation on the earth's surface. The teacher teaches the students how these features can be seen.

**Step III:** The teacher further lists these features with diagrams for clarity. These are convex and concave slope, ridge, an escarpment, undulating region etc.

**(8) Convex Slope:**

A slope is convex if the contours are first close together and then widen as the land rises. As shown in the fig. 19.9, the slope is accidently steep at first, but it becomes gentler on higher round.

A convex slope.

**(9) Concave Slope:**

A slope is concave if the contours on the lower section of the land are more widely spaced, but they come closer together as higher ground is reached. The higher section of the slope is steeper.

A concave slope.

**(10) A ridge:**

This is a long narrow hill and is represented by oval-shaped contour lines. When it is of considerable height it is called a 'range' hence we have a range of mountains.

A ridge.

**(11) An Escarpment:**

A ridge in which one side slopes gently while the opposite side slope steeply. The side is known as the scarp slope or scarp. The long and gentle slope on the opposite side is usually called dip slope.

A model to show a scarp slope and a dip slope.

**(12) An Undulating Region:**

A plain or region with no steep slopes but with the land rising and falling evenly is described as undulating.

Contours representing Undulating land.

**(13) An Isolated Hill:**

A hill which, as the name implies, stand isolated or apart from the rest of the highlands in the region.

**Step IV:** Questions are asked by students and the teacher answer the questions. The teacher gives detail answers and normally reads from textbooks and note.

**Summary/Evaluation:**

To ensure thorough understanding and build up the chalkboard summary, the teacher asks the students the following questions.

(1) List five topographical features

(2) List the major difference between concave and convex slope

(3) Describe the formation of an escarpment

**Assignment:**

In the next lesson define and describe

(a) Undulating hill

(b) Intersivibility

(c) Isolated hill

**Lesson Plan**

**Lesson 22c**

**Method: Expository**

**Topic: Sections, Gradient And Intersivibility**

**Sub-Topic: Drawing A Section**

**Duration: 40 Minutes**

**Instructional Objectives**

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

(a) Draw a cross section using graphs.

(b) State the functions of a sectional drawing

(c) Describe the features that are expose by section drawing

**Procedure:**

**Step I:** The teacher introduces the topic by explaining cross section to the students. The teacher defines a cross section with further explanation.

**Step II:** The teacher write out a list of what constitute cross section and how to draw a cross section. The teacher teaches the students that cross section is the nature of the landscape, if it is cut through vertically.

**Step III:** The teacher further lists some of the various ways to draw a cross section

A section shows contours as an elevation. Section enables a person to visualize the shape and nature of the land. When a section is drawn, we imagine what the region would look like if we were to travel in a straight line from one spot to another. In drawing a section, it is always wise to choose a scale. This scale is known as the Vertical Scale (V.S) or scale of Height and is always highly exaggerated, unlike the horizontal scale. Care should be taken when choosing the vertical scale so as not to give a fantastic notion of the landscape. Suggested scales are 2mm or 3mm to respresent the vertical interval.

**Section Line:**

This is a straight line which joins the two points on a map between which a section is to be drawn.

How to draw a section.

(A)

(B)

V.S 2mm=100m

Method of drawing a section.

(m) Draw a section line X to Y.

(n) Lay a straight edge of paper along the section line.

(o) Mark on it the points where the section line crosses the contours with their appropriate heights.

(p) Where the section line crosses the same contour line consecutively, make a mark to indicate a highland or depression respectively.

(q) Transfer the paper to the horizontal lines and mark off the heights with dots on the horizontal lines which correspond to them.

Join up the dots and complete the sectional.

**Step IV:** Questions are asked by the students and the teacher answers the questions. The teacher gives detail answers and normally reads from textbook and note.

**Summary/Evaluation:**

To ensure thorough understanding and build up the chalkboard summary, the teacher ask the students the following questions

(a) List the steps involve in drawing a cross section.

(b) Describe a cross section

(c) Differentiate between a section and intersivibility.

**Assignment:**

In the next lesson, draw a cross section using graph sheet.

**Lesson Plan**

**Lesson 23c**

**Method: Expository**

**Topic: Sections, Gradient And Intersivibility**

**Sub-Topic: Gradient**

**Duration: 40 Minutes**

**Instructional Objectives**

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

(a) List the steps involve in calculating gradient

(b) Calculating the gradient of a landscape between two points

(c) State the reasons for calculating gradient

**Procedure:**

**Revision:** The teacher asks the following questions from the previous lesson;

(1) Describe cross section.

(2) State the benefits of drawing a cross section.

(3) Differentiate between a cross section and gradients.

**Presentation:**

**Step I:** The teacher introduces the topic by explaining what gradient is all about on the landscape. The teacher teaches the class through detail explanations and gives the benefit of calculating gradient.

**Step II:** The teacher writes out a list of how to calculate gradient. The teacher also asks the students to list other things that are considered when calculating gradient such as vertical interval and horizontal equivalent.

**Step III:** The teacher further lists some other things to be considered when calculating gradient of any landscape. Calculation of gradient is important to engineers and surveyors. Gradient in contour refers to the slope of the land. We learnt earlier that when contour lines are close together the slope is steep. Similarly, when they are farther apart slope is gradual. Gradient are always expressed as fractions with one unit as the numerator.

To find the gradient between two points on the map we must know

(e) The heights of the two places;

(f) The horizontal distance between them.

The gradient is the difference between the two heights divided by the distance between them. In other words, it is the vertical interval (V.I) over the horizontal equivalent (H.E.).

**Example:**

Find the average gradient between two towns, A and B, whose heights above sea level sea level are 120 and 370 respectively.

The distance between the two towns is 10km.

Height at town A … 120m

Height at town B … 370m

Difference between the height, i.e. V.I 250m

Difference between the two towns. i.e. H.E. = 10km

:. Gradient = V.I./H.E. = 250/10,000 = 1/40

We read this as one in forty. This means that there is a rise of 1m for every 40m covered.

**Step IV:** Questions are asked by the students and the teacher answers the questions. The teacher gives detail answers and normally reads from textbook and note.

**Summary/Evaluation**

To ensure thorough understanding and build up the chalkboard summary, the teacher asks the students the following questions.

(1) Define the term gradient

(2) State the role of horizontal equivalent in the calculation of gradient

(3) State how to get vertical interval when calculating gradients of an area.

**Assignment:**

In the next lesson, state the functions of intersivibility, horizontal equivalent and vertical exaggeration.

**Lesson Plan**

**Lesson 24c**

**Method: Expository**

**Topic: Sections, Gradient And Intersivibility**

**Sub-Topic: Intersivibility**

**Duration: 40 Minutes**

**Instructional Objectives**

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

(a) State whether one place is visible form another place in the same landscape.

(b) State from the graph whether an areas is concave slope or convex slope.

(c) List the intervening obstacles between two places on the map as shown in the graph.

**Procedure:**

**Revision:** The teacher asks the following questions from the previous lesson.

(a) With good diagram describe gradient

(b) State how to calculate gradient

(c) List the benefits or the usefulness of gradient to man

**Presentation:**

**Step I:** The teacher introduces the topic by explaining what intersivibility is all about. The teacher defines intersivibility and gives further explanation.

**Step II:** The teacher writes a list of all the steps involve in the construction of intersivibility. The teacher teaches the students areas where intersivibility are necessary and important.

**Step III:** The teacher further lists some of the features of a landscape that is being exposed when intersivibility of area is drawn.

Intersivibility:

When reading a map, it is a help to know whether one place is visible from another. This can be found out by;

i) An examination of the contours and the types of slopes concerned. The slope may be even or uniform, convex or concave. In an even slope, the contour lines are of equal distance apart. The contours of a convex slope are close together at the lower level but get farther apart as one ascends the slope. A concave slope has the contour lines closer together at the higher level but wider at the base. XY is concave while YZ is convex.

When the slope is convex, as in YZ the top of the hill is not visible from the foot of the hill. But, when it is concave, as in XY the top is visible from the bottom.

However, it is important to know whether there is intervening obstacles between two positions on a map. A place is visible or invisible depending on whether there is or not an intervening obstacle. This obstacle is created by land in form of hill.

**Step IV:** Questions are asked by the students and teacher answers the questions. The teacher gives detail answers and normally reads textbooks and note.

**Summary/Evaluation:**

To ensure thorough understanding and build up the chalkboard summary, the teacher ask the students the following questions

(1) State why intersivibility is necessary

(2) State the relationship between sectional drawing and intersivibility.

**Assignment:**

In the next lesson, state the importance of map reading in geography.

APPENDIX D

# Study Habits Inventory

By CHRISTOPHER G.M. BAKARE, Ph.D.

## FORMS (SECONDARY SCHOOL FORM)

**Name**…… **Date**……

**Class, Year or Course**…… **Age**…… **Sex: M. F.**
*(In years)* *(Circle One)*

**School, College or University**……

### DIRECTIONS

The following is a list of questions concerning students' habits and methods of study. Read each statement carefully and answer it as accurately as possible. Put an X in the circle within the column that best describes your habit. For example, the first question is:

| | | Almost Never | Less than Half of the Time | About Half the Time | More than Half of the Time | Almost Always |
|---|---|---|---|---|---|---|
| 1. | When your assigned home is too long or unusually hard, do you either stop or study only the easier part of the lessons? | ○ | ● | ○ | ○ | ○ |

If, in your case, this happens to be true less than half of time i.e., sometimes, place and X as shown in the example

**Psychoeducational Research Productions**

| Almost Never | Less than Half of the Time | About Half the Time | More than Half of the Time | Almost Always |
|---|---|---|---|---|

**Section A:** ***Homework and Assignments.***

**SCORE**

1. When your assigned homework is too long or unusually hard, do you either stop or study only the easier parts of the lesson?
2. If you have to be absent from class, do you make up missed lessons and notes immediately?
3. Even though an assignment is dull and boring do you stick to it until it is completed?
4. Do you complete and submit your assignments on time?
5. Do you begin your assignments as soon as the teacher gives them to you and not allow them to pile up?

| **TOTAL SCORE SECTION A** | |
|---|---|

**Section B:** ***Time Allocation***

7. Do you waste too much time talking or listening to the radio for the good of your studies?
8. Do you find that having many other things to do causes you to get behind in your school work?
9. Do problems outside of the classroom – with other students or at home – cause you to neglect your school works
10. Do you study for at least three hours each day after classes?
11. Is your time unevenly distributed; do you spend too much time on some subjects and not enough on others?
12. Do you spend too much time reading fiction (novels), going out etc., for the good of your school work?

| **TOTAL SCORE SECTION B** | |
|---|---|

**Section C:** ***Reading and Note Taking***

13. In taking notes, do you tend to write down things which later turn out to be unimportant?
14. After reading several pages of an assignment, do you find yourself unable to remember what you have just read?
15. Do you find it hard to pick out the important points of a reading assignment?
16. When reading a long assignment do you stop now and then to try to remember what you have read?
17. Do you have to re-read material several times because the words don't have much meaning the first time you go over them?
18. Do you have trouble picking out the important point in the material read or studied?

| Almost Never | Less than Half of the Time | About Half the Time | More than Half of the Time | Almost Always |
|---|---|---|---|---|

**SCORE**

19. Do you go back and recite to yourself the material you have studied, rechecking any points you find doubtful?
20. Do you miss important points in the lecture while copying down notes on something which has gone before?
21. Do you pronounce words to yourself as you read?

| **TOTAL SCORE SECTION C** | |
|---|---|

**Section D: *Study Period Procedures***

22. Do you keep all you notes for each subject together and carefully arranged for studying?
23. Do you need a long time to get warmed up when you want to start studying?
24. Are you unable to study well because you get restless and unable to sit for long?
25. When you sit down to study, do you find yourself too tired, bored or sleepy to study well?
26. Do you prefer to study your lessons alone rather than with others?
27. Do you seen to get very little done for the amount of time you spend studying?
28. At the beginning of a study period, do you plan your work so that you will make the best use of your time?
29. Do you find yourself beset by too many health problems to study efficiently?

| **TOTAL SCORE SECTION D** | |
|---|---|

**Section E: *Concentration***

30. Do you find that daydreaming distracts your attention from your lessons while studying?
31. Do you find it hard to keep your mind on what you are studying for any length of time?
32. Do outside interruptions disturb you while studying?

| **TOTAL SCORE SECTION E** | |
|---|---|

**Section F: *Written Work***

33. Do you correct errors on the papers which your teachers have marked and return to you?
34. Do you have trouble saying what you want to say on tests essays and other written work?
35. Do your teachers criticize your written work for being poorly planned or hurriedly written?
36. Do you give special attention to neatness on essays, reports and other written work?

| Almost Never | Less than Half of the Time | About Half the Time | More than Half of the Time | Almost Always |
|---|---|---|---|---|

| **TOTAL SCORE SECTION F** | |
|---|---|

**Section G: *Examinations***

| | | SCORE |
|---|---|---|
| 37 | Do you do poorly on tests because you find it hard to think clearly and plan your work within a short period of time? | ○ ○ ○ ○ ○ |
| 38. | Do you get nervous and confused when taking a test and therefore fail to answer questions as well as you otherwise could? | ○ ○ ○ ○ ○ |
| 39. | When getting ready for a test, do you arrange facts to learned in some planned order? | ○ ○ ○ ○ ○ |
| 40. | Are you careless about spelling, punctuation and grammar when answering test questions? | ○ ○ ○ ○ ○ |
| 41. | Are you unable to finish tests within the time allowed although you work until the very last minute? | ○ ○ ○ ○ ○ |
| 42. | When tests are returned, do you find that your mark has been lowered by careless mistakes? | ○ ○ ○ ○ ○ |
| 43. | Do you finish your examination papers and turn them in before time on the examination? | ○ ○ ○ ○ ○ |

| TOTAL SCORE SECTION G | |
|---|---|

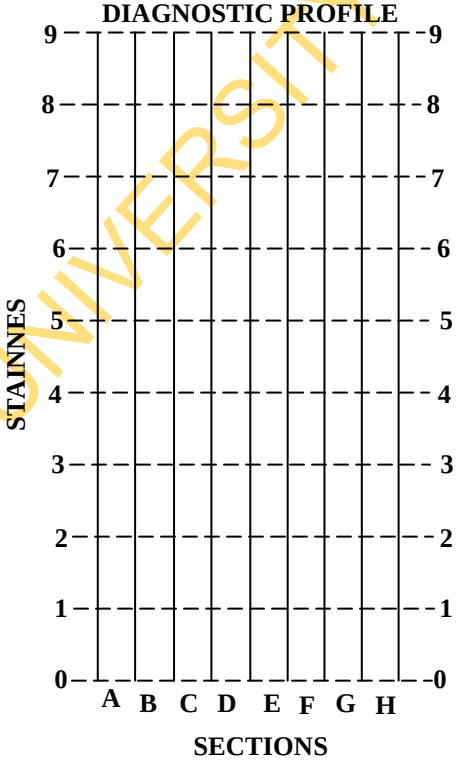
**Section H: *Teachers Consultation***

| | | |
|---|---|---|
| 44. | When you are having trouble with a particular subject, do you try to talk it over with the teacher? | ○ ○ ○ ○ ○ |
| 45. | Do you hesitate to ask a teacher for further explanation on a point that is not clear to you? | ○ ○ ○ ○ ○ |

| TOTAL SCORE SECTION H | |
|---|---|

*Do not write below this line*

**DIAGNOSTIC PROFILE**




| SECTION | SCORE | STANINE |
|---|---|---|
| A | | |
| B | | |
| C | | |
| D | | |
| E | | |
| F | | |
| G | | |
| H | | |

**TOTAL** .....