Junior secondary school pupils were tested in four processes of science. The test subjects consisted of a total of 516 students. There were 113 male second form students, 143 female second formers, 131 male third form students and 129 female third formers. The objective of the study was to compare these four groups on the basis of sex and grade level, on how they performed in the tests which were administered to them. The process skills in which these subjects were tested were: Observation, Prediction, Generalization and in Controlling Variables. The attitude of Open-mindedness was also investigated using an appropriately designed test. The competence of the subjects in the process skills was also analyzed using a laid down criterion of performance of 0.5 (or 50) to decide on group competence.

The observation test required the subjects to utilize all their senses in order to identify and communicate in writing all the differences that they could observe. These were sixteen (including one item for demonstration), which could be written down. In the prediction tests, the subjects watched a demonstration, then on the basis of the demonstration they were required to reason in order to make prediction about the outcomes of some tasks which were presented to them.

The prediction levels were varied depending on the number of variables a subject was to take into consideration during the test. The test on generalization required the subjects to make conclusion on the basis of their earlier observation about the liquids and balls used in the test. The items testing subjects' ability to control variables required them to identify which variables to keep constant and which ones to vary in order to set up appropriate experiment. The test to measure the attitude of Open-mindness required the subject to identify situations in which the response "It is not possible to tell" were applicable and to give some basis for stating so.

The mean performance was calculated for each group in each of the tests administered. A test of significance of difference between two means was performed for the group pairs (a total of 6 group pairs) to find out whether or not the groups deferred in performance. The Chi-Square Technique was also used to test for significance of differences between frequencies of sample pairs which satisfied the criterion which had been set.

Analysis of the results revealed that there were significant differences between the group means in the tests administered. Of particular interest, the results of the analysis revealed that in some processes such as in prediction and controlling variables, the dimension of sex contributed to differential in performance. In observation and generalization, sex as a dimension did not seem to feature. The difference of one year in school attendance did not produce any difference in performance between the subjects.

The Chi-Square Test analysis also revealed some significant results for some groups in some tasks. Form Two male students did not significantly differ from their female counterparts in nearly all tests except in prediction tests. Male Form Two students did not differ from male Form Three students in all the tests given. Form Two girls differed from Form Three girls in only one test, namely generalization. There were four tests in which Form Three boys significantly differed from their female counterparts. These were in prediction (Level Two and Three), Open-mindedness and in Controlling Variables.

The competence of the subjects in the skills tested was found to be very low. Pupils' competence was particularly low in Observation; Prediction (Level Three) in Open-mindedness where in all the cases the percentages of competent subjects were all less than 30.It was suggested that the observed low competence in the skills should be of great concern for science teachers. It was argued that pupils who are incompetent in science skills are not likely to manifest high-level ability in science tasks. To function effectively in the scientific field requires a practitioner to be competent in both content and process.

It was hence suggested that because of observed low competence in the skills, Kenya' secondary school science curriculum should strive to improve pupils' competence in the processes of science particularly that of observation. The call for incorporation of these activities would not require additional funding nor would the number of science lessons have to be increased. The development of competence in the skills can be enhanced by using the same number of lessons using available materials without necessarily incurring additional costs. The long-term benefits in teaching of future scientists was bound to be enormous should attempts to implement these recommendation succeed.