

**SCHOOL BASED FACTORS INFLUENCING STUDENTS
ENROLMENT AND PERFORMANCE IN PHYSICS AT OLEKASASI
SECONDARY IN KAJIADO COUNTY, KENYA**

By

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L40/36187/2019

**A Research Proposal Submitted in Partial Fulfilment of the Requirements for the Post
Graduate Diploma in Education of the University of Nairobi**

DECEMBER, 2021

DECLARATION

This research proposal is my original work and has not been submitted for academic award in any other university

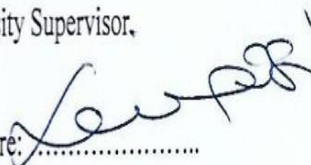
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DEDICATION

This research is dedicated to mother Josephine Kemunto and sister Judith Sarange for their sacrifices, inspiration and upkeep in realizing my academic dreams. I also dedicate this study to my son Markyoung for missing my tender care when doing this research.

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ABBREVIATIONS AND ACRONYMS

BoM	Board of Management
CATs	Continuous Assessment Tests
CUE	Commission for University Education
KCSE	Kenya Certificate of Secondary Education
KICD	Kenya Institute of Curriculum Development
KNEC	Kenya National Examination Council
M o E	Ministry of Education
OD e L	Open Distance e-Learning
P1	Primary 1
SES	Socio-Economic Status
STEM	Science, Technology, Engineering and Mathematics
TSC	Teachers Service Commission
USG	Universities Standards and Guidelines

ABSTRACT

This study presents details of the students' physics class engagement in taking questions, reading and their attitudes with the view of establishing the student's enrolment criteria and performance at Olekasasi Secondary School. Questionnaires, video recordings and interviews were used in gathering information for the research. Content is often given in advance to students for self-study before being taught through combinations of electronic course materials, textbooks and other web resources. Teachers are concerned mainly on the problems students encounter after having self-study of the materials as part of assignments. Data was organized into themes and analyzed by use of Statistical Package for Social Sciences (SPSS 20.0.). The findings of this research were analyzed as percentages of the responses. The study also determined the impact of learning based on inquiry within the STEM education while referring to science subjects (Physics and skills for problem solving that were attained using experimental and control group). Cluster sampling technique was used and each group consisted of 26 students and achievement test done aimed at assessing the impact scientific knowledge had on enrolment and performance in the subject. The research findings from the SPSS output indicated that learning based on inquiry in STEM education had a link between Physics as a subject, its performances and enrolment. It was concluded that the social, economic, cultural and psychological factors influenced the gender differences in line to achieve maximum enrolment and performance in Physics. In the sense that, there exist inequality of gender in choice of Physics subject and thus the question of ubiquity on the notion of male advantage in it. Also, its relation to local community's female representative in STEM as teachers in secondary school, could have influenced on enrolment and performance hence recommend an increase of female role models.

CHAPTER ONE: INTRODUCTION

1.0 Background

Education refers to a medium in which training and acquisition of knowledge take place in institutions such as institutions of higher learning, colleges, primary schools, high schools among other. This helps students to acquire knowledge that enhance them to develop life skills. Individuals decide to prosper in education so that they can be empowered and select their career paths so that their knowledge can have a positive impact in the future.

Contrary to today's world, the process of acquiring education has failed to offer higher academic performance among students within institutions of learning. This is exhibited through way of acquiring academic accreditations that do not match the present economic demands causing frustrations and further, mental disturbances among the candidates in the out of school world. Thus rendering it meagre. The major reason being poor implementation of policies within the educational sector thus hindering enrolment and students' admissions to the learning institutions.

Such like policy include strict admissions criteria, whereby students look for means to beat this through a number of ways: students with foreigner O'Level secondary school certificates are admitted with no proper equivalence to the Kenya National Examinations Council (KNEC); diploma course holders (students) with distinctions and credits are admitted to fourth, third and second year classes; universities also admit P1, pre-university and bridging certificate holders being students into undergraduate programmes and too some of the faith-based universities admit students having done non-academic courses such like divinity and ministry to doing degree programmes.

This real undermines and leaves no chance for the unprivileged in society to secure a chance to learning competently. More shocking is that the Commission for University Education (CUE) revealed non-compliance or low levels of compliance with legal provisions and procedures that authorize credit transfers. The sought to investigate this strict adherence, findings revealed lesser adherence to minimum admission requirements as stipulated in the Universities Standards and Guidelines (2014).

Educational reforms are unavoidable and thus need to be introduced to offer maximum independence within the educational systems by building revision curriculums and finding new ways of involving students' contribution. The government is supposed to work towards expanding educational institutions at all levels such as vocational training for purposes of improving education quality in all areas for purposes of enhancing economic growth. Expansion of educational institution will bring about growth within institutions of higher learning by establishing agency systems, offering new courses and increasing enrolment rates within the institutions.

Numerous researches that have been conducted shows that students have been developing negative attitudes towards science subjects such as chemistry, math and physics. Further findings depict low rates in the enrolment of physics subject in undergraduate programs when compared to other programs despite students having attained the required mean score in KCSE (Kenya Certificate of Secondary Education)

Basing on this, this research aims at identifying major challenges and the grassroots problems that results to decline in enrolment and performance of physics subject in

basic secondary education. It used data analysis methodologies that will help provide results which will be discussed and conclusion made grounded on the school based factors affecting enrolment and performance of the study in physics.

1.1 Problem statement

The research found out quantitatively playing factors that hinder high mean score in physics as a subject by the students in their Kenya Certificate of Secondary Education and come up with resolutions in a conclusive statement without leaving recommendations that guided and direct the institutions of learning more especially the secondary basic education in giving concepts in physics to enable the students to unlock their potential in different fields in the economy and remain patriots.

1.2 Objectives

1. Study factors affecting enrolment of students in physics at Olekasasi Secondary School
2. Study factors affecting student's performance in physics at Olekasasi Secondary School

1.3 Justification for the study

Regardless of the point that a few students go for Physics as a subject in high school curriculum, major courses in universities like STEM courses require students who have done Physics in their KCSE although it is an optional science subject. In addition, diploma technical courses require admission of students who have undertaken physics in Colleges and KCSE. The major aim of the research was to study and examine the consequence of pupils' attitudes, gender on the performance and enrolment of physics. The studies intend to examine the various school factors influencing the average score

in physics and provide a recommendation on how the low performance on the subject can be upgraded.

1.4 Significance of the study

This study is central as it provides recommendations on strategies that can be prioritized by the M o E (Ministry of Education) for purposes of changing students' attitudes towards science subjects such as physics. This will enable them approach the subjects with assurance thus resulting to increased performance, by way of obtaining high mean score, impressive individual grades and in the application of the skills. This is also the purpose to cultivate students into venturing in the field of physics, parents to invest in it and motivate teachers to motivate students to learning the subject.

Policy makers should initiate more female teachers' employment to teach physics and this has many benefits first and foremost to act as positive protagonists to female students. They should also provide policies to attract more students and get to a more balanced timetable in schools that lead to an improved performance in the subject. This study also focuses on opening teachers' minds in assessing the attitudes of students as well as parents and guardians for appropriate measures to be taken. KNEC (Kenya National Examination Council) should prepare exams fairly for purposes of enhancing performance. A suitable syllabus should be developed which is not so overwhelming by the KICD (Kenya Institute of Curriculum Development).

1.5 Conceptual framework

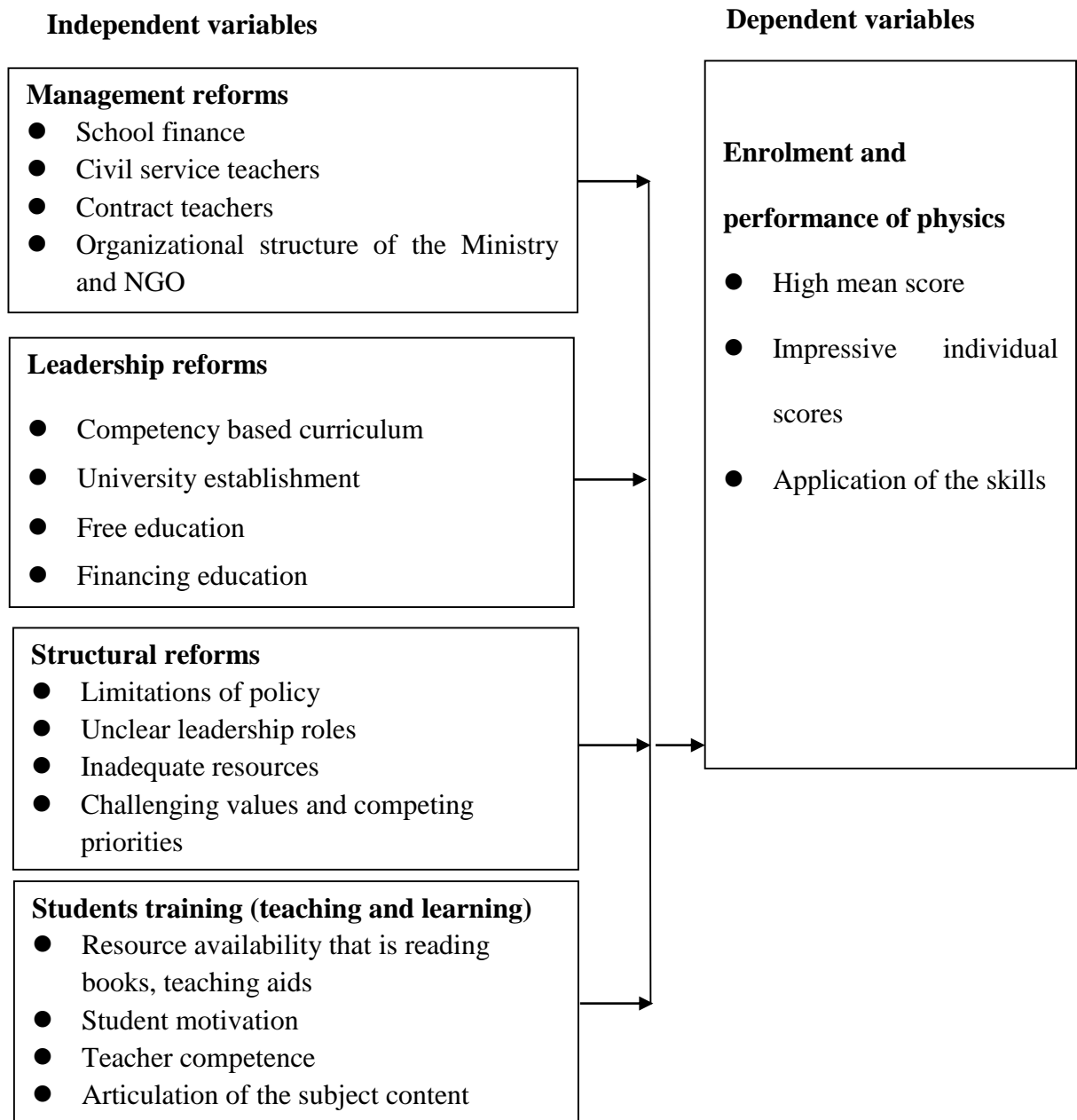


Figure 1.1:Independent and dependent variables in a school environment

The conceptual framework above relates independent and the dependent variables where independent variables include school factors (leadership, management, structural

reforms and availability of learning and teaching resources) while dependent variables being school factors affecting enrolment and performance of physics as a subject.

CHAPTER TWO: LITERATURE REVIEW

2.0 Review of related literature

According to Maddock (1981), studies in science education were anticipated as cultural initiatives and thus not made compulsory for that matter. Wilson (1981) also researched on science orientation in educational institutions as a culture. Over the years, numerous studies conducted on science education as a multicultural has spiced up Wilson and Maddocks efforts. This have recently resulted to emergence of numerous literatures in the same line of research that shows the different features of cross cultural work.

In the past thirteen years (Rennie & McClafferty,1996), two literatures have reviewed and brought attention on the significance of institutions such as museums in acquiring science knowledge. Scholars such as Lucas (1983) researched on how scientific knowledge and learning took place through availability of museums and the emergence of scientific institutions. An introduction by Paulette McManus on Scientific museum education reviewed important social historical aspects that linked information gathered from museums as a result of science to their behaviors and how they were learnt. He noted that scientific museums are still sprouting and thus there is need to assess and describe the activities in place. Further, he describes historical development of scientific museum in three phases through combination of a conventional display museum with a chemistry laboratory and natural history school being listed here in three principal phases in a period of two centuries.

During the beginning of this exhibits, personality was showed by modern successions that was largely trained by the assortment's birth in a 17C filing cabinet of interests; phase two centrally came in in the half second of the 18C whereby the influence of

Linnaeus started to make itself sensed; second quarter in 19C, the third phase had an whole collection redisplayed as a clarification of usual divinity which strategizes changes in third generation museums which aims at giving ideas in more practical ways. This way, scientific knowledge can be demonstrated as well as investigated for interpretation.

Statistics of literature covering from 1970 to 1991 were conducted by the use of approach similar to that of McGaw *et al.* (1991), Glass *et al.* (1989) studied gender differences in students 'attitudes towards science by finding correlations between this attitudes and science achievement. The study revealed that boys had a more positive attitude towards science compared to girls. However, girls had higher attitudes towards biology and physics subjects than boys. Students who had a high positive attitude performed better in the science subjects.

2.1 Statement of hypotheses

This study is investigating factors influencing enrolment rate in physics as a non-compulsory subject among secondary schools in Kenya. The following hypotheses will be a guide:

- i. Student's enrolment in physics is largely influenced by school-based factors.
- ii. Students' enrolment in physics is largely influenced by performance.

2.2 Definition of terms

Scientific literacy: - it is a component which recognizes related trends to scientific skills and appropriate values to responsible individuals

Informal learning: - it's a learning process that is experiential, unstructured and is not based on any institution.

Museum: - This is a place that mirrors issues facing human beings despite their status quo.

Science centers: - These are places of accessing exhibitions for acquiring knowledge in science.

Generation: - a set stage in the existence of mankind.

2.3 Limitation

A restriction; a boundary, real or metaphorical, caused by some thing or some circumstances.

2.4 Delimitation

Non-restrictions within set boundaries, real or metaphorical, caused by some thing or some circumstances.

2.5 Summary of literature review and research gaps

In the previous researches as highlighted herein literature review, started by Maddock (1981), the topic Science Education that is Science, Technology and Modern Society brought out the following findings. That science and education are cultural enterprises which form a part of the wider cultural matrix of society. Also that, educational considerations concerning science must be made in the light of this wider perspective. Thus, it had a research gap that could be advanced out of a personal experience in reading, teaching and in situations of curriculum development in Kenya and other Third World Countries.

To extend this to Wilson (1981), he had a topic as Cultural Contexts of Science and Mathematics Education. In this Cultural Context in Science and Mathematics Education, he found out influences of the above on the teaching and learning of Science and Mathematics. This brought curiosity of interest to relevant persons to read more in the cultural Context of school education. Also to determine these influences on teaching and learning of STEM in secondary schools as a gap.

According to Lucas (1983), there is availability of many sources from which science knowledge is gained. Such examples had been given as the current boom in the provision of entertainment and leisure activities with an information content as the finding. Basing the outcomes on Informal sources of Scientific Knowledge and Learning as his topic. Suggestion was that, more to be done on cross-referencing between groups concerned with the presentation of science. Also to those with social history, art and thus greater sharing of ideas, data and methodologies revealed the gap that triumphed.

In the statistics analyzed according to Glass *et al.* (1981), and Hedges *et al.* (1989) from 1970 to 1991 on Gender Differences in students' attitudes towards science, boys had a more positive attitude towards science than girls in all types of science. A triumphed analysis of the same be carried out to test the results/findings of the already carried out study to come up with examination of the analysis of the topic done. Its correlations between attitudes towards achievement in science too be established.

To list out another one, Rennie & McClafferty, (1996), had findings that museums and similar institutions are important centres of learning science. This succeeded from the topic; Science Centres and Science Learning. A triumphed gap from historical

development of science museums is in the three generations. Also on the idea of “third generation museums” as the major change as well as one concerned with representing ideas rather than the mere talk of science in fiction.

CHAPTER THREE: METHODOLOGY

3.0 Area of study

This study was done at Olekasasi Secondary School that had seven hundred and twenty-four students (724) at the time of the research. The research study focused on school based factors influencing students' enrolment and performance in physics. Data was collected using primary and secondary sources. It also researched on the issues that influenced students and the selection of Physics as a subject in secondary education without leaving factors for enrolment decisions of years 1-4 that is form 1, 2, 3, and 4 in Olekasasi Secondary School.

3.1 Data collection

The study used primary data to gather information via a questionnaire that was semi structured aiming at fourteen students in form one and two, 11 senior students that is in form three and four, and 5 teachers in the physics department at Olekasasi Secondary. Video recording for the Head of Department Interview Guide was prepared with an interview as well as a questionnaire for the students and teachers. This was done in forms through first, cluster random sampling, simple random sampling and purposive sampling techniques in obtaining the data. Distribution of students per subject and academic performance was accessed regardless of their gender.

3.2 Instruments

The study aimed at determining the school based factors influencing performance in physics. For the research to attain his goal a semi-structured questionnaire and simple random sampling was applied in collecting raw data from form one and two classes of 14 students in total, 7 senior students that is from form three and four as well as 5

instructors. Cluster random sampling technique was applied to acquire the 26 students in each experimental and control group of the achievement test. A sample of 26 students in the interview and questionnaire was the choice in form one and two and three and four respectively.

3.3 Design

The study used descriptive approach in determining the factors influencing choice of physics as a subject and performance at Olekasasi. Sampling was done using cluster sampling technique with an experimental group and a control group of 26 students each.

3.4 Data analysis

Data collected was analyzed into relevant themes pertaining to School based factors influencing choice of physics as a subject and performance at Olekasasi. Statistical Package for Social Sciences (SPSS) software was used for data analysis. The findings were made by use of the inquiry-based learning on performance in physics problem solving skills and how this is influenced by the school based factors.

3.5 Ethical considerations

The study concerned more on pedagogical approaches pertaining to student performance, availability of learning/ teaching resources, the student/learner characteristics and teachers' attitude towards physics and hence performance. This was made possible by permission from University of Nairobi, that allowed to collect raw data, proper literature citation was done too as well as free and voluntary participation of respondents in the research was an achievement.

3.6 Operational variables

Table 3.1: Operational variables analysis

Objectives	Variables	Indicators	Level of scale & Scope of data analysis	Research tool	Analysis tool
To establish whether resource availability that is reading books and teaching aids influences performance of students in Physics in Olekasasi Secondary in Kajiado North sub-county.	-Availability of teaching/learning materials	-Available -Not available	-Ordinal -Parametric -Non-parametric	-Video recording -Interview -Questionnaire	SPSS version 20.0
To find out the extent to which presence of role models from teachers that is motivation of the students	-Presence of role models especially female teachers	-Number of male teachers at school -Number of female teachers at school	-Ordinal -Parametric -Non-parametric	Video recording Interview Questionnaire	SPSS version 20.0
To establish relationship between teachers' competence in articulation of subject content to increase physics subject performance in Olekasasi Secondary	-Teachers' competence and articulation of physics subject content	-Very competent -Competent -Low competent -Very low competent	-Ordinal -Parametric -Non-parametric	Video recording Interview Questionnaire	SPSS version 20.0
To establish relationship between teachers' use of diverse methodology and class attendance of the physics subject	-Teachers' use of diverse methodology and class attendance	-Highest -Higher -High -Good -Lower	-Ordinal -Parametric -Non-parametric	Video recording Interview Questionnaire	SPSS Version 20.0
To determine whether active student participation in class is in direct relationship for satisfactory completion of class task with Inquiry-Based-Learning for physics subject in Olekasasi Secondary	-Active student participation -Satisfactory completion of class work	-Positive -Negative	-Ordinal -Parametric -Non-parametric	Video recording Interview Questionnaire	SPSS version 20.0

CHAPTER FOUR: FINDINGS AND DISCUSSIONS

4.0 Introduction

The chapter analyses research outcomes, interprets and present collected information as per the results obtained from the interview guide, questionnaire and interview from both the head of department in Physics, teachers of Physics and students doing Physics in both forms.

4.1 Head of physics department interview

Area of study for the interview was Olekasasi Mixed Day Secondary School's Head of Department-Mathematics and Physics teacher. With a teaching experience of 29 years in service. The first question was that; Is it random streaming they do or they do it according to ability when delivering content? The answer to this question was based on ability by the explanation given that; "streaming is according to ability when delivering content", from head of Physics Department.

A majority of the students (80%) selected science subjects although some were not aware on how to do this. He also said that practicals are used to giving credit of marks to the students and considered too when selecting Physics as a subject. The attitude of the students towards Physics is very enthusiastic, he said. This is by ensuring the attitude of the students is positive by always keeping them on the hand on activities - practicals so that they get used to being in the laboratory. This is made possible by always leaving all the laboratories open all the time for maximum allowance to do those practicals by the students. More so, those who are gifted and give room to those who fear coming to the laboratories and are able to get anything they want. This to the advantage of those students who have prepared a practical or just good in hand-on activities.

To develop skills at lowest level of education, for the students, the school organizes science experimentations symposiums, and in participation in science activities in the school, _science congress for the students though most are not very strong and like 20 % are not aware. They have been organizing for the symposiums but not many as the students are not strong.

Students are encouraged to think logically during physics learning that is when content in classrooms is delivered and most encouraged to get used on hands-on activities which had enabled them to score well-being very strong in acquisition of knowledge over the years. Students are free to seek for assistance and encouraged to do inquiry based learning in physics through practical examples of Brownian motion. They are also reminded to work hard by being elaborated on how they can unlock their potential and made aware of the job opportunities in the economy by learning physics. The explanations were that; first he makes them aware of the job opportunities that are available/there so that they can unlock this potential in the economy by way of becoming Engineers, Physicists and Doctors.

The evaluation policy is based on termly basis and evaluation is done through implementation by setting the exams for students. Lack of sufficient materials for revision and referencing availability. Further referred to lack of resources to acquire them. Proud to have a physics laboratory by referring back whereby they had only one laboratory being shared. One laboratory to three laboratories was a great improvement by board of management organizing for funds.

A percentage of 80 of the students choose for themselves Physics and 20% the head of department does. Sometimes they do present a kind of questionnaire whereby students get to know which of the subject he/she can do or not. Majority are weak though after completion of the labs, scores improved through admiring good grades especially in physics. They ensure all students have participated in practicals by keeping a register and marked during practical lessons so they know who is present or absent.

Students are encouraged to get motivated by designing their own investigative questions aimed at solving problems in physics. Also students are too advised to conceptualize projects that they do in the laboratory and come up with their own tangible and therefore meaningful ideas.

No supportive parents in the school. The answer to whether students are taken out for field trips, symposium or contest was “no”. Why? Like science congress, they are aware but lack opportunity. Several groups-science club not effective. Not interested in Mathematics due to the surrounding and attitude as discussed by parents, negative mentality contributed by the culture-sneaking out of school. Students do not engage themselves in activities like field trips, they do not work as a team-opportunity is missing.

Improving performance by increasing enrolment in Olekasasi in physics is to be started by enrolling more students starting from form one in physics with time, the number of enrolment is going to increase in the school. With time, they may have quality results or not depending on motivation of the students, articulation of subject content, following criteria of content delivery and hence uniform flow or not.

4.2 Physics teacher questionnaire analysis

In a staff of 22 teachers including both TSC and BoM employees, only three were Mathematics and Physics teachers. Out of the three only two responded with the following responses both of whom were males with 29 years and 2 years of teaching experiences respectively. Of the two, every teacher qualified to be a graduate with university education being the highest. Too, with one year ago refreshment course that is ,in-service training in learning area of Physics in the school.

It was foremost that they prepare schemes of work to teach with. Both responded that they attend all the lessons and by further, one of them responded by clarifying that he has 8 lessons per week. To determine how the enrolment is done to members in physics class, the teachers differed by saying “yes” and another saying “no” on whether physics subject students do select the subject on their own. The “no” answer added that they are guided to do so by explaining further that the students needed guidance because, they are not very strong in physics. One of the teachers responded that the average number of students of physics in the form three classes is more than 50 students while the other one responded by saying is 30 to 40 students and actually still struggling to greater numbers.

To determine whether the work load of the teachers allows them to attend to the individual students in terms of marking books, and guiding them to answer questions, they both positively said “yes” it allows them. Both said “yes” that the resources for teaching physics in the school are effective by one expounding that there is availability of audio and video teaching electronic materials through from form one to form four.

According to one of the teachers, the school's enrolment in Physics is satisfactory giving only one reason that the students enroll depending on their abilities and the rest not applicable. The next teacher ranked the school's enrolment in physics as being not satisfactory and gave the complete three reasons why. First, sometime you get a poor student scoring so highly. Secondly, the culture of the institution does not encourage students to handle physics the way it is supposed to, learning materials are scarce and students do not do homework. Thirdly, the parents are ignorant in physics. They do not provide guidance in this subject to their students (children). They have concluded that physics is challenging.

In ranking the school's performance in Physics, both the teachers said "good". Further, to determine the length of period when quality assurance officers did last visit the school, both the teachers agreed at a period less than or equal to 5 years ago.

4.3 Physics teachers' interview analysis

Apparently, one teacher disagreed that parents support students to perform well in Physics while the other was indeterminate. One teacher is in agreement that the school environment is conducive to perform in physics by the students and the other is in disagreement. Both teachers' response is indeterminate on whether the school admits students that cannot do well in physics or actually those who are below average. There is agreement by both the teachers that students get encouragement to think creatively during session of learning. Both agree that students get help during practical physics sessions in making accurate/precise observations.

One of the teachers agrees that students are lazy and actually do not like to work hard and the other is indeterminate. Both the teachers disagree from the fact that their daily workload stops them from engaging to the slow learners in physics. Individually a teacher disagreed that physics enrolment by the students in the third form get influence from parents/guardians while the other is indeterminate. Of the two teachers, one agreed and the other disagreed on school provision of all the required equipment and apparatus for physics practical lessons. One agreed while the other disagreed on whether motivation is achieved on completion of physics syllabus or not. There is disagreement and imprecise on the responses by both the teachers on the fact that most topics in physics are difficult to be handled.

Whether students' predictions are encouraged through by way of doing experiments to verify them based on ideas in science that is physics in particular or relates them to the environment, received an agreement by one teacher and a disagreement by the other.

4.4 Students questionnaire regarding entry behavior, facilities, other resources preferred occupations, and their opinions

4.4.1 Introduction

The questionnaire's research guide is outlined here in summary with analysis section part of it, show results and are presented below. To start with; the research study asked about the primary school level students attended, the grades they attained in their KCPE, average number of students per class, any difficult physics topics encountered, their performance in their last physics exam they did, what are their occupations after school, that is, after doing their KCSE, whether there is any influence from family on their choice of occupation, needed also to know the link physics as a subject has to these

occupations of choice, the efforts teachers made if it had helped them to understand physics practicals and to wind up is by enquiring through this guide whether in within the school environment, there is availability of physics resources such like physics laboratory to help the do physics enquiries through practicals and gathered opinions on how to improve on academic performance in physics.

4.4.2 Students questionnaire results analysis

The number of students who attended mission school, mixed day and boarding school, were 4.5%,77.3% and 18.2% in the sample respectively. In top, those who scored grades A, B, and C were,4.5%,31.8% and lastly 63.6%. in KCPE. Those who responded to the number of students in class were in total of 22 and the percentages per class' average are as follows;63.6% said more than 40,31.8% said (31-40), and 4.5% said (21-30). In this research study sample, students clearly demonstrated their difficulty areas in the physics syllabus by an output of 4.5% in each topic brought on board. In terms of syllabus wideness, only 22 students in sample responded with 40.9% of the students who disagreed while 59.1% who agreed that syllabus was wide.

Considering performance in the last exam in physics that they did,22 responded with4.5%scoring excellently,9.1%scoring very good,22.7%scoring good,40.9%scoring average and finally 22.7%scoring below average.22 in number responded on the occupation after high school with 9.1% who wanted to be Electrical Engineers while the rest of the occupations to be tied at 4.5% interest. Family influence and occupation respondents were 22 with 72.7% who said yes that is, family had an influence on occupation while 27.3 said no.26 in number responded to whether teacher' effort helped understand practical of which,68.2% said yes while 31.8% said no.

A whole number in the sample linked daily activities with lessons learnt in physics by 95.5% who agreed while 4.5% disagreed. In the sample size 9.1% showed they were undecided in relation to link between daily activities and physics and the rest did have an average of 4.5% in all of their elaborations in relation to this. In this study, findings showed that provision of learning resources by parents was 68.2% in agreement and that 31.8% did not agree to this. And at the end of this analysis, availability of physics resources starting from the physics laboratory within the school were looked into. The output of the 26 students in sample opened up to 77.3% in agreement of the availability of resource for physics subject while 22.7% disagreed.

4.4.3 Students' opinions on factors needed to be enhanced to increase performance in physics

The summary of opinions raised by the students as regards to improving performance in physics are as follows:

Better and adequate modern infrastructure to be put in place such as modern physics laboratory facilities.

More time to be created in the teaching and learning of physics.

Increase the number of physics apparatus in the school for practicals and improve them.

Mind time conscious during the practical sessions.

Avail physics equipment for practicals.

More practical lessons to be created for practicals to be done often.

Make the lessons more interactive by adding spice such as practical physics funs in an attempt to promote the study of physics in school.

Adding the number of textbooks that provide for more revision materials and further avoid sharing hence improve learning in physics through reading.

Students to get help from teachers in problem solving in Physics before letting them to attempt alone.

Cases of unkindness from teachers to students and abusing of backbenchers be avoided.

Teachers to be serious in delivering content.

Change physics lessons to be taught in the morning or be morning lessons.

Enlighten the students on the career opportunities that apply to physics so that they can put more effort.

Most often, do physics CATs.

Group discussions should be encouraged.

Science competitions to be carried out more often especially in Physics inventions-science congress, thus leading to improved Physics learning in the school.

4.5 Students interview regarding physics subject

4.5.1 Introduction

To pause and look at is a list of the items in the interview that were used for analysis and as well reflected in table 1. To begin with is the first item on how the influence by friends on students had to do with physics as subject, how often they do self-study on physics, the influence parents had on doing physics, whether physics as a subject is difficult, the feedback on friends had do not like physics, whether they frequently did CATS and assignments, feedback on if they did enjoy Maths and physics, to determine the extent it is in lack of assistance in solving physics problems, how it is that they are unable to handle physics practicals on their own and last, if they either get teacher's help or they struggle on their own to do physics practicals.

Table 4.1: Students responses concerning physics subject

SERIAL NUMBER	ITEM	RESPONSE (%)		
		Agreed	Disagreed	Indeterminate
1.	Influenced by friends to do physics	16.7	83.3	0
2.	Often study physics by self	66.6	16.7	16.7
3.	Influenced by guardian to do physics	0	100	0
4.	Physics is a difficult subject	16.7	50	33.3
5.	My friends do not like physics	33.3	33.4	33.3
6.	Influenced by teachers to do physics	0	100	0
7.	We do not do CATS and assignments frequently	33.4	50	16.7
8. 1	Enjoy doing maths and physics	33.3	66.7	0
9.	Lack of assistance in solving physics problems	33.4	66.6	0
10.	Unable to handle physics practicals on their own	50	16.7	33.3
11.	Teachers helps in doing physics practicals	66.7	33.3	0

4.5.2 Students interview results analysis

Here, the 22 out of 26 as a whole sample size participated. Out of the 22, 16.7% agreed that physics is a difficult subject as well as they had influence from friends to it. In this sample size, 66.6% and 66.7% agreed that they often had to study physics by own while get help to do its practicals from teachers respectively. None agreed whether there was influence from guardians to do physics nor teachers.

In the 26 member sample, 33.3% agreed their friends do not like physics as well do they enjoy doing Maths and physics.33.4% agreed that it is true they do not do CATS and assignments frequently and too that they lack assistance in solving Physics problems. Average of the students in this sample agreed that they are unable to handle Physics practicals on their own.

Of the sample size, 83.3% disagreed that they get influenced by friends to do physics. Of the sample size, 16.7% disagreed to the fact that they often do self-study ahead of teacher in physics and are unable to handle physics practicals on their own. A whole sample size disagreed 100% that they had influence to do physics by guardians and that teachers influenced them to do physics.50% of the sample size disagreed that physics as a subject is difficult and that they do not frequently do CATS and assignments. The sample students disagreed 33.4% and 33.3% that their friends do not like physics and that their teachers help in doing practicals in physics respectively.

Everyone was undecided whether or not friends, guardians and teachers influenced them to do physics, enjoy doing Maths and physics, lack assistance in solving problems in physics and get help from teachers to do practicals in physics. Students in the sample, 16.7%were undecided whether they do self-study often in physics or do not do CATS and assignments frequently. Of the whole sample size, 33.3%were undecided whether physics is a difficult subject, if friends do not like physics or unable to handle physics practicals alone.

4.6 Semi-structured questionnaire analysis table for physics instructors, forms 3 and 4 and forms 1 and 2 groups

Table 4.2: Analysis table for physics instructors, forms 3 and 4 and forms 1 and 2 groups

SERIAL NUMBER	ITEM(S)	RESPONSES (%)					
		INSTRUCTOR (S)		FORM (III&IV)		FORM (I&II)	
		YES	NO	YES	NO	YES	NO
1.	Do availability of resources such as reading books and teaching aids influence performance of the students in Physics?	80	20	57	43	93	7
2.	Do presence of role models that is, teachers, both female and male bring motivation of the students in pursuing Physics as a subject?	100	0	86	14	100	0
3.	Do teachers' competence in articulation of subject content increase/raise Physics subject performance	100	0	86	14	79	21
4.	Do teachers' use of diverse methodology and class attendance influences performance of the Physics subject?	80	20	57	43	57	43
5.	Is active participation of the students in class in direct relationship with satisfactory completion of class task with Inquiry-Based-Learning for physics subject?	100	0	71	29	64	36

CHAPTER FIVE: SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.0 Summary

The respondents were 22 indicating a more than 80% response which was good. In both the interview and questionnaire returned papers for the students. The study used SPSS software Version 20 to analyze the data that was collected. Students' demography, attitude towards science was tested while a realization test was given to gauge how students understood the concepts in physics.

This study was set up in a slum-like area where people have different culture and socio-economic background. It revealed persistence of 4.5% out of the 22 who responded in the sample of 26 on reasons why the topics brought to board are difficult to understand in the syllabus. It too looked at the link between Physics and occupation of choice they had made and the output was 4.5% scored as average meaning that Physics as a subject will help in their life endeavors and that, they share Physics textbooks at an average too of 4.5%. Factors not elaborated for this research included the size of the class, literacy level, difficulty index, cultural background and type of curriculum.

5.1 Conclusion

The research was dedicated to secondary school physics. Gender and socio-economic status (SES) were seen to be the contributing factors in the enrolment of physics as a subject among the students. This was in line with poor family backgrounds due to the fact that these students live in slum-like areas, with illiterate parents. The personal value for the sciences that is physics, its enjoyment, and self-concept in physics and even Math to that extent, are the intervening variables in the study plus performance in the achievement test done. These findings will give educational institutions and policy makers an understanding of factors influencing enrolment and performance of science

subjects such as physics and whether to enroll in physics or STEM subjects at all forms, that is 1,2,3, and 4. It ascertained the social, economic, cultural, psychological factors that influence gender differences in achieving maximum enrolment and performance in it.

The research findings here are important as they will allow stakeholder to take informed decisions and apply different approaches to enhance performance and enrolment in science subjects especially physics also for purposes of future referencing.

Exhibited statistics provided, allow main stakeholders to take a further targeted approach to enhance physics and other science subjects like Mathematics to increase STEM involvement of pupils from different background in their endeavors to partake university education.

5.2 Recommendations

There is need to conduct a research in the same line to ascertain whether the study findings apply to other schools within different counties

Further research should be conducted to examine the extent to which school based factors affect physics performance and enrolment

Another research should be conducted to establish the point to which the factors affect other science subjects' performance and enrolment.

Lastly a research should be conducted to ascertain the causes of disparities amongst different gender and how to bridge the gap.

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APPENDICES

Appendix I: Interview Guide for Head of Department

School Position Held in School

Years of experience

1. Do you do random streaming or you do streaming according to ability when delivering content?
2. What is the procedure students undertake to select science?
3. How do students perceive physics?
4. Which efforts have you taken to change students perceptions mentioned above?
5. Do you encourage student to think rationally during physics classes?
6. Are students taught about relevance of Physics in everyday life?
7. How frequent do you countercheck students' progress and syllabus handling?
8. Do you make that all physics students to get involved in practical activities?
9. Which policies do you to evaluate departments that handle science subject?
10. What process do you use for evaluation?
11. Does the school have enough learning and teaching materials?
12. How many laboratories does the school have for teaching practical physics lessons?
13. Are pupils heartened to carry out studies that are problem solving in nature?
14. Do parents get involved in selecting subjects for their students?
15. How frequently conduct a dialogue with physics students?
16. Are pupils encourages to embrace mathematics and science subjects?
17. Do you expose your pupils to contests?
18. How can you improve enrolment and performance of physics at your institution?

THANK YOU

Appendix II: Teacher's Questionnaires

Dear Physics Teacher,

This questionnaire seeks to research on the influencing factors on enrolment performance in Physics by students. True information will be required to enhance researcher's success. Further information provided herein will be confidential and sustained for research purposes.

BACKGROUND INFORMATION

School

Gender

Years of experience.....

GUIDELINES

- 1 Before answering any questions read carefully.**
- 2 Respond by (✓) appropriate boxes**
- 3 Answer questions in spaces provided for (where applicable)**

QUESTIONNAIRE for teachers

SECTION A:

Tick (✓) the appropriate box.

1. Education level []

a) University []

b) Diploma []

c) KCSE []

d) KCPE[]

e) Polytechnic[]

2. Qualifications professionally

a) Graduate holder[]

b) Diploma holder[]

c) Untrained []

d) Approved[]

e) Certificate holder[]

3. Last physics in – service training

a) > 10 yrs. []

b) > 5 yrs. []

c) 3 yrs. []

d) 1 year []

4. When did quality assurance officers last visit your school?

a) \geq 20 yrs[]

b) 20-15 yrs[]

c) 15-10 yrs []

d) 5-10 yrs []

e) 5-0 yrs[]

5. Are schemes of work normally prepared? YES [] NO[]

6. If yes explain

7. Do science students select subject by themselves? YES [] NO[]

If no explain

8. On average, from three has how many physics students?

- a) More than 50[]
- b) 50-40[]
- c) 40-30[]
- d) 30-20[]
- e) 20-10[]

9. Lessons in a week are how many and do you show up all? YES [] NO[]

10. Does your work load enable you to attend to individual students? YES [] NO[]

11. Are the teaching resources, make effective the teaching of Physics in your school?

YES [] NO[]

12. Rate your Physics school performance?

- a) Excellent[]
- b) Very good[]
- c) Good[]
- d) Fair[]
- e) Poor[]

13. Rate physics school enrolment

- a) Very satisfactory[]
- b) Satisfactory[]
- c) Not satisfactory[]
- d) Poor[]

Give reasons

SECTION B: Teacher's Interview

Use the likert scale to rate the statements: 1=Strongly Disagree 2=Disagree

3=Neither Agree nor Disagree 4=Agree 5=Strongly Agree. (✓ Appropriately)

No.	Statement	1	2	3	4	5
1.	Students get support from their parents do well in Physics					
2.	An environment that is favorable for the students is set by the school for them to do well in physics.					
3.	The school admits students who are low in average and hence not badge in physics.					
4.	Encouragement is done to students so that they creatively think during articulation of content sessions.					
5.	Precise and accurate observations are encouraged and students aided to do so during practical sessions in Physics.					
6.	Students are lazy by way of not working hard.					
7.	Daily workload hinders you from attending to physics slow learners.					
8.	Students' enrolment in Physics in third form is subjective by parents.					
9.	The school avails all the requirements for Physics practical lessons.					
10.	You are motivated when you complete the physics syllabus.					
11.	Most topics in Physics impend to be difficult when handling them.					
12.	Learners are encouraged to verify their predictions by doing experiments that are based on scientific ideas and relate to the environment.					

THANK YOU FOR YOUR COOPERATION.

Appendix III: Students' Questionnaire

SECTION A: GENERAL INFORMATION

School:

Form:

SECTION B:

GUIDELINES

- 1 Before answering any questions read carefully.**
- 2 Respond by (√) appropriate boxes**
- 3 Answer questions in spaces provided for (where applicable)**

1. Type of primary school

- a) Boarding []
- b) Day []
- c) Mixed []
- d) Missionary school []

2. How was your K.C.P.E performance in science?

- a) A []
- b) B []
- c) C []
- d) D []
- e) E []

3. Which is your mean aggregates of the students per stream?

0-10 []

11-20 []

21-30 []

31-40 []

>40 []

4. Among the topics in Physics which ones are difficult?

.....
.....
.....
.....

Explain why

.....

5. Rate your physics syllabus to other subjects?

Wide []

Not wide []

6. Rate the last exams you did in Physics

Highest []

Higher []

High []

Low []

Lower []

7. Talk of your occupation after school?

.....

8. Are you influenced by your family members when it comes to choosing occupation?

YES []

NO []

9. Reason for choosing the occupation

.....
.....

10. How is physics significant in your occupation after high school?

.....
.....
.....

11. Does your teacher of help in understanding practical done in physics?

Yes [] No []

12. Is there a link concerning what is learnt in class and real life situation?

Yes [] No []

Explain

.....

13. Do parents provide you with learning resources for instance textbook?

Yes [] No []

14. How are textbooks shared in a physics class?

.....
.....

15. Does you think the school have adequate learning resources such as apparatus and laboratory?

Yes [] No []

THANK YOU

Appendix IV:Students' Interview

Use the likert scale to rate the statements: 1=Strongly Disagree 2=Disagree

3=Neither Agree nor Disagree 4=Agree 5=Strongly Agree. (Appropriately)

Statement	1	2	3	4	5
Physics is important in forthcoming years					
I was influenced by friends to select physics as a subject					
I frequently study physics by myself					
I was influenced to select physics by my parents/guardian					
Physics is a challenging subject					
My friends hate physics					
There are adequate learning and teaching resources in the school					
I was influenced by my teacher to select physics.					
Assignments are not issued frequently and CATS are not done as well.					
I like carrying out physics and mathematics problems					
We are not helped by our teachers in solving physics difficult tasks.					
I am in a position to carry physics practical by my self					
We are helped by our teacher to carry out physics practical.					
I like physics classes					

Appendix V: Students’ Opinions Viewpoint

In your opinion which factors needed to be enhanced to increase performances in physics?

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Thank you

Appendix VI: Achievement Test

The test is to offer the student with evidence needed for the study and thus is confidential

BACKGROUND INFORMATION

School.....

Form.....

Students name.....

GUIDELINES

Read the questions before answering any question

Answers section A & B in the space provided

ALL working should be indicated clearly

Calculators and mathematical tables might be used

Acceleration as a result of gravity $g=10\text{m/s}^2$

For official use

Section	Question	Maximum score	Students' score
A	1-5	25	
B	6-10	25	
SCORE		50	

PART A

1. Give reasons why wire gauze are used for heating water in a lab (2 marks)

This is because it's a good conductor of heat thus help to disseminate heat in a uniform manner while heating.

2. A car's weight is 6000N and needed pressure for the tire 30N/cm². Calculate the area of the tires when in touch with the ground. (3 marks)

$$1 \text{ tire} = \frac{6000}{4} = 1500 \text{ N}$$

$$\text{Pressure} = F/A$$

$$\frac{1500}{30} = 50$$

$$\text{Area} = 50 \text{ cm}^2$$

3. Explain how surface tension can be reduced (2 marks)

Boiling liquid

Increasing impurities

4. Calculate the water level on a burette holding 35cm³. Given that each drop has a capacity of 0.1cm³ and that 20 drops of water were added (2 marks)

$$\text{Capacity} = 0.1 \text{ cm}^3 \times 20$$

$$= 2 \text{ cm}^3$$

$$= 33 \text{ cm}^3$$

5. Fresh water (200g) with a density of 1g/cm³ was mixed with sea water (200cm³) having a density of 1.2g/cm³. Calculate

- i. Mass of sea water (2 marks)
- ii. Fresh water volume (2 marks)

iii. Density of the mixture (3 marks)

Sea water mass

Mass = Density

1.2g/cm³

=240g

Water volume

Volume = mass/density

=200g/1gcm⁻³

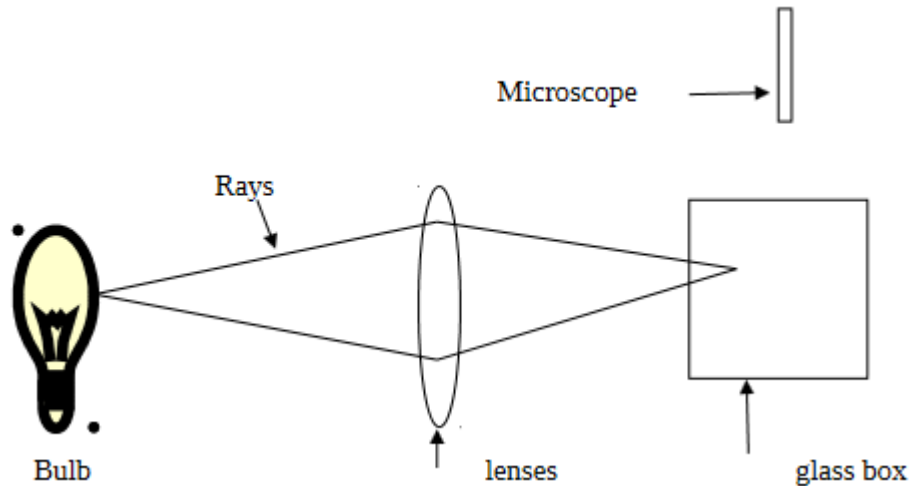
=200cm³

Density of the mixture

Density = mass/volume

$$\frac{(240 + 200)g}{(200 + 200)cm^3} = 1.11gmc^{-3}$$

6. The apparatus below shows the Brownian smoke particles motion. Smoke is encircled in a smoke cell.



a) What is the role of the bulb, lens and microscope (3marks)

Bulb - Produce light

Lens - covers light from the smoke for illumination purposes

Microscope – enlarges smoke particles

b) State and explain the nature of the observed motion of the smoke particles (3 marks)

The smoke particles will move faster or rapidly than before in random continuous manner because of collision with invisible air molecules and among themselves.

c) Kamau will observe what, when smoke particles are in motion and temperatures are slightly raised (3 marks)

Smoke particles will travel rapidly as compared to when the heat had not been increased.

The rapid movement is as a result of increased kinetic energy.

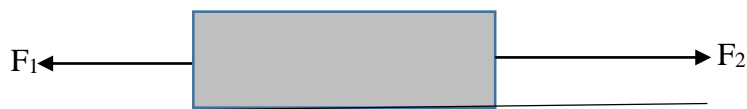
d) How can ammonia gas diffuse faster from one corner to another in a room.(3 marks)

By increasing temperature

Introducing lighter gasses

PART B

7. Fig below shows a body being acted on by two forces F₁ and F₂.



Draw the force F₃ that has same effect on the body as the two forces (2 marks)

8. State Pascal's principle of transmission of pressure in fluids (1 mark)

States that pressure is transmitted equally in all directions of the enclosed container.

9. A pipe of radius 6mm is connected to another pipe of radius 9mm. If water flows in the wider pipe at the speed of 2m/s. What is the speed in the narrow pipe (3 marks)

$$A_1 V_1 = A_2 V_2$$

$$6^2 V_1 = 9^2 \cdot 2 \text{ m/s}$$

$$V_1 = 4.5 \text{ m/s}$$

10. (a) Differentiate between liquid and solid matters in terms of inter molecule (1 mark)

Liquids have large distances in their inter molecule while solids have compact and regular arrangements

(b) An experiment was conducted to estimate diameter of oil molecule. A drop of oil measured 0.05 cm and it spread to a diameter of 20cm. calculate

i. Volume of the dropped oil (3 marks)

$$\text{Volume} = \frac{4}{3} = 0.001375 \text{ cm}^3$$

ii. Area covered by the patched oil (3 marks)

$$= 3.142 \cdot 10$$

$$= 31.42 \text{ cm}^2$$

iii. Twice the radius of the oil molecule (answer in meters) (4 marks)

Diameter = Volume / Areas

$$= \frac{0.01375}{3144.2}$$

$$= 4.4 \times 10^{-6} \text{cm}$$

(d) States

i. Assumptions made above is that (3 marks)

Oil drop was sphere

Oil patch was monolayer

Twice the radius of the oil molecule is equal to the molecule size

The patch of the oil is a circle

ii. Outline possible errors that might have occurred in the experiment (2 marks)

-errors could have occurred in measuring oil drop diameter

It could have also occurred in measuring oil patch diameter.

Appendix VII: Name Strata of the Form I, II, III, And IV in Olekasasi Secondary And Performance in the Achievement Test (Experimental Group)

FORM	S/N	ENROLMENT IN SUBJECT	PERFORMANCE	
		PHYSICS	SCORE X/50	SCORE X/100
I,II	1.	Jimmy Matayo	39	78
	2.	Emmanuel	30	60
	3.	Griffin Gershon	24	48
	4.	Keenan Ojow	37	74
	5.	Alexander MK	29	58
	6.	Abel Fortune	20	40
	7.	Daniel Mungai	40	80
	8.	Salomik M	37	74
	9.	Meliyio Evaline	37	74
	10.	Daniel Mutinda	29	58
	11.	Bonface Mutinda	31	62
	12.	Gift Njoroge	28	56
	13.	Samwel G	18	36
	14.	Musau Faith	36	72
	15.	Purity Mutinda	29	58
	16.	Millicent Indeche	-	-

	17.	Samson Kariuki	-	-
	18.\	Godfrey Kameru	-	-
	19.	Brian Masaki	-	-
	20.	Kalvin Debora	-	-
	21.	Juliana Njeri	-	-
	22.	Samwel Mwangi	-	-
	23.	Clifford Orina	-	-
	24.	Linnet Rai	-	-
	25.	Alex Kimele	-	-
	26.	Ali Isco	-	-
III,IV	1.	Peter Mwanzia	23	46
	2.	Fredrick Kilu	24	48
	3.	Mutuku Nthenge	14	28
	4.	Frankline OG	24	48
	5.	Faith Watoro	22	44
	6.	Kelvin Were	4	8
	7.	Abdulla Hawah	36	72
	8.	Wamaitha T	14	28

	9.	Brian Kombo	23	46
	10.	Ibrahim T	29	58
	11.	James Musyoka	33	66
	12.	Cynthia W	18	36
	13.	Ricko Simiyu	18	36
	14.	Gift Wambui	3	6
	15.	Harun Syad	19	38
	16.	Kilonzo Richard	29	58
	17.	Boniface W	43	86
	18.	Mildred Atieno	-	-
	19.	Zipporah M	-	-
	20.	Lenny Maina	-	-
	21.	Esther Wambui	-	-
	22.	Nancy Wambui	-	-
	23.	Evans Ochieng	-	-
	24.	Lucy Njeri	-	-
	25.	Victor Irungu	-	-
	26.	Gideon Muuo	-	-

**Appendix VIII: Name Strata of the Form I, II, III, and IV in Olekasasi
Secondary and Performance in the Achievement Test (Control Group)**

FORM	S/N	ENROLMENT IN	PERFORMANCE	
		SUBJECT	SCORE	SCORE
		PHYSICS	X/50	X/100
I,II	1.	Samuel Musyoki	4	8
	2.	Benard Nyukuri	12	24
	3.	Emmanuel Kings	15	30
	4.	Finni Balor	7	14
	5.	Daniel Mutinda	30	60
	6.	Chrisantos Ogach	6	12
	7.	Ndulu David	28	56
	8.	Godwin Odhiambo	17	34
	9.	Millicent indeche	2	4
	10.	Humu Abdulla	18	36
	11.	Risper Achieng	-	-
	12.	Simon Ngigi	-	-
	13.	Derrick Kahuru	-	-
	14.	Novel Anyango	-	-
	15.	Alexander Mumo	-	-
	16.	Timothy Maina	-	-

	17.	Ricolisterin Oduor	-	-
	19.\	Juliet Ogola	-	-
	19.	Samuel Gachanju	-	-
	20.	David Mutisya	-	-
	21.	Charity Aloo	-	-
	22.	Joy Akinyi	-	-
	23.	Martha Wanja	-	-
	24.	Griffin Gershon	-	-
	25.	Qaren Phoebe	-	-
	26.	Hisham Adbulkhman	-	-
III,IV	1.	Christopher NE	12	24
	2.	Esther Wambui	13	26
	3.	Francis Karanja	12	24
	4.	Dennis Kangiri	10	20

	5.	Benjamin Musyimi	10	20
	6.	Bruno Penandez	12	24
	7.	Dominic Makana	-	-
	8.	Isaac Ndoria	-	-
	9.	Alice Wanjiru	-	-
	10.	Abdisamad A	-	-
	11.	John Bosco	-	-
	12.	Felix Odhiambo	-	-
	13.	Esther Wangari	-	-
	14.	Mark Kariuki	-	-
	15.	Fadhil Otieno	-	-
	16.	Rosemary W	-	-
	17.	Cedric Kiema	-	-
	18.	Chris Kirubi	-	-
	19.	Suleimani Osama	-	-
	20.	Naima Mohammed	-	-
	21.	John Wanza	-	-
	22.	Sabina Kwamboka	-	-
	23.	Fredrick Kiilu	-	-
	24.	Faisal Abdi	-	-
	25.	Kennedy Marwa	-	-
	26.	Bahati Augustina	-	-

Appendix IX: Semi-Structured Questionnaire for Physics Instructors, Form Three and Four Students, and Form 1 and 2 Students

Indicate Yes or No with the following questions.

1. Do availability of resources such as reading books and teaching aids influence performance of the students in Physics?

Yes () No ()

2. Do presence of role models that is, teachers, both female and male bring motivation of the students in pursuing Physics as a subject?

Yes () No ()

3. Do teachers' competence in articulation of subject content increase/raise Physics subject performance?

Yes () No ()

4. Do teachers' use of diverse methodology and class attendance influences performance of the Physics subject?

Yes () No ()

5. Is active participation of the students in class in direct relationship with satisfactory completion of class task with Inquiry-Based-Learning for Physics subject?

Yes () No ()

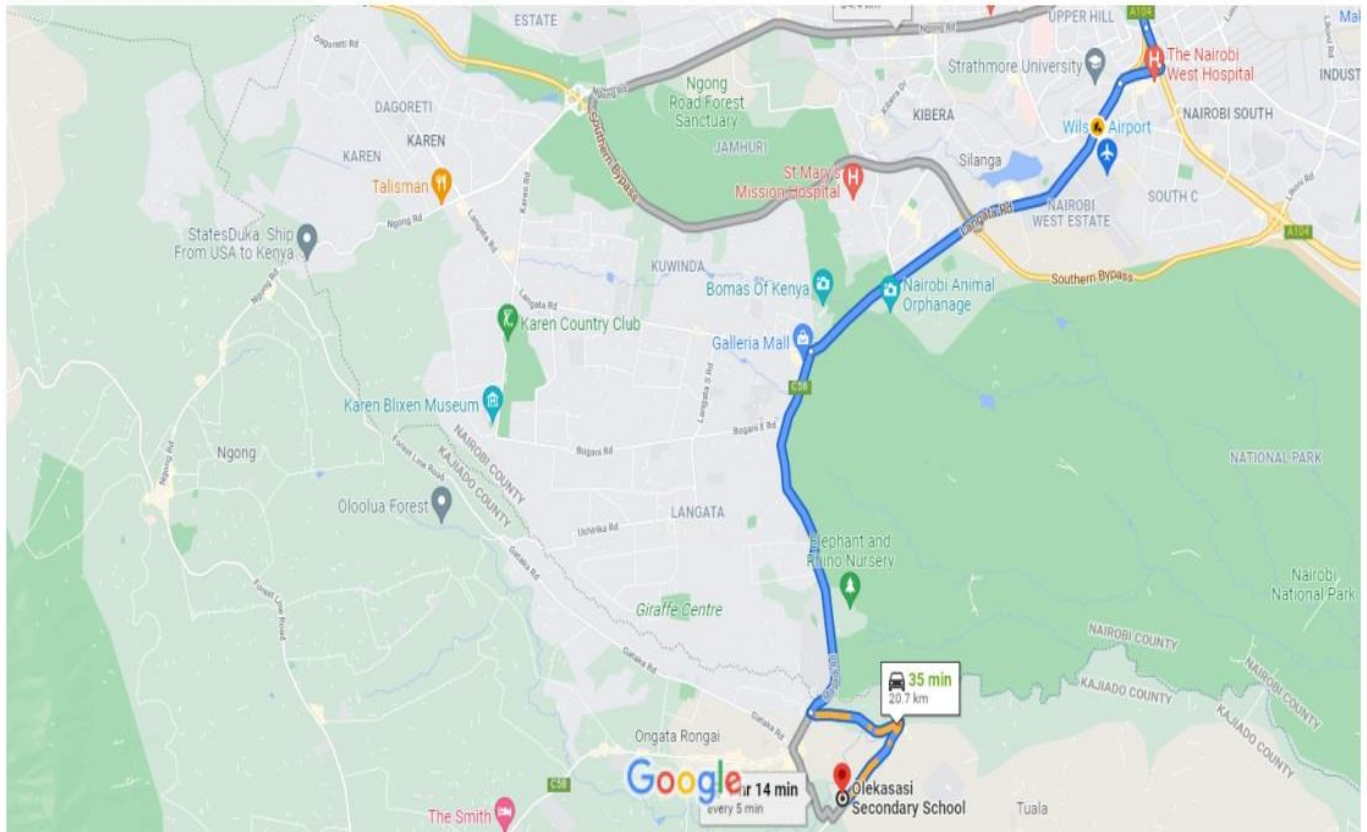
THANK YOU

Appendix X: Location of the Study

Google Maps

Nairobi to Olekasasi Secondary School, Nairobi

Drive 20.7 km, 35 min



Appendix XI: Research Workplan

Activities Time	Chapter one	Chapter two	Chapter three	Data collection	Data analysis	Final Report analysis and Submission
August, 2021						
September, 2021						
October - November, 2021						
November- December, 2021						

Appendix XII: Research Budget Estimate

Serial number	Task	Summary of budget cost in (Ksh)
1.	Developing research concept	20,000
2.	Pretesting design instruments	5,000
3.	Obtaining permission	2,000
4.	Data collection (communication, travelling, and internet)	42,000
5.	Data analysis and reporting	20,000
6.	Report writing	10,000
7.	Unforeseen costs	20,000
	Total	119,000