EFFECTS OF SCHOOL AND HOME-BASED FACTORS ON SECONDARY SCHOOL STUDENTS’ PERFORMANCE IN SCIENCE SUBJECTS IN KIRINYAGA CENTRAL DISTRICT, KENYA

BY

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A THESIS SUBMITTED IN PARTIAL FULFILMENT OF THE REQUIREMENT FOR THE DEGREE OF MASTER OF EDUCATION IN THE SCHOOL OF EDUCATION OF KENYATTA UNIVERSITY

JULY, 2015
DECLARATION

This thesis is my original work and has not been presented for the award of a degree in any other University.

Sign ______________________ Date ______________________

KANYORO, ALICE W.
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APPROVAL

We confirm that the work reported in this thesis was carried out by the candidate under our supervision as student’s supervisors.

Sign ______________________ Date ______________________

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Sign ______________________ Date ______________________

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DEDICATION

This work is dedicated to the Ministry of Education, all trained science teachers and administrators’ so that they can understand what causes poor performance in science subjects and what can be done to enhance good performance in the science subject.
ACKNOWLEDGEMENTS

I would like to acknowledge the assistance I have received from different persons through the study. I feel greatly indebted to everyone who helped in one way or the other to make this work a success.

First I wish to thank my supervisors Professor. Twoli N.W, and Dr. Ondigi S.R. for their guidance and encouragement throughout the study which was overwhelming. I was so short of ideas sometimes but whenever I approached them, I left their offices with a clear-cut way in which to follow. Secondly, I wish to thank all my lecturers at Kenyatta University who offered me support that enabled me to move on with the study. I extend my thanks to all school administrators who offered me support and encouragement during my research. I would also wish to thank all physics teachers in the District in Kirinyaga County and the students who were useful in supplying data which was used in this study.

My classmates in the M.Ed. Class of 2010 deserve mentioning because they provided the necessary encouragement knowing that we had very much in common. Thanks you all.

I also wish to thank my husband Patrick Karimi for his encouragement and support and my children Victor Wangai and Kennedy Muriuki for bearing with my long absence during my study.

Lastly, but above all, I thanks the Almighty God for enabling me to go through all the hustles successfully.
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# ABBREVIATIONS AND ACRONYMS

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<tr>
<td>ANOVA</td>
<td>Analysis of variance</td>
</tr>
<tr>
<td>GPA</td>
<td>Grade Point Average</td>
</tr>
<tr>
<td>H.O.D</td>
<td>Head of Department</td>
</tr>
<tr>
<td>K.C.S.E</td>
<td>Kenya Certificate of Secondary Education</td>
</tr>
<tr>
<td>K.N.E.C</td>
<td>Kenya National Examinations Council</td>
</tr>
<tr>
<td>M.O.E</td>
<td>Ministry of Education</td>
</tr>
<tr>
<td>SR</td>
<td>Students’ Role</td>
</tr>
<tr>
<td>SMASSE</td>
<td>Strengthening Of Mathematics and Science in Secondary Education</td>
</tr>
<tr>
<td>SPSS</td>
<td>Statistical Packaged for Social Sciences</td>
</tr>
<tr>
<td>SES</td>
<td>Socio-economic Status</td>
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ABSTRACT

With the country’s vision of industrialization by 2030 students’ performance in science subjects to produce the expertise to drive the country to its realization has been given the first priority. The effect of school and home-based factors may have a considerable effect on students’ performance in science subjects at Kenya Certificate of Secondary Education (K.C.S.E.). The government has provided support, policy framework and teachers. It has also prioritized science performance in Kenya. However compared to other subjects, students’ performance in science subjects has been below average. This study aimed at investigating the effect school and home-based factors on students’ performance in science subjects. The study was guided by the objectives of establishing the influence of students’ role on performance in sciences, influence of family background on performance in sciences, influence of school environment on performance in sciences and effects of peer influence on performance in sciences. The study utilized descriptive survey research design. Stratified random sampling was used to obtain the study sample. The population study of thirty two public secondary schools was divided into two strata; county school and sub-county schools. The county schools were further stratified into girls’ boarding schools and boys’ boarding schools. Purposive sampling was used to select Form Two students because they had not yet selected the subjects. Random sampling was used to select the desired number of respondents from each stratum on proportionate basis. The study used questionnaires to collect data from the deputy principals, Science teachers and form two students while interview schedules were used to collect data from Heads of science Department and parents. These provided information on financial status of families, family sizes, teacher-student relationships, school influence and involvement of learners in co-curriculum activities, relationship among students, school size and parental involvement in school activities. The questionnaires were pre-tested to establish their validity and reliability before being administered to the respondents. The statistical packaged for social sciences (SPSS) was used to aid in data analysis. The analyzed data was represented using frequency distribution tables and pie charts for easier interpretation. The study established that there was significant relationship between gender and students’ science performance; males performed better than females. Adequate time allocation resulted in better sciences performance while the students who participated in co-curriculum activities performed well in sciences as compared to those who did not participate. The study established that parents with high level of education had their children performing well in sciences. Students who live with both parents performed better in sciences than those without both parents. The students who stayed with the mother had good performance compared to those who stayed with only the father, grandparent or at children homes. Children of financially stable parents performed better in sciences than those who come from financially unstable parents. The research found that peer influence and peer negligence significantly influenced science performance. The research established that the county schools had better science performance than sub-county schools, that the availability of material resources and good student/teacher relationship influenced the students’ science performance positively. The greatest influence on science performance was by B.Ed. and diploma holder teachers while B.Sc. holder teachers had the least influence.
CHAPTER ONE

INTRODUCTION

The performance of students in science subjects in secondary schools in Kenya has continued to be low for many years. School and home-based factors are some of the factors that affect the performance in the science subjects.

1.1 Background of the Study

Science, engineering and technology play an increasingly crucial role in the Kenyan economy. Science, engineering and technology skills are vital, as they provide the basis for an innovative and globally competitive workforce. When learning science, the learner acquires skills such as communicating scientifically, experimenting and testing of hypothesis. These experiences can make a learner to predict the future outcome of various events with great accuracy. The learner is able to inductively, deductively and flexibly approach new situations with confidence and high degree of precision.

Science today dominates such a wide area of human activity that it’s no longer the concern of a select group of people in a society but has become a concern for everybody in the society. This is supported by Das (1990) who adds that science is part and parcel of our life. In the developed countries science has entered every fabric of life and even in the developing countries its impact on life is felt in an increasing manner. Such a situation obviously demands everybody’s acquaintance, with science, both as a product as well as a process (Das, 1990). According to Das (1990) a man without contact with science and its manifestations would be a complete misfit in the modern society. If we conceive education as a process for preparation of a socially efficient citizen, it is imperative that each individual of the society acquires knowledge of science as well as
scientific attitude of mind as a consequent discipline (Das, 1990). Students carry out experiments in order to acquire scientific knowledge and skills. The acquisition of the knowledge and skills can only be assessed by looking at the performance of the students in science at the secondary school level. For a long period of time the students’ performance in science has continued to be below average. Feedback from formal assessment and observation from stakeholders indicate a shortfall in science. It is included in the school’s curriculum for the same reasons as any other subject, but in addition science inculcates special values in a student and which no other subject can provide. Therefore when its performance continues to go down year in year out it raises a concern among the parents, teacher’s, government and other stakeholders.

Parents, teachers, government and other stakeholders invest heavily in sciences in terms of human and material resources and it is their expectation that their input yields substantial output (Jesse, 2005). The stakeholder’s immediate feedback is students’ good performance in examination and subsequent acquisition of scientific knowledge and skills bearing in mind that Kenya intends to become industrialized by 2030. Despite all this effort science performance continued to be lower than the other subjects (Samuel, 2005). Despite the much effort put by educational administrators and stakeholders, the performance of students in science subjects continues to be poor year in year out compared to other curriculum subjects.

Table 1.1 shows students’ performance in science subjects in Kenya Certificate of Secondary Education (K.C.S.E) as compared to other subjects for the last five (5) years.
Table 1.1 Kenya Certificate of Secondary Education Performances for Five years

<table>
<thead>
<tr>
<th>SUBJECT</th>
<th>NAME(CODE)</th>
<th>2005</th>
<th>2006</th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
<th>AVERAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>English(101)</td>
<td></td>
<td>42.86</td>
<td>39.78</td>
<td>39.70</td>
<td>33.78</td>
<td>39.21</td>
<td>39.07</td>
</tr>
<tr>
<td>Kiswahili(102)</td>
<td></td>
<td>45.24</td>
<td>51.87</td>
<td>45.95</td>
<td>37.28</td>
<td>39.08</td>
<td>43.88</td>
</tr>
<tr>
<td>Mathematics(121)</td>
<td></td>
<td>18.49</td>
<td>21.87</td>
<td>23.10</td>
<td>21.30</td>
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<td>Biology(231)</td>
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<td>32.01</td>
<td>29.84</td>
<td>44.70</td>
<td>30.34</td>
<td>27.30</td>
<td>32.84</td>
</tr>
<tr>
<td>Physics(232)</td>
<td></td>
<td>35.99</td>
<td>40.82</td>
<td>42.23</td>
<td>36.71</td>
<td>31.31</td>
<td>37.41</td>
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<tr>
<td>Chemistry(233)</td>
<td></td>
<td>29.44</td>
<td>27.01</td>
<td>27.69</td>
<td>22.74</td>
<td>19.12</td>
<td>25.20</td>
</tr>
<tr>
<td>History/Government(311)</td>
<td></td>
<td>54.83</td>
<td>54.08</td>
<td>54.60</td>
<td>40.96</td>
<td>45.78</td>
<td>50.65</td>
</tr>
<tr>
<td>Geography(311)</td>
<td></td>
<td>43.70</td>
<td>44.38</td>
<td>49.66</td>
<td>37.01</td>
<td>37.87</td>
<td>42.52</td>
</tr>
<tr>
<td>C.R.E(313)</td>
<td></td>
<td>57.74</td>
<td>55.40</td>
<td>62.39</td>
<td>50.41</td>
<td>42.81</td>
<td>53.75</td>
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<tr>
<td>I.R.E(314)</td>
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<td>62.73</td>
<td>59.60</td>
<td>62.58</td>
<td>54.71</td>
<td>43.12</td>
<td>56.55</td>
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<td>Home science(441)</td>
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<td>54.00</td>
<td>43.28</td>
<td>42.05</td>
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<td>44.71</td>
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<td>57.37</td>
<td>61.93</td>
<td>57.95</td>
<td>56.18</td>
<td>58.42</td>
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<td>Agriculture(443)</td>
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<td>47.85</td>
<td>41.09</td>
<td>46.60</td>
<td>43.13</td>
<td>37.28</td>
<td>43.19</td>
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<td>Computer Studies(451)</td>
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<td>57.33</td>
<td>56.87</td>
<td>57.61</td>
<td>45.83</td>
<td>48.17</td>
<td>53.16</td>
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<td>Music(511)</td>
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<td>51.03</td>
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<td>46.85</td>
<td>46.92</td>
<td>49.60</td>
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<tr>
<td>Business Education(565)</td>
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<td>-</td>
<td>48.86</td>
<td>58.11</td>
<td>37.73</td>
<td>35.43</td>
<td>36.03</td>
</tr>
</tbody>
</table>


From Table 1.1, it can be observed that the mean score of the science subjects has remained lower than that of most curriculum subjects. Student failure to take precaution when carrying out experiments led to poor performance by the students (K.N.E.C report, 2005). According to K.N.E.C report (2005) student usually make inaccurate observations and writes observations in an unacceptable scientific language hence poor performance in the subjects. This may have been contributed by lack of adequate previous exposure to the process of experimentation.
Table 1.2 shows performance of the science subjects in Kirinyaga Central District from 2008-2011.

**Table 1.2 Kirinyaga District Examination Results for Four years**

<table>
<thead>
<tr>
<th>YEAR</th>
<th>SUBJECT</th>
<th>MEAN %</th>
</tr>
</thead>
<tbody>
<tr>
<td>2008</td>
<td>Biology</td>
<td>43.99</td>
</tr>
<tr>
<td></td>
<td>Physics</td>
<td>35.24</td>
</tr>
<tr>
<td></td>
<td>Chemistry</td>
<td>34.27</td>
</tr>
<tr>
<td>2009</td>
<td>Biology</td>
<td>36.49</td>
</tr>
<tr>
<td></td>
<td>Physics</td>
<td>41.55</td>
</tr>
<tr>
<td></td>
<td>Chemistry</td>
<td>30.27</td>
</tr>
<tr>
<td>2010</td>
<td>Biology</td>
<td>49.98</td>
</tr>
<tr>
<td></td>
<td>Physics</td>
<td>43.08</td>
</tr>
<tr>
<td></td>
<td>Chemistry</td>
<td>40.50</td>
</tr>
<tr>
<td>2011</td>
<td>Biology</td>
<td>49.93</td>
</tr>
<tr>
<td></td>
<td>Physics</td>
<td>44.81</td>
</tr>
<tr>
<td></td>
<td>Chemistry</td>
<td>39.84</td>
</tr>
</tbody>
</table>

**Source: D.E.Os office Kirinyaga Central District**

From the table 1.2, it can be observed that the average mean score for the science subjects is below half of the total mark with chemistry being comparatively lower than biology and physics. It’s therefore evident that sciences are poorly performed in Kirinyaga Central District.

Science is a practical subject and its curricular should give students the opportunity to practice the processes of investigation in scientific contexts. In secondary schools this should involve working in well-equipped laboratories. Practical science investigation work is needed to enhance the relevance of school science, actively engage students in learning and provide opportunities to develop the skills and processes that contribute to scientific literacy.
Students’ academic achievement is assessed by use of final examination grades at the end of the fourth year of high school. Passing well in national examination plays an important role in shaping ones post-school life. More importantly, good performance in science subjects in Kenya determines ones future career in science and technology. According to Munywoki (2004), parents, government and other stakeholders continue to invest heavily in the education of young Kenyans every year in the hope that the inputs would result to better outputs.

Students were also unable to make accurate inferences and communicate them using acceptable scientific language (K.N.E.C report, 2006). Majority of candidates did not understand the questions and also failed to give correct interpretations of the expressions in the situations represented in the questions (K.N.E.C report, 2006). According to the K.N.E.C reports, students’ attitude, pedagogy (teaching approaches) and content were isolated as some of the factors contributing to low achievement in sciences. From the results of the performance in science subjects and comments of various reports, it’s possible to conclude that there exist a problem on how student relate with each other, how students use material resources available and exposure given to the student on the learning resources during the process of learning.

One of the demands in the 21st century is the acquisition of scientific skills and knowledge in order to enhance development and industrialization. Kenya cannot afford to be left behind. Teaching of sciences should therefore be enhanced in schools. Laboratories should be constructed and properly equipped for teaching and learning.
science subjects and examinations. The scientific approach is the method recommended worldwide for the teaching and learning of sciences. This method not only provides the students with the necessary skills but makes the subjects very interesting. This knowledge on scientific language can be highly enhanced by exposing the student to scientific materials from their early stages in secondary school. This exposure is highly determined by the availability of resources and eventually this will be influenced by school and home-based factors. (K.N.E.C report, 2005).

A person’s education is closely linked to opportunities one has, income and well-being (Barry, 2005). Therefore, understanding of educational attainment benefits and hindrances which may affect the attainment becomes very crucial. There are several topical areas that are most commonly linked to academic performance including student role (SR) factors, school factors, family factors and peer factors. Student Role is how well an individual fulfills the role of a student in an educational setting. School environment factors, such as school size, neighborhood and relationships between teachers and students also influence test scores (Crosnoe, Johnson & Elder, 2004).

One’s family background has also been found to influence student’s performance in sciences. Research has found that socio-economic status, parental involvement and family size are particularly important family factors (Majoribanks, 1996). Peer influences can also affect student performance in science. Peer pressure and peer negligence can lead to an individual participating in risk-taking behaviors which have been found to have a negative effect on scores (Santor et al, 2000). Parents pass on a measure of their
advantage and disadvantage to their children. The attention in the parents’ generation may be on a family characteristic such as total income (Jerrim, 2009).

It is well-known that children’s educational outcomes vary sharply with their parents’ socio-economic background (Jerrim, 2009). Differences in outcomes with parental background emerge at the pre-school level and are re-enforced in childhood and teenage years through to tertiary education (Jerrim, 2009). Scientific knowledge and skills are constructed in the mind through actions of the individual. Children are not passive receptors but active agents in developing their own minds (Arthur et al, 1980). Scientific knowledge evolves out of physical experience and occurs when children reflect on their actions and relate and organize reality in some way in their mind (Arthur et al, 1980). It is important to involve student in rich experiences at their level of development because to do this is more likely to provide a better foundation for later stages of cognitive growth (Arthur et al, 1980).

According to Jerrim (2009), an individual learns and develops his mind only by using it. Jerrim (2009) emphasizes that the only way a person learns the techniques of making discoveries is to discover. Through discovery, a student slowly learns how to organize and carry out investigations. One of the greatest payoffs of the discovery is that it aids better memory retention (Arthur et al, 1980).
1.2 Statement of the Problem

Scoring well in the KCSE final examination in science subjects is a visible goal that motivates all the stakeholders in education namely learner, teacher, parent and government. As revealed in the background of the study, student performance in science subjects has however been poor compared to the other subjects. The government has put in place various policy frameworks to promote improved performance in science subjects. For example; SMASSE programme has been introduced in secondary school, primary schools and teacher training colleges to strengthen performance in science subjects. The government has also tried to equip school laboratories with the aim of promoting performance in science subjects which in turn will support industrialization and achievement of Vision 2030. The curriculum developers have given science subjects more contact hours than other subjects in the secondary school curriculum. Despite all this frantic effort by all stakeholders namely learners, teachers, parents, and government performance by students in science subject continues to be poor compared to other curriculum subjects. Schools in Kenya are of different status. They are grouped into National, County and District schools. These schools require adequate teaching and learning resources and well trained teachers to enhance good performance. The requirements vary from one category of school to another.

This differential performance interests the researcher and needs to be investigated. The study investigated how school and home-based factors affect students’ performance in science subjects in public secondary schools in Kirinyaga Central District in Kirinyaga County, Kenya.
1.3 Purpose of the Study

The purpose of the study was to investigate the influence of school and home-based factors on science performance in Secondary Schools of Kirinyaga Central District in Kirinyaga County, Kenya. Among the factors to be investigated were student’s role in performance, influence of family background, peer influence and influence of school environment on performance of science subjects. The study collected data from Deputy Principals, Heads of science Department, science teachers, parents and form two students.

1.4 Objectives of the Study

The specific objectives are:-

i) To investigate the influence of student’s role on science performance in public secondary schools.

ii) To establish the influence of family background on students’ performance in science subjects in public secondary schools.

iii) To investigate how peer influences affects students’ performance in science in public secondary schools.

iv) To assess the influence of school environment on students’ performance in science subjects in Public secondary schools.
1.5 Research Questions

i) What are the influences of students’ role on science performance in Public secondary school?

ii) How do family backgrounds influence sciences performance in public secondary schools?

iii) How does peer influence affect science performance in public secondary schools?

iv) In which ways does school environment influence science performance in Public secondary schools?

1.6 Significance of the Study

The findings of this study are important to science teachers for they are able to understand how they can effectively utilize the available resources to teach science effectively. The findings also would enable the teachers understand how they can effectively interact with the students, parents and the society at large and use the available resources to motivate the learners thus enhancing their understanding of the science subjects. The findings would be of benefit to the learners because they would understand how they can make maximum use of the available resources and interact effectively with teachers to enhance their academic achievement in sciences thus achieving their full potential. To the policy makers, the finding would enable them to understand the shortfalls there are which limit performance in science subjects. They would also be made to understand how they can mobilize resources for use by learners in schools to uplift students’ performance in sciences. This knowledge is very significant.
having in consideration that we need to become industrialized by 2030. The policy makers and other stakeholder’s would also find these finding very important because they would enable them to understand the impacts of the SES on student achievement in science. The finding would also contribute to the growth of knowledge.

1.7 Assumptions of the Study

In this study the following assumptions were made:

(i) That the respondents participated freely without fear or other undesirable biases.
(ii) That the data provided by the respondents through research instrument was true.
(iii) The behavior of the learner was not be affected by the presence of the researcher.

1.8 Scope of the Study

This study dealt with Deputy Principals, Heads of science Department, science teachers, parents and form two students in public secondary schools in Kirinyaga Central District in Kirinyaga County.

1.9 Limitation of the Study

Time and poor communication network limits the extension of the research to other parts of the country. The study was confined to public secondary schools in Kirinyaga Central District in Kirinyaga County. Most of the schools in the district are rural schools and therefore getting the information was a challenge in terms of communication and travel.
1.10 Theoretical Frame-work

The study was guided by Gag’ne’s (1984) information processing model. In this model, Gag’ne determines that it is from the surrounding environment that the learner receives information using the five senses (receptors). The environment is provided for by the set-up of the learning situation that can either be favorable or not favorable. Fig 1.1 shows the Information Processing Model by Gag’ne that was used to guide the study.

Figure 1.1 Information Processing Model by Gag’ne (1984)

SOURCE: Adapted and modified from Bloom, B.
From the stimulus received, the learner codes the information in readiness for transfer to short-term memory. In the short-term memory, information can be easily forgotten and therefore all effort should be made to help and guide the learner to store the information in the long-term memory. In order for the information to be properly stored in the long-term memory, the students, teachers and the parents should make deliberate effort to help the learner to do that by creating conducive environment for learning and ensuring that what will be intended to be learnt has actually been learnt. This eventually will help in information retrieval by the students. This study sought to establish whether this is done and if there will be a correlation between the school and home-based factors and performance.
1.11 Conceptual Frame-work

In Kenya, the major yardstick used to measure educational output is performance in national examination. Various factors interact to bring about performance in science subjects.

**Student Role in Performance**
- Sex
- Extra-curricular activities
- Student Aspirations

**Family Background**
- Parent Educational Level
- Family Structure
- Parenting Practices and Aspirations
- Income
- Siblings Education Level
- Family Size
- Maternal Characteristics

**Peer Influences**
- Peer Pressure
- Peer Negligence

**School Environment**
- School Structure
- School Composition
- School Climate
- Teachers

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**STUDENTS PERFORMANCE IN SCIENCE SUBJECTS**

**Teaching methodology**

**School Curriculum**

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Figure 1.2: Conceptual Frame-work of the study.

**Source: Self-Constructed.**

Figure 1.2 shows the interaction between the dependent variables (student performance in science subjects) and independent variables (Student role in performance, family background, peer influence and school environment). Availability of fund to finance requirements for performance of science subjects is vital for its performance. Family
background is a strong influence to students’ performance in science subjects. Parent with no education have little or no influence to the performance of their children. Educated parents provide technical guidance to their children and this can play a role in their performance. Other family related factors such as geographical location, genetic inheritance, family structure (composition), parents work and parenting style can determine students’ performance in science subjects. Peer influences can have a positive or negative impact on science performance. Peer influence can represent a powerful force in maintaining order, productivity and positive academic and rehabilitative environment among students. Peers with learning and an achievement culture towards science subject can influence one another towards that direction. The culture where the students come from can be a strong influence toward science performance. Their attitude, values, norms towards science may affect students’ academic achievement.
1.12 Operational Definition of Terms

**Achievement:** Attainment of the desired objective.

**Cultural Aspect:** The beliefs, norms perceptions values and altitudes of a community.

**Funds:** Finances available to finance education.

**Feedback:** Information about achievement of objectives given back to the educational system.

**Peer influence:** To seek advice, copy behavior due to friendship and attachment with other peers.

**Performance:** Realizing a specific outcome through testing.

**Personality factors:** Internal characteristics found in every child. These include Child’s intellectual ability and approach to learning, attitude and disposition, self-esteem and impulse control.

**Science performance:** This refers to how well or badly student performed science subjects at Kenya Certificate of Secondary Examination.

**School and home-based Factors:** Refers to school and home details of family which influence education outcome.
CHAPTER TWO
LITERATURE REVIEW

2.1 Introduction

This chapter will highlight and assess available literature relevant on effects of school and home-based factors on science subject’s performance. The literature will come from books, journals, internet and theses. The literature review will be related to the study under the following heading: Introduction, student role and science performance, family background and science performance, peer influence and science performance, school environment and science performance. Literature review will also help in establishing existing gaps, some of which will be addressed by this study.

2.2 Student Role and Science Performance

Student Role (SR) is how well an individual fulfills the role of a student in an educational institution (Barry, 2005). SR involves factors such as sex of the students, students ethnicity, school effort, co-curricular activities, deviant behavior and student disabilities (Barry, 2005). Personality, availability of social supports, and family cohesion are often identified as categories of factors that can impact a child positively or negatively (Sameroff et al., 1993). Personality factors are defined as internal characteristics found in every child, including the child’s intellectual ability and approach to learning, attitude and disposition, self-esteem, and impulse control (Sameroff et al., 1993). Research finding explains that the reasons for poor performance in the science subjects range from inadequate resources, large classes, inadequate time allocation, poor science teaching due to teachers’ incompetence and poor commitment to students’, poor attitude to learning
(Balogum, 1994). Bajah (1998) states that there are positive correlations between high performance in practical tasks and factors like human, learning environment, library, audio-visuals, textbooks and particularly students’ inherent factors. Many studies on gender factor in science abound there exists gender gaps in students’ performance in science subjects (Ogunkola & Olatoye, 2010). Certain facts are even attributed to gender gaps and stereotyped images of sexes in schools (Ogunkola & Olatoye, 2010). Mills (1993) states that boys perform better than girls on tasks requiring mathematical concepts.

Past research has indicated an academic achievement gap in science subject between sexes, with boys ahead of girls (Barry, 2005). However, more recent research has shown that the achievement gap has been narrowing and that in some instances girls have higher academic achievement in sciences than boys (Chambers & James, 2004). For example, girls have been found to exert more effort at school, leading to better performance in science subjects (Carbanaro, 2005). Home environment is among the most important influences on academic performance (Bugs-Parents, 2003). At the same time girls seem to shy away from taking risks in experiments that may seem dangerous thus affecting their performance in the subjects (Kariuki, 2009). Science subjects cannot be adequately taught without allowing learners an opportunity to have a feel of practical lessons that aid them in the examination and also helps them develop their psychomotor skills (Kariuki, 2009). Kariuki (2009) observes that among other factors, practical lessons helps learners to prepare for the practical examination. The M.O.E. has a rule that for candidates to have a good pass in science subjects, a pass in the practical examination is a must. Probably this mode of assessment makes many learners lose out on valuable marks due to the fact
that they may not have been exposed enough to a good number of practical lessons (Kariuki, 2009). Many schools put it as a rule that once a student breaks an item he/she should pay (Kariuki, 2009). This makes many students, especially girls, shy away from using the apparatus for fear of breaking them (Kariuki, 2009). The do-not-touch mindset that is taught in the present system ought to change to enable more learners have a feel of science equipment, feel the excitement for science and understand that there remains a lot to be done (Kariuki, 2009). That is why the use of simple apparatus constructed locally would provide a magnificent opportunity for educators in developing countries to extract the essence of a good science education thus improving performance (Kariuki, 2009).

School influence is defined as the “amount of time and energy that students expend in meeting the formal academic requirement established by their teacher and/or school” (Carbonaro, 2005). There are three types of school influence namely; role oriented influence (showing up to and behaving in class), procedural influence (meeting specific class demands such as completing assignment on time) and intellectual influence (critically thinking about and understanding the curriculum) (Barry, 2005). It is expected that a student who puts forward significant effort in all three categories will perform better in sciences (Ceballo et al, 2004). Kariuki (2009) found out that students’ attitudes, aspirations and time devoted to studying science subjects determines performance in the subjects. Typically, effort has been positively linked with academic performance in science subject both in direct and indirect ways (Barry, 2005). Some studies have shown that high student effort leads to greater educational values, which in turn indirectly affects
student performance (Carbonaro, 2005). Effort has also been linked to higher student grade point averages (GPA) (Carbonaro, 2005). Effort has been measured in a variety of ways ranging from time spent on homework to attentiveness in class and all have been positively linked with school performance (Carbonaro, 2005). This study seeks to establish whether a deliberate effort is made by learners to spend meaningful amount of time in learning science subjects that could help in improving the performance in the subjects.

Participating in co-curricular activities, such as sports or clubs will have a positive effects on science performance (Hunt, 2005). Co-curricular activities provides additional, complimentary roles for a student that benefits the students academically by increasing their self-esteem and overall participation/interest in school (Barry, 2005). Participating in activities outside of class raises one’s status and create bonds with teachers and therefore enhances academic performance (Barry, 2005). Theoretically, because of its existence upon rules and equality (disregarding the prejudice that can exist within the framework of sport), sports provides an egalitarian utopia in which the rich and the poor, black and white, can subject themselves to a symbolic test unhampered by the accumulation of wealth or poverty, looks or skin pigmentation (Saint, 2011). The development of motor skills and physical fitness and knowledge must begin in the earliest years of primary school. During these years, the students are physically and intellectually capable of benefiting from instruction in physical education and are highly motivated and enthusiastic about learning (Saint, 2011). Physical fitness has a major role in the development of young mind (Saint, 2011). It is an integral part of the total education of any child and is closely linked to other creative and learning experiences and skill
acquisition (Saint, 2011). Regular physical activity provides numerous health benefits which leads to improved mental health and cognitive functioning (Saint, 2011). Through Physical Education, psychological development may be nurtured and opportunities created to develop interpersonal relationship, personal growth and self-esteem. Objectives such as good sportsmanship, cooperation, teamwork, giving and receiving support, appreciation for regular exercise, emotional control, leadership and fellowship skill and the development of a positive self-concept can be furthered through physical education (Saint, 2011).

Student deviance and delinquency have been linked to academic outcomes (Murdock et al, 2000). Deviant behavior ranges from less severe acts such as disorderly conduct in the classroom to more severe acts like committing criminal offences (Voelkl et al, 1999). Poor academic performance in science is usually accompanied with deviant behavior (Barry, 2005). Truancy has also been connected to poor grades and additional behavior problems (Barry, 2005). It has also been found that students who do well in science subjects are less likely to be deviant (Barry, 2005). Deviant behavior is also linked to dropping out of school (Voelkl et al, 1999).

2.3 Family Background and Science Performance

Family background is key to students’ life in and outside the school environment. It is the most important influence on student learning and includes factors such as, parenting practices and aspirations, income, two-parent versus single-parent households, divorce, maternal characteristics, family size and neighborhood (Mojoribanks, 1996). The environment at home is a primary socialization agent and influences a child’s interest in
school and aspirations for the future (Barry, 2005). Parental influence has been identified as an important factor affecting students’ achievement in sciences (Ogunkola & Olatoye, 2010). Results indicate that parent education and encouragement are strongly related to improved student achievement (Wang et al., 1996). Phillips (1998) found that parental education and socio-economic status have an impact on student achievement. Students with parents who were both college educated tended to achieve at the highest levels, but family size was modestly related to achievement (Ferguson, 1991).

Family processes, such as support of education and aspirations for children's academic attainment, have been shown to influence positively the achievement of children in science subjects (Barry, 2005). It is widely recognized that if pupils are to maximize their potential from schooling they will need the full support of their parents. Attempts to enhance parental involvement in education occupy governments, administrators, educators and parents’ organization (Desforges & Abouchaar, 2003). It is anticipated that parents should play a role not only in the promotion of their own children’s but more broadly in school improvement and the democratization of school governance (Desforges & Abouchaar, 2003).

The attempt to identify the impact of parental involvement and family education on educational outcomes must proceed with the clear recognition that these processes will be influenced by a wide range of other factors and at the same time work through a range of intervening processes (Desforges & Abouchaar, 2003). It is frequently found that the rate at which parents talk to teachers about their children's behavior and progress is negatively correlated with performance because the talk is usually a response rather than accused of
the problem (Desforges & Abouchaar, 2003). Thus the relationship between parental involvement and achievement is probably not linear (Desforges & Abouchaar, 2003). Research shows that supportive and attentive parenting practices positively affect academic achievement (Eamon et al., 2005). In addition, high parent aspirations have been associated with increasing students' interest in education (Majoribanks, 1996). Parental involvement in school has been linked to both positive and negative influences on academic achievement (Domina, 2005). It is thought that the type of involvement may make a difference and that in some cases parents become involved after their child has already had academic difficulties (Domina, 2005). Other recent research has found more conclusively that while parental involvement may not help academic scores, it does help prevent behavioral problems (Domina, 2005).

It has been well known for decades that pupil’s educational achievement is related to parent’s social class (Desforges & Abouchaar, 2003). Historically, the study of family influences on the science achievement of economically disadvantaged youth has focused on status variables. A moderate, positive correlation has been found between socio-economic status and children's academic achievement on science subjects. Michieka (1983) in his study noted that lack of school fees led to frequent absenteeism. These lost man-hours could not be recovered and led to failure in examinations mainly because the students did not prepare adequately to cover the syllabus. Waweru (1982) noted that poverty exerts pressure on pupils’ performance in sciences. This is because they cannot afford basic learning resources such as textbooks, pens, school fees among others (Waweru, 1982). Malnutrition and poor living conditions influence the health of the child.
and thus directly or indirectly affects his/her ability to learn and understand concepts in science subjects thus affecting his / her performance (Waweru, 1982). Nderitu (1999) noted that limited income among lower class families had been found to restrict provision of school books, supplementary books, remedial fees, development funds and other necessary materials to ensure good attendance and performance at school by pupils (Nderitu, 1999). Poor families have lower aspirations for their children than upper class due to the opportunity cost of the child. Poor families wanted their children to be involved in income generating activities so going to school meant a greater loss (Nderitu, 1999).

Research on the influence of income and mother’s employment suggest that working is not a predictor of negative outcomes and working can have both positive and negative effects on student’s achievement in science subjects (Mulkey et al, 1992). Regardless of whether they are single or married, mothers who work full time often have less time to spend with their children a condition that may lead to lower achievement and increases in behavior problems at school which ultimately affect their performance in science subjects (Marsh & Herbert, 1990). For many single-parents’ families, however, children receive more benefits than harms from their mother’s work. Research shows that children from low-income, single-parent families actually earn higher grades than children from two-parents homes with similar income (Mulkey et al, 1992). This suggest that single parents who work teach their children coping strategies that limit the impact of financial hardship, low parental involvement and other risk factors on academic performance (Mulkey et al, 1992).
More recent studies of status have focused on family structure variables (Desforges & Abouchaar, 2003). These studies have shown a correlation between single parenting and low academic achievement. Dating back to the 1970s, the Family Deficit Model views the nuclear or two-parent family as the ideal family structure (Marsh & Herbert, 1990). According to this model, single-parent families have a negative impact on children simply because they do not have a nuclear family structure (Marsh & Herbert, 1990). When parent separate or divorce, children who are left under the custody of their mother’s often lose both the financial and emotional support of their fathers, which can have a negative impact on academic performance (Nelson et al., 2001). Remarriage often changes parental behavior as a formerly single parent enters a new relationship (Nelson et al., 2001). This disruption can be hard on children who may feel that they are losing another parent (Nelson et al., 2001). The presence of stepsiblings also reduces time with and access to parents, further decreasing the amount of support individual children receive (Nelson et al., 2001). Although children in blended families still tend to have higher academic achievement in science subjects than those living with single parents, some children will replace academic problems with emotional and behavioral difficulties, essentially eliminating many of the positive effects brought on by the increase in family income (Marsh & Herbert, 1990).

However, the presence of extended family members has been shown to overcome this problem in many instances. Further, some researchers have shown that the relationship of single parenthood with academic achievement in science subjects is mediated through
processes in the family that support academic achievement in science subjects. Previous research shows that children from single-parent households do not perform as well as children from two-parent households (Majoribanks, 1996). There are different explanations for this achievement gap. Single-parent households have less income and there is lack of support for the single-parent who increases stress and conflicts (Majoribanks, 1996). Single parents often struggle with time-management issues due to balancing many different areas of life on their own. Some research has also shown that single-parents are less involved with their children and therefore give less encouragement and have lower expectations of their children than two parent households (Majoribanks, 1996). Divorce has also been seen to negatively affect academic achievement in science subjects (Jeynes, 2002). Jeynes (2002) found that students whose parents had divorced were among those who performed poorly in science subjects. This is due to the fact that divorce causes a family’s SES level to decrease and parental connections are harmed (Jeynes 2002,).

Maternal characteristics are another key factor that affect academic achievement (Baharudin & Luster, 1998). Mothers who are more educated and have higher self-esteem have children who perform very well in science subjects (Baharudin & Luster, 1998). Also mothers who delay childbearing have been shown to provide more “cognitively stimulating” and supportive environments at home which has a positive effect on science performance (Eamon et al, 2005).
Hammer (2003) asserts that home environment is as important as what goes on in the school. Important factors include parental involvement in their children’s education, how much TV they watch and the number of children in the home (Hammer, 2003). Small family size has been linked with higher academic achievement (Majoribanks, 1996). Students with fewer siblings are likely to receive more parental attention and have more access to resources than children from large families. The additional attention and support leads to better school performance (Majoribanks, 1996). Parents become less involved as their children get older (Pena, 2000). This may because parents feel less able to help as their children get older and the school work becomes more difficult (Pena, 2000). Parents of low-achieving adolescent students are more likely to be involved at home than parents of successful students (Shumow & Miller, 2001). Not surprisingly parents who get along with their children and parents who have had positive experiences in helping other students in the past are also more likely to become involved (Eccles & Hanold, 1993). Parents of high achieving students are more likely, however, to participate in school governance and school activities than are parents of average or struggling students and parental involvement both at home and at school is correlated positively to the educational level of parent (Eccles & Hanold, 1993). Children who live in higher quality neighborhoods typically perform better in school than those who live in poorer neighborhoods (Eamon et al., 2005). Poorer neighborhoods often lack positive role models, adult supervision and connections to good schools (Eamon et al., 2005). That kind of environment often prevents students from creating healthy social networks and leads to a lack of motivation which negatively affects performance in science subjects (Eamon et al., 2005).
2.4 Peer Influences and Science Performance

Peer groups are an important socialization agent. Participating in peer activities is a primary stage of development and adolescents’ identities are often closely associated with that of their peers (Santor et al, 2000). As children enter adolescence, friends take on a more prominent role in their lives (Carol & Erika, 1996). Research findings show that peer relationships are a significant contributor to understanding adolescent development (Carol & Erika, 1996). Peer groups form a key part of adolescents developmental process and can have a negative effect on young people due to peer pressure and peer conformity. Higher degree of peer pressure, which is the pressure from others to participate in certain activities and peer conformity which is the degree to which an individual adopts actions that are sanctioned by their peer group, have been shown to increase the likelihood of risk taking behaviors such as substance abuse and sexual activity (Santor et al 2000). These risk taking behaviors indirectly affect school performance in a negative way (Santor et al 2000). Abundance of studies have examined the negative influences of peers on delinquent or antisocial behaviors, fewer studies have focused on the extent adolescents’ friends foster successful outcomes and pro-social behaviors’ (Carol & Erika, 1996). Four underlying themes of the prevailing conceptualization of peer influences need to be re-considered (Carol & Erika, 1996). First of all, peer influence has been more commonly conceptualized as encouragement from friends to engage in delinquent behaviors’, pressure to hold undesirable values and attitudes, or discouragement from participating in pro-social behaviors’ (Carol & Erika, 1996). Research has shown that peer influence is not unidirectional (Carol & Erika,
Research shows that peers encourage and discourage adolescents in five different areas of their lives: participation in antisocial behaviors’, family involvement, conformity to peer norms, school involvement and peer group involvement (Carol & Erika, 1996). Peers do not only affect adolescents decisions to drink, smoke, use drugs, or engage in other delinquent behaviors but also influence adolescents’ involvement in school (Carol & Erika, 1996). Because adolescents spend much of their day in school with their peers, their affiliation affect their academic development (Carol & Erika, 1996).

Research found that children peer context is related to changes in engagement in school (Carol & Erika, 1996). Motivation of the children peer groups influenced individual’s change in motivation across the school (Carol & Erika, 1996). In addition to affecting motivation, peer influences may also be related to adolescents’ different achievement levels in school (Carol & Erika, 1996). The potential for peers to affect individual achievement is central to many important policy issues in elementary and secondary education, including the impacts of school choice programs, ability tracking within schools, “mainstreaming” of special education students, and racial and economic desegregation (Burke & Tim, 2008). Grouping students in classrooms by ability can likewise have significant impacts on students achievement depending on the magnitude of peer influences (Burke & Tim, 2008). The effect of desegregation policies on achievement depends not only on potential spillovers from average ability, but on whether different peers exert different degrees of influence on individual outcomes (Burke & Tim, 2008).
Peer effects are not “one-size-fits-all,” but rather exhibit striking differences across students of different abilities and across different segments of the peer ability distribution (Burke & Tim, 2008). For example, the weakest students appear to experience the biggest positive impact from having higher quality peers (Burke & Tim, 2008). At the same time, however, such benefit appears to derive specifically from having peers in the highest quartile of the ability distribution (Burke & Tim, 2008). High ability students appear to experience the weakest spillovers from mean peer ability, but nonetheless may suffer sharp losses due to an increase in the share of peers of very low ability (Burke & Tim, 2008). While low-ability students appear to benefit significantly from having top quality peers, those peers will experience reductions in achievement gains from mixing with students of very low ability, reductions that may fully offset the weaker students’ gains (Burke & Tim, 2008). It is anticipated that the quality of a school will influence the type of peer group experience a pupil might meet (Desforges & Abouchaar, 2003). At the same time, the individual pupil will influence the peer group as well as the peer group influencing the individual (Desforges & Abouchaar, 2003). Students innate characteristics, aptitudes, motivation levels and fixed habits constitute the main channels by which school peers influence each other’s outcomes (Burke & Tim, 2008). Students may learn directly from peers based on their high aptitude levels and knowledge of a subject; they may benefit from having well–behaved peers who create a classroom atmosphere that is conducive to learning, or they may free-ride on classmates’ questions or superior note-taking skills (Burke & Tim, 2008).
2.5 School Environment and Science Performance

A student’s educational outcome and academic success is greatly influenced by the type of school that they attend (Barry, 2005). School factors include school structure, school composition and school climate (Barry, 2005). The school one attends is the institutional environment that sets the parameters of a student’s learning achievement (Barry, 2005). Crosnoe et al, (2004) suggested that school sector (public & private) and class size are two important structural components of schools. Private schools tend to have better funding and smaller class sizes than public schools (Crosnoe et al, 2004). The additional funding of private schools leads to better performance in science subjects because of more access to resources (Crosnoe et al, 2004). Smaller class sizes create more intimate settings and therefore can increase teacher-student bonding which has also been shown to have a positive effect on student success in sciences (Crosnoe et al, 2004). The relative social class of a student body also affect academic achievement (Eamon et al, 2005). Student from low socio-economic background who attend poorly funded schools do not perform well as student from higher social classes (Eamon et al, 2005).

School composition or the general make up of a school is another important factor regarding academic achievement (Barry, 2005). The ethnic makeup of a schools’ student body has shown to influence performance and students’ attachment to their school (Bali et al, 2004). Culture and ethnicity also are socio-economic factors that can contribute to children’s thoughts and attitudes (Mark, 2009). Both can have an impact on how the children’s are raised, their core values, and their sense of family, tradition and the value they attach to education. The history of one's ethnicity, special holidays, and cultural
beliefs are all things that can be passed down between generations and shape individual identities even in terms of academic achievement. Students’ performance and school attachment increases when a student ‘own tribe matches the most common tribe of their schools’ student body (Barry, 2005). People’s cultural and religious belief and perception if negative on science subjects may affect its performance negatively among the students. Cultural background and involvement in home chores by students affects students’ performance. Earlier studies show that these factors actually influence students’ performance in national examinations. School climate is defined as “the general atmosphere of a school” (Crosnoe et al, 2004). School climate is closely related to the interpersonal relations between students and teachers (Barry, 2005). Trust between students and teachers increases if a school encourages teamwork (Barry, 2005). Research shows that students who trust their teachers are more motivated and as a result perform better in sciences (Crosnoe et al, 2004). School policies and programs often dictate school climate (Bali & Micheal, 2004). Therefore, minority students benefit more from school policies if the administrators and teachers, who help create the policies, are representative of minorities’ (Bali & Micheal, 2004). Students can focus more clearly on subject areas when a school is able to create an environment where student feel safe (Barry, 2005). If a school is able to accomplish a feeling of safety, students can have success despite their family or neighborhood backgrounds (Crosnoe et al, 2004).

Research shows that teacher quality matters a great deal for student achievement but it’s not strongly linked to observed teacher characteristics (Rockoff et al, 2004). Teachers give assignments nonrandom within schools controlling for unobserved teacher inputs which
are crucial when measuring classroom performance (Argys et al., 1996). Observed teacher inputs, such as experience, will constitute inadequate controls if most of the variation in teacher effectiveness derives from unobserved factors (Burke & Tim, 2008). Rothstein (2008) found that future teachers appear to influence current student achievement gains

2.6 Summary

This chapter mainly addresses different factors which affect performance in science subjects. These factors include: family background, student role performance, peer influences and school environment. The chapter expounds on how these factors contribute towards the performance in science subjects. Previous research shows that the family background from where these students come from greatly affects their performance in science subjects. Research shows that depending on the family status a student can be motivated to learn or de-motivated to learn thus affecting their performance. Previous research shows that Students get exposed to varying socio-economic status which brings about an achievement gap in science subject among various students. Research shows that the achievement gap is observed on variety of measures including standardized test scores, grade point averages, dropout rates and school completion rates. The achievement gap in science subjects has become a focal point of education reform efforts with the aim of closing the gap.
CHAPTER THREE

METHODOLOGY

3.1 Introduction

This chapter presents the methodology used in the study. This involves research design, locale of the study, target population, sample and sampling techniques, research instruments, pilot study, validity and reliability of the instruments, data collection procedure and data analysis techniques.

3.2 Research Design and Process

A research design is the structure of the research (Kombo&Tromp, 2006). It is the “glue” that holds all of the elements in a research project together (Kombo&Tromp, 2006). A research design can be regarded as an arrangement of conditions for collection and analysis of data in a manner that aims to combine relevance with the research purpose (Kombo&Tromp, 2006). Research design is the plan, structure and strategy of investigation conceived so as to obtain answers to research questions. This study employed descriptive survey research design. Descriptive survey is a method of collecting information by interviewing or administering a questionnaire to a sample of individuals (Orodho, 2005). The research process and design followed the stages shown in the figure 3.1. The process started with the consideration of the population of secondary schools in Kirinyaga Central District in Kirinyaga County. Purposive sampling was done for piloting the study. The sample was made of Deputy Principals, Heads of science Department, science teachers, parents and form two students. Data was collected using questionnaires and interview schedules. It was then analyzed using descriptive statistics and presented in tables and charts.
Figure 3.1 Research Design and Process of the Study

Source: Self-Constructed.
3.3 Location of the Study

The study was carried out in Kirinyaga Central District. This district is located in Central Province of Kenya and on the southern slopes of Mt Kenya. The district neighbors’ Kirinyaga South District on the southern side, Kirinyaga East District on the eastern side and Kirinyaga West District on the western side. The district was purposively selected because of its varying economic status as a result of tea, coffee and dairy farming. The researcher also had knowledge of the different localities of the schools within the area. Research shows that the choice of the location is determined by the familiarity to an area, limitation of time and money (Gay, 1976). Familiarity to the region helps the researcher to administer the research instruments and improve the ethical, legal and public relation in a research. The region was also enclosed by good communication network there by making it possible to easily access most of the schools within the District.

3.4 Target Population

The researcher targeted twenty six (26) public secondary schools. The targeted population was five hundred and twenty eight (528) form two students, fifty one (51) parents who had form two students, sixty six (66) science teachers, twenty six (26) Heads of science Department and twenty six (26) Deputy Principals. A total of six hundred and ninety seven (697) respondents were used by the researcher.
3.5 The Sample and Sampling Procedure

Sampling is a process of selecting a number of individuals or objects from a population such that the selected group contains elements representative of the characteristics found in the entire group (Orodho & Kombo, 2002). A sample is a finite part of a statistical population whose properties are studied to gain information about the whole (Webster, 1985). When dealing with people, sampling can be defined as a set of respondents (people) selected from a larger population for the purpose of a survey (Kombo & Tromp, 2006).

3.5.1 Secondary Schools

The secondary schools used were selected through stratified random sampling. According to Kombo & Tromp (2006), stratified sampling involves dividing your population into homogeneous sub-groups and then taking a simple random sample in each sub-group. The thirty-two schools in the district were divided into two strata; County school and District schools. The County schools were further stratified into boys boarding and girls boarding. According to Mugenda A & Mugenda O (2003), where time and resources allow, a researcher should take as big sample as possible. This is because the smaller the sample the bigger the sampling error. Putting this into consideration the researcher took 26 schools which is 81.25% of the total number of schools. The sample selected from each homogeneous group was summarized in the Table 3.2.

3.5.2 Schools Deputy Principals

The schools Deputy Principals were purposively selected. Since each school has one Deputy Principal, all the school Deputy Principals in all the twenty six (26) sampled
schools were selected making the sample school Deputy Principals to be twenty six (26) as summarized in the Table 3.2

**3.5.3 Heads of Science Department**

The schools Head of science Department were purposively selected. In each school one Head of science Department was selected making a total of twenty six (26) Head of Department (science) as summarized in the Table 3.2

**3.5.4 Science Teachers**

Purposive sampling was used to select science teachers who were teaching form two classes. A total of 66 Science teachers in the sample schools were selected on proportionate basis. Research has shown that using this method of sampling yields research data that can be generalized to a larger population (Kombo&Tromp, 2006). The table 3.1 shows the total number students and science teachers in the schools, total number of students in form two and the science teachers that were involved in teaching the form two classes. The percentage of the schools, teachers and students that are targeted by the study is also shown in table 3.1

**3.5.5 Form Two Parents**

Purposive sampling was used to select parents whose children are in form two in the sample schools. A total of 51 parents were selected on proportionate basis as summarized in the Table 3.2.

**3.5.6 Form Two Students**

In this study, form two students were targeted. Form two students were purposively selected for the study because the learners at this level have fully adapted to the environment and they had not yet selected the subjects that they were to be examined in the Kenya Certificate of Secondary Examination. This reduces the biasness of the data
collected from students. The students were selected proportionally to the size of the school. A total of 528 students participated in this study which was 38.5% of the total population of form two students in the sample schools as summarized in the Table 3.1

### Table 3.1 The Study Sample: Students and Teachers

<table>
<thead>
<tr>
<th>SUBJECT</th>
<th>Number of school</th>
<th>Sample number of schools</th>
<th>Form two students in the sample schools</th>
<th>Form two students involved in the study</th>
<th>Form Two Science teachers in the schools</th>
<th>Form Two Science teachers in the sample schools</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>TOTAL NUMBER</td>
<td>32</td>
<td>26</td>
<td>1371</td>
<td>528</td>
<td>121</td>
<td>66</td>
<td>100</td>
</tr>
<tr>
<td>%</td>
<td>100</td>
<td>100</td>
<td>38.5</td>
<td>100</td>
<td>54.55</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: Kirinyaga Central District Education Office and pre-study survey

### Table 3.2 The Sampling Grid

<table>
<thead>
<tr>
<th>Category Of school</th>
<th>Type of school</th>
<th>Number of schools</th>
<th>Sample number of schools</th>
<th>School Deputy Principal</th>
<th>H.O.Ds Science</th>
<th>Science teachers</th>
<th>Form two students students</th>
<th>Form two students parents</th>
</tr>
</thead>
<tbody>
<tr>
<td>County schools</td>
<td>Boys Boarding</td>
<td>3</td>
<td>2</td>
<td>2</td>
<td>6</td>
<td>60</td>
<td>12</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Girls Boarding</td>
<td>5</td>
<td>3</td>
<td>3</td>
<td>18</td>
<td>90</td>
<td>18</td>
<td></td>
</tr>
<tr>
<td>Sub-County schools</td>
<td>Mixed Day</td>
<td>24</td>
<td>21</td>
<td>21</td>
<td>42</td>
<td>378</td>
<td>21</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Total</td>
<td>32</td>
<td>26</td>
<td>26</td>
<td>66</td>
<td>528</td>
<td>51</td>
</tr>
</tbody>
</table>
3.6 Research Instruments

The researcher used two data collection instruments in this study, namely:

(a) Questionnaires (b) Interview Schedules

3.6.1 Questionnaires

A questionnaire is a written list of questions, which are related to the topic. This is a research instrument that gathers data over a large sample (Kombo&Tromp, 2006). Questionnaires help in collecting data from a large sample and diverse regions (Kombo&Tromp, 2006). The researcher in this study used closed ended questions which were structured. These helped to measure the objective responses. Other questions were unstructured (open ended) to measure subjective responses to enhance formulation of useful recommendation of the study.

A set of three questionnaires were developed for: Deputy Principals, Science teachers, students

3.6.1.1 Questionnaires for Deputy Principals

These were completed by deputy principals in the sampled school. They were used to collect data on the population of the schools, remedial teaching, and participation of students in co-curricular activities, Students’ behavior in school and their performance in science subjects.

3.6.1.2 Questionnaires for Science Teachers

They were completed by science teachers having form two classes selected on proportionate basis from each sampled school. They gave the researcher more insight on
the professional qualification of the teacher, availability of material resources for teaching and learning science subjects, teacher student relationship in school

3.6.1.3 Questionnaires for Students
They were completed by form two students from the sampled schools. They were used to collect data on the students’ performance, category of schools, family background, career aspirations, use of material resources and peer influence.

3.6.2 Interview Schedules
These are questions asked orally (Kombo&Tromp, 2006). In this study the researcher used unstructured interviews and structured interviews. The interview schedules were administered to Heads of science Department and parents.

3.6.2.1 Interview Schedule for Heads of Science Department
An interview with the Head of Department in the sample schools was conducted. This helped the researcher to know more about the availability of material resources, performance of science subjects, which co-curricular activities student are involved in, time allocated for teaching the science subjects and effort put by teachers in promoting performance in science subjects.

3.6.2.2 Interview Schedules for Parents
Interviews with the parents from the sampled schools were conducted. This helped the researcher to get insight on the financial status of the parents and the commitment they have towards academic excellence of their children.
3.7 Pilot Study

After designing the research instruments, the researcher conducted a pilot study. The pilot study was used mainly for the validation and testing the reliability of the research instrument that was used. According to Kombo & Tromp (2006), a pilot study of the questionnaire and interview schedules was the only way the researcher could find out if everything “works” particularly the research instruments. One county school was selected for the pilot study. The school was selected in Kirinyaga West District which was not included in the sample of the study. The questionnaires were administered to one deputy principal, ten science teachers, and twenty form two students. The interview schedules were conducted on one head of department (science) and four parents who had Children in form two classes.

3.7.1 Validity of the Research Instruments

According to Orodho (2005) piloting is a necessary process as it ensures that measurements are of acceptable validity and reliability. Webster (1985) observes that validity is the extent to which an instrument measures what is supposed to be measured. According to Mulusa (1988) a test of research instrument is said to be valid if it measures what it is supposed to measure. Content validity and criterion validity of the instruments were determined by my supervisors and experts in research who looked at the measuring technique and coverage of specific areas (objectives) covered by the study. The experts then advised the researcher on the items to be corrected. The corrections on the identified questions were incorporated in the instrument thus increasing validity. Construct validity
was done by my supervisors who assessed the theoretical framework regarding the concept to be measured and were found to conform to the theoretical expectations.

3.7.2 Reliability of the Research Instruments

Reliability is the ability of a research instrument to consistently measure the characteristics of interest over time. According to Mulusa (1998) a reliability test of research instruments is one that consistently produces the expected results. Mulusa (1998) pointed out that instrument reliability refers to the level of internal consistency or the stability of the measuring devices. They say that because of economy in time and labour, the procedure for extracting an estimate of reliability should be obtained from the administration of a single test. The split half- technique was adopted. In this method, the total number of items were divided into halves by assigning the odd numbered items to one half and even numbered items to the other half. A correlation was taken between the two halves. A statistical correlation to estimate the reliability of the whole test was then computed using the formula below.

\[(i) \quad r = 1 - \frac{6\sum(D)^2}{N(N^2-1)}\]

Where:

- \(r\) = Correlation coefficient,
- \(N\) = Sample,
- \(\sum\) = Summation of scores,
- \(D\) = Deviation

\[(ii) \quad SH = \frac{2r}{1+r} \quad \text{(Where items are doubled)}\]
A reliability coefficient of 0.768 was obtained and is accepted as recommended by Mugenda.A&Mugenda.O (1999).

3.8 Data Collection Procedure

The researcher obtained an introduction letter from Kenyatta University and after that obtained a permit from the National Council for Science and Technology in order to be allowed to collect data. The researcher then notified the D.E.O. of Kirinyaga Central District about the study. The researcher made prior arrangements with the heads of the selected school on the day to administer the instruments. Each school in the sample was visited by the researcher to deliver the questionnaires which were filled by the Deputy Principal, science teachers and the form two students. A brief explanation of the purpose of the study was given at the beginning of the questionnaire to enable the respondents to feel confident to respond. The completed questionnaires were picked and kept for analysis. The researcher visited each school to conduct an interview with the Head of science Department. The researcher visited each school in the sample schools during academic clinics to conduct an interview with the form two parents. The interviews were guided by the interview schedules.

3.9 Data Analysis and Presentation Procedure

After collection of data, the researcher checked for completeness of the filled questionnaires and coded them. The data was then arranged and grouped according to particular research questions. The data was tabulated and analyzed using descriptive statistics by Statistical Package for Social Sciences (SPSS). Martin & Acuna (2002)
states that SPSS is able to handle large amount of data, and given its wide spectrum of statistical procedures purposefully designed for social sciences. Frequency distribution and percentages were used to analyze demographic data. Comparative tables showing frequencies and percentages were also used. Coding categories were developed as a way of organizing the qualitative data (open-end questions) according to particulars research questions. The questionnaire responses were grouped according to research objectives and data analyzed.

3.10 Logistical and Ethical Considerations

Permission from the Ministry of Education was sought to carry out the research. The District Education Officer (Kirinyaga Central District) was also informed of the intent to carry out research in the district. Head teachers from the sampled schools were consulted to allow research to be carried on in their schools. The researcher provided the respondents with information on purpose of the study, procedure to be followed, benefits of the study to the respondents, and assurance of privacy and confidentiality. The major ethical problem in this study was the privacy and confidentiality of the information acquired from the respondents because some of the information required from the respondents was personal.
CHAPTER FOUR
DATA ANALYSIS, PRESENTATION AND INTERPRETATION

4.1 Introduction
This chapter analyses the data that was collected, presents and offers the interpretation of the results from the findings collected from the sampled respondents under the following sub-heading: influence of students’ role on performance in science, influence of family background on science performance, effects of peer influence on science performance and influence of school environment on science performance.

4.2 Demographic Characteristics of the Respondents
This section describes the biographic characteristics of the respondents in the study area. Such a description is important in providing a clear understanding of the respondents and institutions included in the study and which may have influenced the results based on the objectives of the study. The demographic characteristics covered in this section include; gender composition and the age in years of the respondents as well as the category of school.

4.2.1 Sex Composition of the Students
It was important to establish the gender composition of the students and the results are provided in Figure 4.1.

![Figure 4.1 Sex of Student Respondents](image)

Figure 4.1 Sex of Student Respondents
Figure 4.1 indicates that majority of the students, 59.31% are male and 40.69% are female. The dominance of male students to female students may be due to the fact that education for girls is still somehow not as highly emphasized especially in the sciences as compared to the education of boys in the sciences. Consequently, although the female gender constitute slightly over half the population it remains slightly under represented in academic circles.

4.2.2 Sex Composition of Science Teachers
The study investigated the gender composition of science teachers and the results are presented in figure 4.2

![Pie chart showing sex composition of science teachers](chart.png)

Figure 4.2 Sex Composition of Science Teachers

Figure 4.2 indicates that majority of science teachers (66.6%) are male while 33.3 % are female. The predominance of male science teachers to female could probably be attributed to the fact that stereotypes in the education sector have persistently represented science as more masculine and humanities as more feminine. As a result many females prefer to follow humanities oriented disciplines than males.

4.2.3 Sex Composition of Parents
The study sought to find out the gender composition of the parents and the results are presented in Figure 4.3
Figure 4.3  Sex Composition of Parents

Figure 4.3 shows that majorities (71.43%) of the parents are male and 28.57% are female. Perhaps this is due to the patriarchal systems of cultural identification where men are the heads of the family and children are taken to belong to the father.

4.2.4 Category of Schools

The study investigated the category of schools in the district and the responses are provided in Figure 4.4.

Figure 4.4  Category of schools

Figure 4.4 indicates that majority of schools (61.52%) were sub-county schools and county schools constitutes 38.48%. There are no national schools in the district. The large percentage of sub-county schools could probably be attributed to the newly established CDF funded schools which were started to cater for transition of the large number of students from the free primary education programme that was started in 2008. Again the sub-county schools are less expensive and therefore popular with the low income families.
in the district. The pure boys and girls boarding schools are the county schools which are meant to admit students from all over the county.

4.3 The Influence of Students’ Role on Performance in Sciences

The first research objective sought to establish the influence of students’ role towards science performance. Students’ role was defined by gender, school influence, participation in co-curricular activities and students’ aspirations. This section represents the research findings about the influence of students’ gender, school influence, participation in co-curricular activities and students’ aspirations towards performance in science subjects.

4.3.1 Influence of Gender on Students Performance in the Science Subjects

The study sought to establish the effect of the students’ gender on performance in sciences. The findings are presented in Table 4.1

Table 4.1 Influence of Gender on Students Performance in Sciences

<table>
<thead>
<tr>
<th>Science performance</th>
<th>Sex</th>
<th></th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>male</td>
<td>female</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Frequency</td>
<td>%</td>
<td>Frequency</td>
</tr>
<tr>
<td>Excellent(76-100)</td>
<td>28</td>
<td>5.3</td>
<td>14</td>
</tr>
<tr>
<td>very good(61-76)</td>
<td>77</td>
<td>14.6</td>
<td>25</td>
</tr>
<tr>
<td>good(46-60)</td>
<td>105</td>
<td>19.8</td>
<td>49</td>
</tr>
<tr>
<td>average(35-45)</td>
<td>68</td>
<td>12.9</td>
<td>75</td>
</tr>
<tr>
<td>below average(less than 35)</td>
<td>37</td>
<td>7.0</td>
<td>50</td>
</tr>
<tr>
<td>Total</td>
<td>315</td>
<td>59.6</td>
<td>213</td>
</tr>
</tbody>
</table>

Table 4.1 shows that 5.3% of the male and 2.7% of the female respondents indicated they had excellent performance in science; very good were male, 14.6% female 4.7%; good 19.8% male and 9.2% female; average 12.9% male and female 14.2%; below average
7.0% and 9.5% male and female respectively. These results clearly indicate that the male students were performing much better in science than the female students. The better performance of the male students in science as compared to the female students could probably be attributed to the stereotypes’ in the education sector that represented science as more masculine and humanities as more feminine. Ogunkola & Olatuye (2010) found that there exists gender gap in students’ performance in science subjects. Mills, (1993) found that boys perform better than girls on tasks requiring mathematical concepts. As a result many female students are made to believe that science disciplines are a male domain and females should venture in humanities oriented disciplines. In addition one way ANOVA was done to find out whether the mean differences were statistically significant. The results are shown on Table 4.2

**Table 4.2 One-Way (ANOVA) of the student sex and science performance**

<table>
<thead>
<tr>
<th></th>
<th>Sum of squares</th>
<th>df</th>
<th>Mean square</th>
<th>F</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Between groups</td>
<td>20.637</td>
<td>2</td>
<td>20.637</td>
<td>14.763</td>
<td>.000</td>
</tr>
<tr>
<td>Within groups</td>
<td>753.474</td>
<td>526</td>
<td>1.398</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>774.111</strong></td>
<td><strong>528</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

From the ANOVA results in Table 4.2 it is evident that there were significant differences in sex on students’ science performance. The computed P-value (0.001) was less than the set alpha value (0.05).

**4.3.2 School Influence and Students Performance in Science Subjects**

The study sought to find out from the students whether the amount of time allocated for teaching science subjects was adequate and whether it affected the performance of sciences in schools. The findings are provided in Table 4.3
Table 4.3 Time Allocated for Teaching Science Subjects and Science Performance

<table>
<thead>
<tr>
<th>Time allocated for teaching science subjects</th>
<th>Science Performance</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Good</td>
</tr>
<tr>
<td></td>
<td>Freq</td>
</tr>
<tr>
<td>Adequate</td>
<td>159</td>
</tr>
<tr>
<td>Inadequate</td>
<td>0</td>
</tr>
<tr>
<td>Total</td>
<td>159</td>
</tr>
</tbody>
</table>

Table 4.3 shows that of the respondents who indicated that adequate time were allocated, 30.2% had good performance and 39.9% average performance. On the other hand the respondents, who indicated that there was inadequate time allocation in sciences, none had good performance while 29.9% indicated average performance. These results are in agreement with the findings of studies by Barry (2005), Moses (2009) & Carbonaro (2005). Carbonaro (2005) stated that students who spend adequate time in meeting the formal academic requirement established by their teacher and/or school performed better while Carbonaro(2005) observed that a student who puts forward significant effort perform better in sciences. Kariuki (2009) found out that students’ who devoted more time to studying science subjects performed better in the subjects. Typically, effort has been positively linked with academic performance in science subject both in direct and indirect ways (Barry, 2005).

4.3.3 Impact of Participation in Co-curricular Activities on Science Performance
The study sought to find out from the student the impact of participation in co-curricular activities on science performance. The findings are presented in Table 4.4
Table 4.4 Impact of Participation in Co-curricular Activities

<table>
<thead>
<tr>
<th>Science performance</th>
<th>Participation in co-curricular activities</th>
<th>Yes</th>
<th>%</th>
<th>No</th>
<th>%</th>
<th>Total</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Freq</td>
<td>%</td>
<td>Freq</td>
<td>%</td>
<td>Freq</td>
<td>%</td>
</tr>
<tr>
<td>Excellent(76-100)</td>
<td>Yes</td>
<td>37</td>
<td>7.0</td>
<td>12</td>
<td>2.3</td>
<td>49</td>
<td>9.3</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>12</td>
<td>2.3</td>
<td>37</td>
<td>7.0</td>
<td>50</td>
<td>9.7</td>
</tr>
<tr>
<td>Very Good(61-76)</td>
<td>Yes</td>
<td>86</td>
<td>16.3</td>
<td>20</td>
<td>3.8</td>
<td>106</td>
<td>20.1</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>20</td>
<td>3.8</td>
<td>86</td>
<td>16.3</td>
<td>107</td>
<td>21.0</td>
</tr>
<tr>
<td>Good(46-60)</td>
<td>Yes</td>
<td>104</td>
<td>19.7</td>
<td>42</td>
<td>8.0</td>
<td>146</td>
<td>27.7</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>42</td>
<td>8.0</td>
<td>104</td>
<td>19.7</td>
<td>148</td>
<td>29.6</td>
</tr>
<tr>
<td>Average(35-45)</td>
<td>Yes</td>
<td>96</td>
<td>18.2</td>
<td>41</td>
<td>7.7</td>
<td>137</td>
<td>26.4</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>41</td>
<td>7.7</td>
<td>96</td>
<td>18.2</td>
<td>138</td>
<td>27.1</td>
</tr>
<tr>
<td>Below Average(Less than35)</td>
<td>Yes</td>
<td>47</td>
<td>8.9</td>
<td>43</td>
<td>8.1</td>
<td>91</td>
<td>17.0</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>43</td>
<td>8.1</td>
<td>47</td>
<td>8.9</td>
<td>91</td>
<td>17.0</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>370</td>
<td>70.1</td>
<td>158</td>
<td>29.9</td>
<td>528</td>
<td>100</td>
</tr>
</tbody>
</table>

Table 4.4 shows that majority of the student respondents, 70.1% participated in co-curricular activities and 29.9% did not participate. Of the respondents who participated 7.0% had excellent performance in sciences, 16.3% very good, 19.7% good, 18.2% average and 8.9% below average. Of the students who did not participate 2.3% had excellent performance, 3.8% very good, 8.0% good, 7.7% average and 8.1% below average. It is evident from these findings that the respondents who participated in co-curricular activities performed well in sciences as compared to those who did not participate. These results are in agreement with (Hunt, 2005), who found that students who participate in co-curricular activities such as sports and clubs have a positive attitude towards science subjects thus performing better.

Table 4.5 One -Way ANOVA of Co-Curricular Activities and Performance

<table>
<thead>
<tr>
<th></th>
<th>Sum of squares</th>
<th>df</th>
<th>Mean square</th>
<th>F</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Between groups</td>
<td>1.673</td>
<td>2</td>
<td>.837</td>
<td>.599</td>
<td>.550</td>
</tr>
<tr>
<td>Within groups</td>
<td>632.353</td>
<td>526</td>
<td>1.396</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>634.026</td>
<td>528</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
From the ANOVA results in Table 4.5 it is evident that there were no statistically significant differences in the students’ participation in co-curricular activities on science performance. The computed p-value (0.6) was more that the set alpha value (0.05).

4.3.4 Students Career Aspirations and Performance in Science

The study investigated from the students their career aspirations after school. The responses are provided in Table 4.6.

Table 4.6 Students Career Aspirations and Science Performance

<table>
<thead>
<tr>
<th>Occupation after school</th>
<th>Science performance in third term exam</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Very good (61-76)</td>
<td>Good (46-60)</td>
</tr>
<tr>
<td>Doctor</td>
<td>27 4.9</td>
<td>34 6.4</td>
</tr>
<tr>
<td>Nurse</td>
<td>3 0.6</td>
<td>3 0.6</td>
</tr>
<tr>
<td>Engineer</td>
<td>41 7.8</td>
<td>46 8.7</td>
</tr>
<tr>
<td>Teacher</td>
<td>1 0.2</td>
<td>3 0.6</td>
</tr>
<tr>
<td>Tourist manager/guide</td>
<td>0 0</td>
<td>3 0.6</td>
</tr>
<tr>
<td>Land survey</td>
<td>1 0.2</td>
<td>2 0.4</td>
</tr>
<tr>
<td>Lawyer</td>
<td>5 0.9</td>
<td>19 3.6</td>
</tr>
<tr>
<td>Journalism</td>
<td>1 0.2</td>
<td>8 1.5</td>
</tr>
<tr>
<td>Farmer</td>
<td>0 0</td>
<td>1 0.2</td>
</tr>
<tr>
<td>Accountant</td>
<td>2 0.4</td>
<td>6 1.1</td>
</tr>
<tr>
<td>Police personnel</td>
<td>5 0.9</td>
<td>7 1.3</td>
</tr>
<tr>
<td>Fashion</td>
<td>0 0</td>
<td>1 0.2</td>
</tr>
<tr>
<td>Others</td>
<td>14 3.7</td>
<td>20 3.8</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>99 17.7</strong></td>
<td><strong>153 31.0</strong></td>
</tr>
</tbody>
</table>

Table 4.6 shows that majority of respondents aspired to join a career as a doctor (21.0%), engineer(28.6%), lawyer(9.7%), police (5.5%) nurse 4.5% and accountant 4.3%. Other responses are tabulated in the same table. Majority of students aspired to join careers which are science oriented and this perhaps contributed to their good performance in sciences. Sameroff et al (1993) found that students’ intellectual ability and approach to
learning attitude and disposition, self-esteem and impulse control highly affects the students’ performance in sciences.

### Table 4.7 One-Way (ANOVA) of Career Aspirations

<table>
<thead>
<tr>
<th>Sum of squares</th>
<th>df</th>
<th>Mean square</th>
<th>F</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Between groups</td>
<td>210.379</td>
<td>4</td>
<td>52.595</td>
<td>2.786</td>
</tr>
<tr>
<td>Within groups</td>
<td>10082.489</td>
<td>524</td>
<td>18.881</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>10292.868</td>
<td>528</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

From the ANOVA results in Table 4.7 it is evident that there were statistically significant differences in the students’ career aspirations and science performance. The computed p-value (0.03) was less that the set alpha value (0.05).

#### 4.4 The Influence of Family Background on Science Performance

The second research objective investigated the influence of students’ family background towards science performance. Students’ family background was defined by whether the student lives with parents, family size, parents’ level of education, siblings’ education and parental income.

##### 4.4.1 Parents Level of Education and Students Performance in Science

The study sought to find out from the parents the effect of the parents’ level of education on students’ performance in science subjects. The findings are provided in Table 4.8
Table 4.8 Parents Level of Education and Students Performance in Sciences

<table>
<thead>
<tr>
<th>Science Performance</th>
<th>Parents’ Level of Education</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Diploma &amp; Above Freq %</td>
<td>A-Level Freq %</td>
<td>O-Level Freq %</td>
<td>Other Freq %</td>
<td>Fre %</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Excellent</td>
<td>10 19.6</td>
<td>9 17.6</td>
<td>8 15.7</td>
<td>5 9.8</td>
<td>32 64.6</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Good</td>
<td>5 9.8</td>
<td>1 2.0</td>
<td>4 7.8</td>
<td>6 11.8</td>
<td>14 31.4</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Average</td>
<td>1 2.0</td>
<td>1 2.0</td>
<td>0 0</td>
<td>1 2.0</td>
<td>3 6.0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>16 31.4</td>
<td>11 21.6</td>
<td>12 23.5</td>
<td>12 23.5</td>
<td>51 100</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 4.8 clearly indicates that, 31.4% of the parents had diploma & above level of education this was followed by O-level with 23.5% while A-level had 21.6%. Parents with diploma & above level of education had their children performance in science as follows, excellent (19.6%), good (9.8%) and average (2.0%). Parents with A-level had excellent (17.6%), good and average at 2.0% each. Those with O-level of education had excellent at 15.7%, good at 7.8% and none had average performance. These results show that parents with high level of education had their children performing well in sciences. This agrees with (Ferguson, 1991) findings which states that students whose parents have high academic levels perform well in science subjects.

Table 4.9 One-Way ANOVA of Parents Level of Education

<table>
<thead>
<tr>
<th></th>
<th>Sum of squares</th>
<th>df</th>
<th>Mean square</th>
<th>F</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Between groups</td>
<td>3.160</td>
<td>4</td>
<td>.790</td>
<td>2.342</td>
<td>.007</td>
</tr>
<tr>
<td>Within groups</td>
<td>14.507</td>
<td>47</td>
<td>.337</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>17.667</td>
<td>51</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
From the ANOVA results of Table 4.9 it was evident that there were statistically significant differences in the parent’s level of education on student’s science performance. The computed p-value 0.01 was less that the set alpha value (0.05).

4.4.2 Persons that the Student Lives with and Performance in Science

The study compared the performance of science subjects of students who lived with both parents and those who did not live with both parents. The findings are provided in Table 4.10

Table 4.10 Persons that the Student lives with and Performance in Science

<table>
<thead>
<tr>
<th>Science performance</th>
<th>Do you live with both parents</th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Yes</td>
<td>%</td>
<td>No</td>
<td>%</td>
</tr>
<tr>
<td></td>
<td>Freq</td>
<td>Freq</td>
<td>%</td>
<td>Freq</td>
<td>%</td>
</tr>
<tr>
<td>Excellent(76-100)</td>
<td>38</td>
<td>5</td>
<td>0.9</td>
<td>44</td>
<td>8.1</td>
</tr>
<tr>
<td>Very good(61-76)</td>
<td>75</td>
<td>25</td>
<td>4.6</td>
<td>102</td>
<td>18.8</td>
</tr>
<tr>
<td>Good(46-60)</td>
<td>114</td>
<td>39</td>
<td>7.4</td>
<td>155</td>
<td>29.0</td>
</tr>
<tr>
<td>Average(35-45)</td>
<td>107</td>
<td>35</td>
<td>6.6</td>
<td>144</td>
<td>26.9</td>
</tr>
<tr>
<td>Below average(less than 35)</td>
<td>63</td>
<td>27</td>
<td>5.1</td>
<td>91</td>
<td>17.0</td>
</tr>
<tr>
<td>Total</td>
<td>397</td>
<td>131</td>
<td>24.8</td>
<td>528</td>
<td>100</td>
</tr>
</tbody>
</table>

Table 4.10 indicates that majority (75.2%) of the student respondents live with both parents compared with 24.8% who do not live with both parents. Of the students respondents who live with both parents 7.2% had excellent performance, 14.2% had very good, 21.6% good, 20.3% average and 11.9% below average. Of the students who do not stay with both parents 0.9% indicated excellent performance in science, 4.7% very good, 7.4% good, 6.6% average and 5.1% below average. It is clear that the students who live with both parents had better performance in sciences. This probably is due to parental
guidance, mentoring and availability of resources in a two parent family compared to one or no parent family. (Desforges & Abouchaar, 2003) found that there is a correlation between single parenting and low academic achievement in science subjects. Marsh & Herbert (1990) found that single parent families have a negative impact on children thus affecting their performance in science subjects.

Table 4.11 One -Way ANOVA of the Person the Student lives with.

<table>
<thead>
<tr>
<th>Does not leave with both parents</th>
<th>Sum of squares</th>
<th>df</th>
<th>Mean square</th>
<th>F</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Between groups</td>
<td>1.464</td>
<td>4</td>
<td>.366</td>
<td>.414</td>
<td>.798</td>
</tr>
<tr>
<td>Within groups</td>
<td>113.917</td>
<td>127</td>
<td>.883</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>115.381</td>
<td>131</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

From the ANOVA results in Table 4.11 it is evident that there were no statistically significant differences in the performance of the students who lived with both parents or not on science performance. The computed p-value (0.8) was more that the set alpha value (0.05). The study further compare the science performance of the students who did not live with both parents in relation to the person the student lived with. The findings are provided in Table 4.12.
Table 4.12 Science Performance for Student who do not live with both Parents

<table>
<thead>
<tr>
<th>Science performance</th>
<th>Students lives with</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mother</td>
<td>Freq</td>
<td>%</td>
<td>Father</td>
<td>Freq</td>
<td>%</td>
<td>Grandparent</td>
<td>Freq</td>
<td>%</td>
</tr>
<tr>
<td>Excellent</td>
<td>6</td>
<td>4.6</td>
<td></td>
<td>0</td>
<td>0</td>
<td></td>
<td>0</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Very good</td>
<td>20</td>
<td>15.3</td>
<td></td>
<td>1</td>
<td>0.8</td>
<td></td>
<td>2</td>
<td>1.5</td>
<td></td>
</tr>
<tr>
<td>Good</td>
<td>30</td>
<td>22.9</td>
<td></td>
<td>1</td>
<td>0.8</td>
<td></td>
<td>5</td>
<td>3.8</td>
<td></td>
</tr>
<tr>
<td>Average</td>
<td>25</td>
<td>19.1</td>
<td></td>
<td>4</td>
<td>3.1</td>
<td></td>
<td>4</td>
<td>3.1</td>
<td></td>
</tr>
<tr>
<td>Below average</td>
<td>18</td>
<td>13.7</td>
<td></td>
<td>7</td>
<td>5.2</td>
<td></td>
<td>3</td>
<td>2.3</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>99</td>
<td>75.6</td>
<td>13</td>
<td>9.9</td>
<td>14</td>
<td>10.7</td>
<td>2</td>
<td>1.5</td>
<td>3</td>
</tr>
</tbody>
</table>

Table 4.12 indicates that for the students’ respondents who lived with parents, 75.6% live with the mother, 9.9% with father, 10.7% with grandparent, 1.5% at children home. Of the students’ respondents who lived with the mother, 4.6% indicated excellent performance, 15.3% very good, 22.9% good, 19.1% average and 13.7% below average. Students, who lived with father, none had excellent performance, 0.8% each for very good and good, 3.1% average and 5.2% below average. Those who lived with grandparent none had excellent performance, 1.5% very good, 3.8% good, 3.1% average and 2.3% below average. For respondents who lived at children’s home only 1.5% said they had very good performance. The results indicate that respondents who lived with the mother had good performance compared to all other categories. Probably mothers are capable for providing emotional support which is essential for student to cope with psychological problems and have appropriate adjustment in school.
Table 4.13 One-Way ANOVA for Students who do not live with both Parents

<table>
<thead>
<tr>
<th></th>
<th>Sum of squares</th>
<th>df</th>
<th>Mean square</th>
<th>F</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Between groups</td>
<td>1.464</td>
<td>4</td>
<td>.366</td>
<td>.414</td>
<td>.798</td>
</tr>
<tr>
<td>Within groups</td>
<td>113.917</td>
<td>127</td>
<td>.883</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>115.381</td>
<td>131</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

From the ANOVA results provided in Table 4.13 it was evident that there were no statistically significant differences in performance of the students depending with whom the students stayed with. The computed p value (0.8) was more than the set alpha value (0.05)

4.4.3 Influence of Family Size on Science Performance

The study sought to find out from the students the effect of family size on performance of science subjects. The responses are provided in Table 4.14

Table 4.14 Influence of Family Size on Science Performance

<table>
<thead>
<tr>
<th>Science performance</th>
<th>Number of Family Members</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1-3</td>
</tr>
<tr>
<td></td>
<td>Freq</td>
</tr>
<tr>
<td>Excellent (76-100)</td>
<td>7</td>
</tr>
<tr>
<td>Very good (61-76)</td>
<td>21</td>
</tr>
<tr>
<td>Good (46-60)</td>
<td>31</td>
</tr>
<tr>
<td>Average (35-45)</td>
<td>23</td>
</tr>
<tr>
<td>Below average (&lt;35)</td>
<td>17</td>
</tr>
<tr>
<td>Total</td>
<td>99</td>
</tr>
</tbody>
</table>

Table 4.14 indicates that majority of the respondents, (39.0%) come from families with 3-5 members, this was followed by 26.8% who had 5-6 members while 18.8% had 1-3 members. Of the students respondents who came from families with 1-3 members 1.3%
had excellent performance, 4.0% very good, 5.9% good, 4.4% average and 3.2% below average. For respondents from families with 3-5 members, 2.8% had excellent performance, 5.7% very good, 11.4% good, 12.3% average and 6.8% below average. For families with 5-6 members, 2.8% had excellent performance, 6.4% very good, 3.8% good, 6.1% average and 3.4% below average. The results indicate that students from families with 3-5 members performed better in sciences than those from 1-3 or 5-6 members. Perhaps this could be due to fewer resources in large families and the fact in small families the student may lack the support of siblings in his/her pursuits of education. Majoribank (1996) findings showed that students with fewer siblings are likely to receive more parental attention and have more access to resources than children from large families. The additional attention and support leads to better school performance.

Table 4.15 One -Way ANOVA of the Students Family Size

<table>
<thead>
<tr>
<th>Family size</th>
<th>Sum of squares</th>
<th>Df</th>
<th>Mean square</th>
<th>F</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Between groups</td>
<td>.884</td>
<td>4</td>
<td>.221</td>
<td>.238</td>
<td>.917</td>
</tr>
<tr>
<td>Within groups</td>
<td>482.069</td>
<td>524</td>
<td>.927</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>482.952</td>
<td>528</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

From the ANOVA Table 4.15 it was evident that there were no statistically significant differences in the students’ family size on science performance. The computed p-value (0.9) was more than the set alpha value (0.05).

4.4.4 Parents Financial Stability and Students Science Performance

The research sought to find out from the parents the effect of parents’ financial status on student’s performance in science. The results are tabulated in Table 4.16
Table 4.16 Effect of Parents Financial Stability and Students’ Science Performance

<table>
<thead>
<tr>
<th>Science Performance</th>
<th>Are you Financially Stable</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Freq</td>
<td>%</td>
</tr>
<tr>
<td>Excellent</td>
<td>19</td>
<td>37.3</td>
</tr>
<tr>
<td>Good</td>
<td>8</td>
<td>15.7</td>
</tr>
<tr>
<td>Average</td>
<td>2</td>
<td>3.9</td>
</tr>
<tr>
<td>Total</td>
<td>29</td>
<td>56.9</td>
</tr>
</tbody>
</table>

Table 4.16 shows that majority, 56.9% of the parents were financially stable and 43.1% were not stable. Of the parents who were financially stable 37.3% of their children had excellent performance, 15.7% good and 3.9% average. For the parents who were not financially stable 25.5% of their children had excellent, 13.7% good and 3.9% average performance in science. It is indicative of these results that the children of financially stable parents were performing better in sciences than those of the financially unstable parents. This could perhaps be due to ability of financially stable parents to provide resources that can support the education of their children. Nderitu (1999) found that limited income among low class families had been found to restrict provision of text books, supplementary books, remedial fees, development fund and other necessary materials to ensure good attendance and performance at school by pupils.

Table 4.17 One-Way ANOVA of the Parents’ Financial Stability

<table>
<thead>
<tr>
<th>Children performance in science</th>
<th>Sum of squares</th>
<th>df</th>
<th>Mean square</th>
<th>F</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Between groups</td>
<td>.429</td>
<td>2</td>
<td>.429</td>
<td>1.144</td>
<td>.290</td>
</tr>
<tr>
<td>Within groups</td>
<td>17.238</td>
<td>49</td>
<td>.375</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>17.667</td>
<td>51</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
From the ANOVA results in Table 4.17 it was evident that there were no statistically significant differences in the parents’ financial stability on the students’ science performance. The computed p-value (0.3) was more that the set alpha value (0.05).

### 4.4.5 Students Performance in Science and the Number of Siblings in School

The research sought to investigate from the parents the effect of the number of siblings in secondary school on science performance by students. The results are provided in table 4.18.

<table>
<thead>
<tr>
<th>Performance in science</th>
<th>One</th>
<th>Two</th>
<th>Three</th>
<th>None</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Freq</td>
<td>Freq</td>
<td>Freq</td>
<td>Freq</td>
<td>Freq</td>
</tr>
<tr>
<td>Excellent</td>
<td>9</td>
<td>17.6</td>
<td>17</td>
<td>33.3</td>
<td>5</td>
</tr>
<tr>
<td>Good</td>
<td>5</td>
<td>9.8</td>
<td>6</td>
<td>11.8</td>
<td>3</td>
</tr>
<tr>
<td>Average</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>3.9</td>
<td>2</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>14</strong></td>
<td><strong>27.4</strong></td>
<td><strong>25</strong></td>
<td><strong>49.0</strong></td>
<td><strong>10</strong></td>
</tr>
</tbody>
</table>

Table 4.18 shows that majority, 49.0% of the respondents had two siblings in secondary school, 27.4% had one, 19.6% had three and 4.0% had none. Of the respondents who had one sibling in secondary school, 17.6% indicated excellent and 9.8% had good performance in sciences. The respondents with two siblings, 33.3% had excellent, 11.8% had good and 3.9% had average performance. The respondent with three siblings, 9.8% had excellent 5.9% good and 3.9% average performance in science subjects. This perhaps could be due to competition among the siblings and high aspiration of the siblings. This motivates them to perform better.
Table 4.19 One-Way ANOVA of the Number of Siblings in School and Performance

<table>
<thead>
<tr>
<th></th>
<th>Sum of Squares</th>
<th>df</th>
<th>Mean Square</th>
<th>F</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Between Groups</td>
<td>4.571</td>
<td>4</td>
<td>2.286</td>
<td>2.170</td>
<td>.126</td>
</tr>
<tr>
<td>Within Groups</td>
<td>47.408</td>
<td>47</td>
<td>1.054</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>51.979</td>
<td>51</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

From the ANOVA results in Table 4.19 it was evident that there were no statistically significant differences in the number of siblings in secondary schools on science performance. The computed p-value (0.1) was more than the set alpha value (0.05).

4.4.6 Parent’s Occupation and Students’ Performance in Sciences

The study investigated from the parents the effect of parents’ occupation on students’ science performance. The findings are tabulated in Table 4.20

Table 4.20 Parent’s Occupation and Students’ Performance in Sciences

<table>
<thead>
<tr>
<th>Performance in science</th>
<th>Business</th>
<th>Farmer</th>
<th>Occupation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Freq</td>
<td>%</td>
<td>Freq</td>
</tr>
<tr>
<td>Excellent</td>
<td>6</td>
<td>11.8</td>
<td>8</td>
</tr>
<tr>
<td>Good</td>
<td>0</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>Average</td>
<td>0</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Total</td>
<td>6</td>
<td>11.8</td>
<td>11</td>
</tr>
</tbody>
</table>

Table 4.20 shows that teachers and civil servants constitute majority of the parents at 25.5% each, 21.5% are farmers, 15.7% are private sector employees and 11.8% are in business. Of the parents in business 11.8% of their children indicated excellent performance, for farmers 15.7% indicated excellent performance, 3.9% good and 1.9%
average. For civil servants, 11.8% indicated excellent, 11.8% good and 1.9% average. The private sector employee, 11.8% indicated excellent and 3.8% good while for teachers 11.8% indicated excellent, 9.8% good and 3.9% average. These results show that the students who performed excellently were from families where farming is done. This agrees with Marsh & Herbert (1990) who found that parents’ occupation can have both positive and negative effects on student achievement in science subject. According to Marsh & Herbert (1990) parents who work full time often have less time to spend with their children condition that may lead to lower achievement and increases in behavior problems at school which ultimately affect their performance in science subjects.

**Table 4.21 One -Way ANOVA of Parents’ Occupation and Students’ Performance**

<table>
<thead>
<tr>
<th>Children performance in science</th>
<th>Sum of squares</th>
<th>df</th>
<th>Mean square</th>
<th>F</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Between groups</td>
<td>1.567</td>
<td>4</td>
<td>.392</td>
<td>1.046</td>
<td>.395</td>
</tr>
<tr>
<td>Within groups</td>
<td>16.100</td>
<td>47</td>
<td>.374</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>17.667</strong></td>
<td><strong>51</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

From the ANOVA results in Table 4.21 it was evident that there was no statistically significant difference in the parent’ occupation on science performance. The computed p-value (0.4) was more that the set alpha value (0.05)

**4.5 The Influence of Peer Influence on Science Performance**

The third research objective sought to find out how peer influence affects performance in science subjects.

**4.5.1 Impact of Peer Pressure on Performance in Sciences**

The research sought to find out the impact of peer pressure on performance in science subjects. The findings are provided in Table 4.22
Table 4.22 Impact of Peer Pressure on Performance in Sciences

<table>
<thead>
<tr>
<th>Science performance</th>
<th>Freq</th>
<th>%</th>
<th>Freq</th>
<th>%</th>
<th>Freq</th>
<th>%</th>
<th>Freq</th>
<th>%</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Excellent (76-100)</td>
<td>12</td>
<td>2.3</td>
<td>12</td>
<td>2.3</td>
<td>17</td>
<td>3.2</td>
<td>41</td>
<td>7.8</td>
<td></td>
</tr>
<tr>
<td>Very good (61-76)</td>
<td>19</td>
<td>3.6</td>
<td>42</td>
<td>8.0</td>
<td>38</td>
<td>7.2</td>
<td>99</td>
<td>18.8</td>
<td></td>
</tr>
<tr>
<td>Good (46-60)</td>
<td>44</td>
<td>8.3</td>
<td>65</td>
<td>12.3</td>
<td>47</td>
<td>8.9</td>
<td>156</td>
<td>29.5</td>
<td></td>
</tr>
<tr>
<td>Average (35-45)</td>
<td>39</td>
<td>7.4</td>
<td>57</td>
<td>10.8</td>
<td>45</td>
<td>8.5</td>
<td>141</td>
<td>26.7</td>
<td></td>
</tr>
<tr>
<td>Below average (&lt;35)</td>
<td>25</td>
<td>4.7</td>
<td>39</td>
<td>7.4</td>
<td>27</td>
<td>5.1</td>
<td>91</td>
<td>17.2</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>139</td>
<td>26.3</td>
<td>215</td>
<td>40.8</td>
<td>174</td>
<td>32.9</td>
<td>528</td>
<td>100</td>
<td></td>
</tr>
</tbody>
</table>

Table 4.22 clearly shows that majority of the respondents (40.8%) indicated that they were moderately influenced by their peers, this was followed by 26.3% who said that they were greatly influenced. 32.9% indicated that they were less influenced by their peers. The students respondents who were greatly influenced indicated their science performance as follows, 2.3% excellent, 3.6% very good, 8.3% good, 7.4% average and 4.7% below average. The respondents who said they were moderately influenced by peers indicated, 2.3% excellent, 8.0% very good, 12.3% good, 10.8% average and 7.4% below average. The less influenced students indicated their science performance as; 3.2% excellent, 7.2% very good, 8.9% good, 8.5% average and 5.1% below average. This is in agreement with Santor et al., (2000) who found that higher degree of peer pressure, which is the pressure from others to participate in certain activities and peer conformity which is, the degree to which an individual adopts actions that are sanctioned by their peer group, have been shown to increase the likelihood of risk taking behaviors such as substance abuse and sexual activity. These risk taking behaviors in directly affects school performance in a negative way (Santor et al 2000). Analysis of variance indicated that
there was no statistically significant difference in peer negligence on the students’ science performance.

4.5.2 Peer Negligence as a Cause of Academic Failure

The research investigated from the students peer negligence and academic failure. The findings are provided in Table 4.23

<table>
<thead>
<tr>
<th>Table 4.23 Peer Negligence and Academic Failure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Science performance</td>
</tr>
<tr>
<td>Strongly agree</td>
</tr>
<tr>
<td>Excellent(76-100)</td>
</tr>
<tr>
<td>Very good(61-76)</td>
</tr>
<tr>
<td>Good(46-60)</td>
</tr>
<tr>
<td>Average(35-45)</td>
</tr>
<tr>
<td>Below average(&lt;35)</td>
</tr>
<tr>
<td>Total</td>
</tr>
</tbody>
</table>

Table 4.23 shows that majority of the respondents, 35.2% strongly agreed that peer negligence causes academic failure, 28.1% agreed, 18.2% were neutral, 8.9% strongly disagreed and 9.5% disagreed. Those who strongly agreed indicated their science performance as follows; excellent 2.3%, very good 6.4%, good 10.8%, average 9.8% and below average 5.9%. The respondents who agreed had; excellent 2.3%, very good 4.4%, good 7.8%, average 8.1% and below average 5.5%. Neutral had the following; excellent 1.3%, very good 4.0%, good 5.3%, average 5.5% and below average 2.1%. The respondents who disagreed had; excellent 1.3%, very good 2.3%, good 2.3%, average 2.1% and below average 1.5%. strongly disagreed gave the following responses, excellent 0.8%, very good 1.5%, good 3.0%, average 1.5% and below average 1.9%.
These results show that the respondents in agreement with peer negligence causes academic failure performed comparatively better than those who disagreed.

Table 4.24 One-Way ANOVA of the Students Peer Neglect

<table>
<thead>
<tr>
<th></th>
<th>Sum of squares</th>
<th>df</th>
<th>Mean square</th>
<th>F</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Between groups</td>
<td>3.851</td>
<td>4</td>
<td>.963</td>
<td>.682</td>
<td>.605</td>
</tr>
<tr>
<td>Within groups</td>
<td>725.814</td>
<td>524</td>
<td>1.412</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>729.665</td>
<td>528</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

From the ANOVA results in Table 4.24 it was evident that there was no statistically significant difference in the peer negligence on the students’ science performance. The computed p-value (0.6) was more that the set alpha value (0.05)

4.6 The Influence of School Environment on Science Performance

The fourth research objective investigated the influence of school environment on science performance. The school environment was defined by; type of school, academic level of teachers, and availability of material resources, teacher pupil relationship and effect of the physical environment.

4.6.1 School Category and Science Performance

The study investigated the category of schools and science performance and the findings are presented in Table 4.25
Table 4.25 School Category and Science Performance

<table>
<thead>
<tr>
<th>School performance</th>
<th>County</th>
<th>Sub-County</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Freq</td>
<td>%</td>
<td>Freq</td>
</tr>
<tr>
<td>Excellent(76-100)</td>
<td>27</td>
<td>5.1</td>
<td>21</td>
</tr>
<tr>
<td>Very good(61-76)</td>
<td>52</td>
<td>9.8</td>
<td>44</td>
</tr>
<tr>
<td>Good(46-60)</td>
<td>64</td>
<td>12.0</td>
<td>78</td>
</tr>
<tr>
<td>Average(35-45)</td>
<td>50</td>
<td>9.5</td>
<td>94</td>
</tr>
<tr>
<td>Below average(&lt;35)</td>
<td>23</td>
<td>4.4</td>
<td>75</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>216</td>
<td><strong>40.9</strong></td>
<td>312</td>
</tr>
</tbody>
</table>

Table 4.25 shows that majority, 59.1% of the schools are sub-county and 40.9% are county schools. Of the county schools 5.1% indicated excellent science performance, 9.8% very good, 12.0% good, 9.5% average and 4.4% below average. For the sub-county schools 4.0% had excellent, 8.3% very good, 14.8% good, 17.8% average and 14.2% below average. These result shows that the county schools had better science performance than sub-county schools. This could be due to the county schools admitting students with better entry behavior than district schools. This is supported by Barry (2005) who found that student’s educational outcome and academic success is greatly influenced by the type of school that they attend.

Table 4.26 One-Way ANOVA of School Category and Science Performance

<table>
<thead>
<tr>
<th></th>
<th>Sum of Squares</th>
<th>df</th>
<th>Mean Square</th>
<th>F</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Between Groups</td>
<td>11.965</td>
<td>4</td>
<td>11.965</td>
<td>8.810</td>
<td>.003</td>
</tr>
<tr>
<td>Within Groups</td>
<td>609.809</td>
<td>524</td>
<td>1.358</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>621.774</strong></td>
<td><strong>528</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

From the ANOVA results in Table 4.26 it was evident that there was were statistically significant difference in the school category on the students’ science performance. The computed p-value (0.01) was less that the set alpha value (0.05).
4.6.2 Availability of Material Resources and its Effect on Science Performance

The study investigated the impact of material resources on science performance and the findings are provided in Table 4.27

Table 4.27 Impact of Material Resources on Science Performance

<table>
<thead>
<tr>
<th>Science Performance</th>
<th>Impact of material resources on performance</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Great</td>
<td>Moderate</td>
</tr>
<tr>
<td>Excellent(76-100)</td>
<td>31</td>
<td>10</td>
</tr>
<tr>
<td>Very Good(61-76)</td>
<td>54</td>
<td>37</td>
</tr>
<tr>
<td>Good(46-60)</td>
<td>71</td>
<td>71</td>
</tr>
<tr>
<td>Average(35-45)</td>
<td>63</td>
<td>59</td>
</tr>
<tr>
<td>Below Average(&lt;35)</td>
<td>29</td>
<td>39</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>248</td>
<td>216</td>
</tr>
</tbody>
</table>

Table 4.27 shows that majority of the respondents (46.9%) indicated that material resources had a great impact on science performance, 40.9% said it had moderate impact and 12.1% indicated minimal impact. Of the respondents who indicated great impact 5.9% had excellent science performance. According to Crosnoe et al (2004) availability of material resources leads to better performance in science subjects because of more access to the resources.

Table 4.28 One-Way ANOVA of Material Resources on Students’ Performance

<table>
<thead>
<tr>
<th></th>
<th>Sum of squares</th>
<th>df</th>
<th>Mean square</th>
<th>F</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Between groups</td>
<td>13.745</td>
<td>3</td>
<td>4.582</td>
<td>3.280</td>
<td>.021</td>
</tr>
<tr>
<td>Within groups</td>
<td>695.700</td>
<td>525</td>
<td>1.397</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>709.444</strong></td>
<td>528</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

From the ANOVA results in Table 4.28 it was evident that there was were statistically significant difference in the availability of material resources on the students’ science performance. The computed p-value (0.02) was less that the set alpha value (0.05).
4.6.3 Teacher Student Relationship and Science Performance
The study investigated the teacher student relationship and performance in science subjects. The results are indicated Table 4.29

Table 4.29 Teacher Student Relationship and Science Performance

<table>
<thead>
<tr>
<th>Teacher student relationship</th>
<th>Science performance in Department</th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Good</td>
<td>Good</td>
<td>Freq</td>
<td>%</td>
<td>Freq</td>
<td>%</td>
</tr>
<tr>
<td></td>
<td>158</td>
<td>29.9</td>
<td>370</td>
<td>70.1</td>
<td>528</td>
</tr>
<tr>
<td>Bad</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Total</td>
<td>158</td>
<td>29.9</td>
<td>370</td>
<td>70.1</td>
<td>528</td>
</tr>
</tbody>
</table>

Table 4.29 clearly shows that all the respondents indicated a good relationship with their teachers. Majority 70.1% indicated average performance in sciences while 29.9% indicated good performance in sciences. These results are in agreement with Barry (2005) who observed that school climate is closely related to the interpersonal relations between students and teachers. Trust between students and teachers increases if a school encourages teamwork. Students who trust their teachers are more motivated and as a result perform better in sciences (Crosnoe et al, 2004).

4.6.4 Academic Level of Science Teachers and Students Performance in Science
The research sought to find out the influence of the academic level of teachers on science performance by students. The findings are tabulated in Table 4.30
Table 4.30 Academic Level of Science Teachers and Students Science Performance

<table>
<thead>
<tr>
<th>Science Performance</th>
<th>B.Ed.</th>
<th>B.Sc</th>
<th>Diploma</th>
<th>Postgraduate Diploma</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Freq %</td>
<td>Freq</td>
<td>Freq%</td>
<td>Freq %</td>
<td>Freq%</td>
</tr>
<tr>
<td>Excellent</td>
<td>20</td>
<td>30.3</td>
<td>7</td>
<td>10.6</td>
<td>27</td>
</tr>
<tr>
<td>Good</td>
<td>7</td>
<td>10.6</td>
<td>0</td>
<td>0</td>
<td>13</td>
</tr>
<tr>
<td>Total</td>
<td>27</td>
<td>40.9</td>
<td>7</td>
<td>10.6</td>
<td>66</td>
</tr>
</tbody>
</table>

Table 4.30 shows that 30.3% respondents indicated that the influence of B.Ed. teachers on science performance is excellent compared with 10.6% who indicated good, 10.6% indicated the influence of B.Sc. teachers is excellent, 18.2% indicated excellent influence by diploma while 10.6% indicated excellent influence by post graduate diploma teachers. These results indicate that the greatest influence on science performance was by B.Ed. and diploma teachers while B.Sc. teachers had the least influence. Perhaps this may be explained by the fact that B.Ed. and diploma teachers had training in teaching methodology while the B.Sc. teachers had not, consequently their content delivery may not be as good. This is in agreement with Rockoff et al (2004) whose research shows that teacher quality matters a great deal for student achievement. A similar study by Rothstein (2008) found that teachers appear to influence current student achievement gains.
CHAPTER FIVE
SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction
This chapter gives the summary of research findings, conclusions made in accordance with the results, recommendations for future implementation and suggestions for further research in education. The study was aimed at investigating the effects of school and home-based factors on science performance in public secondary schools in Kirinyaga Central District, Kenya.

5.2 Summary of Research Findings
In this section a summary of the finding of this study is presented under the following subheading: the influence of student’s role in performance, influence of family background, effect of peer influence and the influence of school environment.

5.2.1 Influence of Student’s Role on Performance
This section provides answer to the question;” what are the influences of student’s role on science performance?” The results indicated that the male students were performing much better in science than the female students. This confirms the observation by Mills (1993) who found that boys perform better than girls on tasks requiring mathematical concepts. As a result many female students are made to believe that science disciplines are a male domain and females should venture in humanities oriented disciplines (Mills, 1993). The study also revealed that time allocated for teaching and learning science had a great impact on the performance of the subjects. This confirms the observation by Kariuki (2009) who found out that students’ who devoted more time to studying science subjects performed better in the subjects. It was evident from the findings that
respondents who participated in co-curricular activities performed well in sciences as compared to those who did not participate. These results are in agreement with (Hunt, 2005), who found that students who participate in co-curricular activities such as sports and clubs have a positive attitude towards science subjects thus performing better. From the study, students who aspired to join careers which are science oriented had good performance in sciences. According Sameroff et al, (1993) students’ intellectual ability and approach to learning attitude and disposition, self-esteem and impulse control highly affects the students’ performance in sciences.

5.2.2 Influence of Family Background on Students Performance

This section provides answer to the question; “How do family backgrounds influence science performance?” The study established that parents with high level of education had their children performing well in sciences. This agrees with (Ferguson, 1991) findings which states that students whose parents have high academic levels perform well in science subjects. It emerged from the study that students who lived with both parents had better performance in sciences while those who lived with the father, grandparent or at children home performed below average compared to those who lived with the mother. Desforges & Abouchaar (2003) found that there is a correlation between single parenting and low academic achievement in science subjects. Marsh & Herbert (1990) found that single parent families have a negative impact on children thus affecting their performance in science subjects.
The research established that students from families with 3-5 members performed better in sciences than those from 1-3 or 5-6 members. Majoribank (1996) argued that students with fewer siblings are likely to receive more parental attention and have more access to resources than children from large families. The additional attention and support leads to better science performance. It was indicative from the study that children of financially stable parents were performing better in sciences than those of the financially unstable parents. Students respondents who had two siblings in secondary school, performed better than those with either one or three siblings. On the parent’s profession and student’s performance in sciences the study found out that were no significant relationship in the parent’s occupation and students’ science performance. This implies that family background impacts on students’ performance in science subjects.

5.2.3 Effects of peer influence on student’s performance in science subjects
This section seeks to provide answer to the question; “How does peer influence affect science performance? “The study shows that majority of the students were moderately influenced by their peers and majority of the students agreed that peer negligence causes academic failure. This is in agreement with Santor et al,(2000) who found that higher degree of peer pressure, which is the pressure from others to participate in certain activities and peer conformity which is, the degree to which an individual adopts actions that are sanctioned by their peer group, have been shown to increase the likelihood of risk taking behaviors such as substance abuse and sexual activity. These risk taking behaviors in directly affects school performance in a negative way (Santor et al 2000). Analysis of variance indicated that there was no significant relationship between peer negligence and
students’ performance science in science subjects. This implies that peer negligence negatively impacts on science performance.

5.2.4 Influence of school environment on science performance.
This section provides answer to the question; “In what ways does school environment influence performance in science subjects? “The study shows that the county schools had better science performance than sub-county schools. This is supported by Barry (2005) who found that student’s educational outcome and academic success is greatly influenced by the type of school that they attend. Analysis of variance indicated that there was significant relationship between the school category and the students’ science performance. The study shows that material resources had a great impact on science performance and this affected the students’ performance in the science subjects. According to Crosnoe et al (2004) availability of material resources leads to better performance in science subjects because of more access to the resources. Analysis of variance indicated that there was significant relationship between the availability of material resources and the students’ performance in science subjects. The study revealed that there exist a good relationship between teachers and students which eventually leads to good performance on science subjects. The results are in agreement with Barry (2005) who observed that school climate is closely related to the interpersonal relations between students and teachers. Trust between students and teachers increases if a school encourages teamwork. Students who trust their teachers are more motivated and as a result perform better in sciences(Crosnoe et al, 2004).The study established that majority of the students respondents indicated that the greatest influence on science performance was by B.Ed. and diploma holder teachers while B.Sc. holder teachers had the least influence. This is in agreement with Rockoff et al (2004) whose research shows that
teacher quality matters a great deal for student achievement. A similar study by Rothstein (2008) found that teachers appear to influence current student achievement gains. This implies conducive school environment positively impacts on performance in science subjects.

5.3 Conclusions

Based on the finding of this study, the following conclusions were made:-

(i) Students’ gender, students’ career aspirations positively impacts on performance. Adequate time allocation resulted in better performance in science subjects. Students who participated in co-curricular activities performed well in sciences compared to those who did not participate. It was also evident that parent level of education positively influences the performance of the student in the science subjects. The person the student lives with does not influence the students’ performance in the science subjects.

(ii) Parents level of education greatly influences performance of the science subjects. The studies revealed that student who live with both parents perform well compared to these who live with one parent. It was also evident from the study that the size of the family and the economic status of the parents had positive impact on performance. On the parent’s profession and student’s performance in sciences the study found out that were no significant relationship in the parent’s occupation and students’ science performance.

(iii) Peer pressure and peer negligence significantly influenced performance in the Science subjects.
(iv) The research established that the county schools had better performance in science subjects than sub-county schools. Performance in the science subject is highly influenced by the availability of the material resources and teacher student relationship. The academic level of the teachers greatly influenced the students’ performance in the subjects.

5.4 Recommendations for Action

Based on the findings and conclusions of this study, the following recommendations are made for action:

a) Ministry of Education (M.O.E) and school administrators should put measures in place to ensure that female students compete favorably well in science subjects to their male counterparts. They should ensure that the female students are positively encouraged and motivated towards science subjects. Students should be encouraged to participate more in co-curricular activities since those who participated performed well in sciences as compared to those who did not participate. Co-curricula activities provide additional complimentary roles for the students which benefits the students academically by increasing their self-esteem.

b) The Ministry of Education (M.O.E) should try to allocate adequate time for science subjects. This would help in improving performance in science subjects since students would have adequate time to practice scientific skills which would go a long way in improving the performance in the science subjects.
c) School administrations should guide students into appropriate peer interactions in schools. Role models should be invited in the schools to give motivational talks to the students on the need for good performance in science subjects.

d) School administrators and teachers should develop a healthy working relationship and also ensure good student /teacher relationship. Positive student/teacher bonding usually had a positive effect on students’ success in science subjects. It can be recommended that all science teachers to undergo in-service training because the greatest influence on performance in science subjects was by B.Ed. and diploma holder teachers while B.Sc holder teachers had the least influence. The Ministry of Education (M.O.E) should organize seminars workshops and other in-service courses to familiarize science teachers and school administrators on the current development in science education.

e) The Ministry of Education (M.O.E) should put measures to ensure that District schools perform as well as the county schools. This can be done by establishing mobile laboratories at district level to be used by the schools in the area for those experiments that the district schools cannot afford to buy resource for due to their cost implication to the school budget and also for those that require electricity. The resource for teaching science subjects are conspicuously not adequate and thus the Ministry of Education (M.O.E) should initiate a budget program to provide the resources if the performance in science subjects is to be improved.
5.5 Suggestions for Further Research

From the findings of this study, further research can be conducted. Therefore the following are suggestions for further research.

a) Measures that schools can employ in order to make peer influence favorable to science performance.
b) Research should be conducted to identify the causes of poor performance in science subjects by female students compared to their male counterparts.
c) Research should also be conducted on the use of new resources such as ICT integration in the teaching of sciences in secondary schools.
REFERENCES


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APPENDICES

APPENDIX I: QUESTIONNAIRE FOR DEPUTY PRINCIPALS

I am interested in finding out how school and home-based factors affect performance in science subjects among secondary schools students. Please give as honest information as possible. The information you give will be treated as confidential between you and the researcher.

Instructions

1. Please read through the instructions very carefully first before you start answering the questions.

2. For the Yes/No or Boxed questions indicate your choice by ticks in the appropriate places/boxes.

3. The questions with spaces to be filled should be answered in the spaces provided below/next to the statement.

4. The information you will give will help to improve science performance in your area if the results are complete and trustworthy.

5. Your co-operation is needed in this inquiry and therefore do all you can to ensure it is a success.

6. The information you will give will be treated as confidential between you and the researcher only and will be used for the purpose of research only.

7. Please be precise, honest and accurate in your answer.
1. What is the population of your school?..........................................................

2. How many streams is your school?..............................................................

3. How many students do your school have per class?.................................

4. How many science teachers do you have?.................................................

5. In your opinion, what is the relationship between science teachers and students?

6. Do you offer remedial classes for the students?
   Yes □
   No □

7. Do you offer extra tuition during the holidays?
   Yes □
   No □

8. Do parents pay for extra tuition for their children?
   Yes □
   No □

9. In your opinion, how would you rate the parents payment of remedial classes and extra tuition money?
   Prompt □
   Not prompt □

10. How do you deal with the weak students in your school?
    ..............................................................................................................
    ..............................................................................................................
    ..............................................................................................................
11. Do your students participate in co-curricular activities?

Yes [ ]

No [ ]

12. If yes, which activities do they participate in?

……………………………………………………………………………………

……………………………………………………………………………………

13. Do you invite parents to your school to discuss the students’ performance?

Yes [ ]

No [ ]

13. If yes, how often do they come?

……………………………………………………………………………………

……………………………………………………………………………………

14. What was your school mean grade in the last K.C.S.E exam?............................

15. What was the performance in the science subjects in the last K.C.S.E exam?

……………………………………………………………………………………

……………………………………………………………………………………

16. Is the performance by the students in the science subjects satisfactory?

Yes [ ]

No [ ]

17. If the answer above is NO, what in your opinion affects students’ performance in Science subjects?

……………………………………………………………………………………
18. How would you describe your students’ behavior in class?

………………………………………………………………………………………….

………………………………………………………………………………………….

19. Do you think the student behavior affects their performance in sciences?

   Yes   

   No    

21. If yes, how do they affect?

   Negatively

   Positively

22. How is the relationship between students?

………………………………………………………………………………………….

………………………………………………………………………………………….

23. Does their relationships affect their performance in science subjects?

   Yes   

   No    

24. If yes how does it affect?

   Negatively

   Positively
APPENDIX II: HEAD OF DEPARTMENT INTERVIEW SCHEDULE

1. Does your department have adequately knowledgeable teachers in sciences?
   Yes ☐
   No ☐

2. Do you have apparatus for teaching sciences?
   Adequate ☐
   Inadequate ☐

3. Are teachers under you creative in improvising teaching aids?
   Yes ☐
   No ☐

4. Do teachers under you offer remedial teaching to students who are weak in sciences?
   Yes ☐
   No ☐

5. Are laboratory experiments done in science?
   Often ☐
   Less often ☐
   Always ☐

6. Are textbooks for science subjects in your department enough?
   Yes ☐
   No ☐

7. Do students have access to any other reading materials rather than textbooks?
   Yes ☐
   No ☐
8. If yes, please specify which ones.

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

7. How is the performance of sciences in your department?

   Excellent  □
   Good        □
   Average     □
   Below average □

8. In your opinion, is the performance of sciences in your department satisfactory?

   Yes        □
   No         □

9. If the answer above is no, give possible reasons.

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

10. What in your opinion affects the performance of sciences in your school?

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

11. Are students in your school involved in extra-curriculum activities?

   Yes     □
   No      □

12. If yes which activities do they participate in?

........................................................................................................................................
13. In your opinion does participation in co-curriculum activities affect performance in sciences?

Yes   [ ]

No   [ ]

14. If yes, how does it affect. Briefly explain ..........................................................

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

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

15. As a H.O.D science, what effort do you put to promote performance in sciences?

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

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

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

16. How do your students relate with students from other schools?

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

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

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

17. In your opinion, how does science teachers relate with students?

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

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

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

18. Is the time located for teaching science subjects adequate?

Yes   [ ]

No   [ ]
APPENDIX III: QUESTIONNAIRE FOR SCIENCE TEACHERS

I am interested in finding out the how school and home-based factors affect performance in science subject among secondary schools students. Please give as honest information as possible. The information you give will be treated as very confidential between you and the researcher.

Instructions

1. Please read through the instructions very carefully first before you start answering the questions.

2. For the Yes/ No or Boxed questions indicate your choice by ticks in the appropriate places/ boxes.

3. The questions with spaces to be filled should be answered in the spaces provided below/next to the statement.

4. The information you will give will help to improve science performance in your area if the results are complete and trustworthy.

5. Your co-operation is needed in this inquiry and therefore do all you can to ensure it is a success.

6. The information you will give will be treated as confidential between you and the researcher only and will be used for the purpose of research only.

7. Please be precise, honest and accurate in your answer.
PART A: GENERAL INFORMATION

1. Indicate your gender.
   - Male
   - Female

2. What is your teaching subject?
   - Chemistry
   - Physics
   - Biology

3. What is the highest level of your professional qualification?
   - M.ED
   - B.ED
   - B.SC
   - Diploma
   - Postgraduate
   - Any other specify____________________________________________

4. How long have you taught sciences?
   - 0 – 3 years
   - 4 – 6 years
   - 7 – 9 years
   - Over 10 years
PART B: FINANCES AND SCIENCE PERFORMANCE

The following factors are related to availability of funds towards achievement of science performance in public secondary school. Describe how each factor is effective in promoting science performance.

<table>
<thead>
<tr>
<th>Category</th>
<th>Highly effective</th>
<th>Effective</th>
<th>Not effective</th>
</tr>
</thead>
<tbody>
<tr>
<td>Supply of text books</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Prompt payment of school fees</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Payment for remedial and tuition</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Supply of supplementary books</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Purchase of uniform</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Adequate personal effects</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
APPENDIX IV: PARENTS INTERVIEWSCHEDULE

PART A: GENERAL INFORMATION

1. Indicate your gender.
   Male ☐
   Female ☐

2. What is your occupation?

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

3. What is your highest educational level?
   University level ☐
   Diploma ☐
   A LEVEL ☐
   O LEVEL ☐
   Any other specify___________________________________________________________

3. How many children do you have?
   Sons………………
   Daughters…………

4. How many children do you have in secondary school?

   ..............................................................................................................................
PART B: FINANCIAL STATUS

1. Indicate your financial status.

________________________________________________________________________

________________________________________________________________________

2. Do you pay your children school fees promptly?

Yes ☐

No ☐

3. Are your children usually sent home from school to collect school fees?

Yes ☐

No ☐

4. If the answer above is yes, how long do they stay at home?

________________________________________________________________________

5. Do you pay for remedial tuition for your children?

Yes ☐

No ☐

6. Do you buy extra learning materials for your children?

Yes ☐

No ☐

7. Do you visit your children schools to discuss their performance?

Yes ☐

No ☐
8. If yes, how often do you visit?
   Often  
   Less often  

9. How is your children performance in science subject?
   Excellent  
   Good  
   Average  
   Poor  

10. In Your opinion has your educational level contributed to this performance?
    Yes  
    No  

APPENDIX V: STUDENTS QUESTIONNAIRE

I am interested in finding out the socio-economic factors which affect performance in sciences among secondary schools students. Please give as honest information as possible. The information you give will be treated as very confidential between you and the researcher.

Instructions

1. Please read through the instructions very carefully first before you start answering the questions.

2. For the Yes/ No or Boxed questions indicate your choice by ticks in the appropriate places/ boxes.

3. The questions with spaces to be filled should be answered in the spaces provided below/next to the statement.

4. The information you will give will help improve science performance in your area if the results are complete and trustworthy.

5. Your co-operation is needed in this inquiry and therefore do all you can to ensure it is a success.

6. The information you will give will be treated as confidential between you and the researcher only and will be used for the purpose of research only.

7. Please be precise, honest and accurate in your answer.
1. Indicate your gender.
   - Male
   - Female

2. Indicate the category of your school
   - Provincial
   - District

3. Your age (years)
   - 11 – 13
   - 14 – 16
   - 17 – 19
   - 20 and over

3. How many are you in your family?

4. Are you a child of a single parent?
   - Yes
   - No

5. If the answer in question 5 above is Yes which parent do you live with?
   - Mother
   - Father
   - Grandparent
   - Live in a children home
   - Any other specify

6. For how long have you lived with the person above?
7. Science knowledge will be useful in your future life?

   Strongly Agree □
   Agree □
   Neutral □
   Strongly Disagree □
   Disagree □

8. What do you intend to become after school [occupation]?

   …………………………………………………………………………………………………

9. Briefly explain why you like that occupation ………………………………………
   …………………………………………………………………………………………………
   …………………………………………………………………………………………………

10. What was your average performance in science subjects in the end of third term exam?

    Excellent [76-100] □
    Very good [61-75] □
    Good [46-60] □
    Average [35-45] □
    Below average[less than 35] □

11. How will science knowledge help you in the occupation you intend to take after school?

    …………………………………………………………………………………………………
    …………………………………………………………………………………………………
13. To what extent does financial ability of your parent affect your performance in science subjects?

   Moderate  
   Not at all 

14. Are you paid for to attend extra tuition?

   Sometimes  
   Always   
   Never   

15. Does payment of school fees by your parent affect your performance in science?

   Yes  
   No  

16. Are you given some pocket money?

   Adequate  
   Inadequate  

17. What impact does material resources have on your performance in science subjects?

   Great impact  
   Moderate impact  
   Manual impact  

13. To what extent does peer influence affect your performance in science subjects?

   Greatly  
   Moderate  
   Less  
14. What impact does advice given to you by your peer have on your science performance?

- Greatly
- Moderate
- Least impact

15. Peer neglect cause academic failure?

- Strongly agree
- Agree
- Neutral
- Strongly disagree
- Disagree

16. Who has influenced you more in science?

- Teacher
- Parent
- Peer
### APPENDIX VIII: KIRINYAGA CENTRAL DISTRICT SCHOOLS

#### SUB-COUNTY MIXED DAY SCHOOLS IN KIRINYAGA CENTRAL DISTRICT

<table>
<thead>
<tr>
<th>SCHOOL</th>
<th>ENROLLMENT</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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<td>Boys</td>
<td>Total</td>
</tr>
<tr>
<td>Karaini</td>
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<td>179</td>
<td>329</td>
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<tr>
<td>Kiamuruga</td>
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<tr>
<td>Getuya</td>
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<td>Kiarugu</td>
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<td>115</td>
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<td>St Johns Thaita</td>
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<td>Gitwe</td>
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<td>Kiaritha</td>
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<td>142</td>
</tr>
<tr>
<td>Gatwe sec</td>
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<td>121</td>
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<td>Kabonge</td>
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<td>Thumaita west</td>
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<tr>
<td>Mukangu</td>
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## COUNTY BOARDING SCHOOLS IN KIRINYAGA CENTRAL DISTRICT

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<th></th>
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</thead>
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<td>Boys</td>
<td>Total</td>
<td></td>
<td></td>
</tr>
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<td>Kagumo Girls</td>
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<td>-</td>
<td>468</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ngaru Girls</td>
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<td>Kiranja Girls</td>
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<td>Njega boys</td>
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</table>
APPENDIX IX : LETTER OF INTRODUCTION

ALICE WANJIRU KANYORO
P.O.BOX. 8
KERUGOYA.

THE PRINCIPAL,
SCHOOLS IN KIRINYAGA COUNTY,
P.O.BOX
KERUGOYA.

Dear Sir /Madam.

RE: LETTER OF INTRODUCTION

My name is Alice Wanjiru Kanyoro a student at Kenyatta University undertaking a research in the learning of science in Kirinyaga central district. Due to your legitimate position as the principal I kindly request you to allow me to collect some data from science teachers, head of science department and students .I also request for guidance to parents who can provide the relevant information required for the completion of the study.

I guarantee that the information collected will be used for academic purpose only and will be treated with absolute confidence.

Yours faithfully

ALICE WANJIRU KANYORO

CC D .E.O KIRINYAGA CENTRAL DISTRICT
SAMPLE SCHOOLS PRINCIPALS.
APPENDIX X: MAP OF KIRINYAGA COUNTY
NATIONAL COMMISSION FOR SCIENCE, TECHNOLOGY AND INNOVATION

Phone: +254-20-2213471, 2241349, 310571, 2219420
Fax: +254-20-318245, 318249
Email: secretary@nacosti.go.ke
Website: www.nacosti.go.ke
When replying please quote

Ref: No.

9th January, 2013

NACOSTI/P/14/6605/533

Kanyoro Alice Wanjiru
Kenyatta University
P.O.Box 43844 - 00100
NAIROBI.

RE: RESEARCH AUTHORIZATION

Following your application for authority to carry out research on “Effects of socio-economic factors on students performance in science subjects in Kirinyaga Central District, Kenya,” I am pleased to inform you that you have been authorized to undertake research in Kirinyaga County for a period ending 31st December, 2014.

You are advised to report to the County Commissioner and the County Director of Education, Kirinyaga County before embarking on the research project.

On completion of the research, you are expected to submit two hard copies and one soft copy in pdf of the research report/thesis to our office.

[Signature]

DR. M. K. RUGUTT, PhD, HSC.
DEPUTY COMMISSION SECRETARY
NATIONAL COMMISSION FOR SCIENCE, TECHNOLOGY & INNOVATION

Copy to:

The County Commissioner
The County Director of Education
Kirinyaga County.
APPENDIX XII: RESEARCH PERMIT

THIS IS TO CERTIFY THAT

MISS. KANYORO ALICE WANJIRU

OF KENYATTA UNIVERSITY, 8-10300

Seyu, has been permitted to

conduct research in Kirinyaga County on the topic: EFFECTS OF
SOCIO-ECONOMIC FACTORS ON
STUDENT'S PERFORMANCE IN SCIENCE
SUBJECTS IN KIRINYAGA CENTRAL
DISTRICT, KENYA.

for the period ending: 31st December, 2014

Signature:

Applicant's

Date of Issue: 9th January, 2014

Fee: Kshs 1000.00

Secrectary

National Commission for Science, Technology & Innovation