EFFECTIVENESS OF REWARD ON MATHEMATICS ACHIVEMENT OF GRADE III STUDENTS

A

THESIS

BY

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Letter of Approval

A

Thesis

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The thesis entitled **"Effectiveness of Reward on Mathematics Achievement of Grade III Students"** has been approved in partial fulfillment of the requirements for the degree of Master of Education, specialization in Mathematics Education.

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LETTER OF CERTIFICATE

This is to certify that **Mrs. Jamuna Rijal,** a student of academic year 2068/069 with campus Roll No. 133 Thesis No. 1031, Exam Roll No. 281615 and T. U. Registration Number 7-2-32-834-2005 has completed this thesis under my supervision for the period prescribed by the rules and regulations of Tribhuvan University, Nepal. The Thesis entitled **"Effectiveness of Reward on Mathematics Achievement of Grade III Students"** has been prepared based on the results of her investigation conducted during the period of April, 2015 to August, 2015. I hereby, recommend and forward that her thesis be submitted for the evaluation as the partial requirement to award the degree of Master of Education specialization in mathematics.

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ABSTRACT

The study entitled "Effectiveness of Reward on Mathematics Achievement of Grade III Students" is an attempt to study the effectiveness of reward on students' achievement. It was conducted in Rasuwa district involving 17 students in experimental group and 15 students in control group. The study had two purpose: one is to analyze the effect of reward on mathematics achievement of grade III students and second is to gain an insight into the students' participation in learning during experiment.

This study used pre-test post-test non-equivalent group design and data was collected through experiment done providing one group with reward and another without reward by conducting the experiment for three weeks duration. Open-ended interview and classroom observation, where also taken for qualitative data. Achievement test papers, open-ended questions for interview, checklist and rating form for observation were main tools of this study. The t-value was calculated from the scores of achievement test to find the significance difference between two mean scores of pre-test and post-test and the information from interview and observation were analyzed using qualitative techniques.

It is concluded that psycho-symbolic reward with verbal reward play effective role to increase students' achievement scores and practice of reward creates positive consequences such as increasing students' involvement, punctuation and appropriate changes in students' activities and work habits.

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INTRODUCTION

Background of the Study

Rewards as an appropriate and effective way to manage behaviour in the elementary classroom. It induces learning approach, behaviour and feeling of positive emotion. The reward system as a collection of brain structures that attempts to regulate and control behaviour by inducing pleasurable efforts. Rewards are important for building a predictable, positive social culture in a school and effective, important and functional part of any educational context. Rewards are especially important for helping motivate a child to build early competence with reading, writing or social skills. Rewards have a greater role increasing and maintaining quality of education. It is an important concept to consider in primary level because reward provides positive input to children with a great deal to improve teaching/learning activities. Rewards are given for participation in an activity. They are effective when they are delivered in ways that provide students with informative feedback about their performance. Reward seeks to influence conduct favourably by associating a pleasant feeling with the desire act. "A reward means something given to one person by another person or group which brings pleasure or satisfaction to the recipient. When student is rewarded immediately after some behaviour and know that the reward is given for the behaviour, to be strengthened. That is the behaviour is likely to recur when the situation is appropriate. Also, if a reward is promised for similar behavior, the probability is increased that the student will try to produce the desired behaviour again" Herbert and Richard (1971).

Teacher can offer different forms of reward system to his/her students such as praise, token reward, tangible and activity reward, symbolic reward etc. Selecting the right type, level and form of rewards to encourage student is a competence developed over time. Reward should be replaced with teaching that is focused on the intrinsic motivation of the students. Reward is the thing that is given to the students for their splendid deeds. "Rewards may be symbolic (gold star, medals or honor rolls), materials (a piece of candy, a sum of money or the right to participate in the student activities or to hold office) or psychological (knowledge of progress, recognition of adequanly or growth toward adequacy)" Hill (1965). Rewards, by ensuring safety, indicating esteem and leading to belongingness have their place in motivating the pupil an area of knowledge. Because contact is required to build an interest in an activity, idea or person, rewards are recommendable in the role of teaching/learning. "Rewards provide incentive for healthy emulation among individuals and group of individuals",(Agrawal, 2005) .When one is rewarded for the work s/he has performed, it is sure that it makes one happy and another is likely to be motivated towards the learning in the name of getting reward as well. Agrawal further says "It gives happiness to the parents when their children gets prize. They encourage their children to put in all the more labour."

The effective learning depends upon the proper teaching /learning way which motivates the learners to learn through active participation. Reward activities are the main way to motivate the learners in classroom activities and it helps shaping of behaviour, finding out individual difference, confirming the behaviour, providing feedback and developing personality. The addition of reward in the instructional process is intended to achieve two major purposes: to motivate students towards

teaching/learning activities and secondly to help pupil develop effective learning and working habits. "The person might be presented with a number of paired associates to study and told for each one how much money he will receive if he can remember that pairing on a later cued recall test. In such a situation, recall will vary directly with the expected pay off for remembering a given items. However, it appears likely that this is largely due to more rehearsal time allotted by the subject to the high-pay off items to the determined of the low-pay off ones" Hilgard (1977, p.48). Reward helps to pupil become a better learner and producer to encouraging pupils to improve their knowledge and skill through learning. It provides the necessary feedback with constructive comments and suggestions where it may improve and acknowledgement of learning and thinking. Rewards allow students to learn in joyful atmosphere.

Especially in primary level, reward has been valuable to motive students. Mathematics which was created with human need has been dynamic side and important component of every moment of life. But most of the students realize that mathematics is very difficult subject and it is very challenging that how can we motivate students to learn the mathematics meaningfully. Here, reward is one of the best remedial measures to motivate the students in teaching/learning activities. So, in the mathematics classroom, reward helps to encourage appropriate behaviour and build the skill fluency needed to attain the natural benefit of skill. Grade III is the beginning step of formal education and considers it as vital role to promotion of overall development. The beginning education has traditionally attempted to prepared children for their future social roles by teaching mathematic as a tool for solving practical problem. Nowadays, the aim of mathematics teaching is not only to develop mathematical competence but also communication is competence on the part of

learning (Parajuli and Subedi, 2001). There are several factors which affect student's achievement. Some of the factors are students, teachers, school, peer group, interest and aptitude, environment, reward, punishment etc. The reward is one of the important factors which directly and indirectly effect on the achievement of students. Reward is strong weapon for motivation and gives the realistic picture on practice. So, the idea of reward in classroom teaching is an important concept for effective teaching and learning in the beginning of the school year.

Motivation, Reward and Reinforcement

Motivation is commonly thought of as inner drive, impulse, emotion or desire that moves one to particular action. Motivation is something that can, like self-esteem, be global, situational or task oriented. It also typically examined in terms of the intrinsic and extrinsic orientation of the learners. Those who learn for their own self perceived needs and goals are intrinsically oriented and those who pursue a goal only to receive an external reward from someone else are extrinsically motivated. "Intrinsically motivated activities are ones for which there is no apparent reward except the activity itself. People seem to engage in the activities for their own and not because they lead to an extrinsic reward. Intrinsically motivated behaviours are aimed of bringing about certain internally rewarding consequences, namely: feelings of competence and self-determination" Edward (1975, p.23)."Motivation is the desire to achieve beyond expectations, being driven by internal rather than external factors, and to be involved in a continuous striving for improvement" (Torrington, Hall, Taylor and Atkinson, 2009, p.276).

The contrary, extrinsically motivated behaviours are carried out in anticipation of reward from outside and beyond the self. Typical extrinsic rewards are prize,

grades and certain types of feedback: positive feedback. But reward and reinforcement are the motivating factors in the learning process. "Reward is the benefits that arise from performing a task, rendering a service or discharging a responsibility" (Pittas, 1995, p.11).

Reinforcement may positive and negative which may use to change the behaviours of learners. Reward is a part of reinforcement which is always positive and doing the act as positively.

Thus, we can now easily claim that motivation is inner drive, impulse or emotion but reward and reinforcement are motivating factor. Furthermore, reward reinforcement is a type of motivation: extrinsic motivation.

Statement of the Problem

The idea of reward is an important concept to consider in teaching/learning activities because reward provides positive input to children with a great deal to improve teaching/learning activities. Nowadays, the importance of mathematics is increasing day by day and it is being essential in school level but the students are less success on it due to less interest on mathematics. Therefore, it is being challenge for teachers and parents to raise the interest towards mathematics and teach it effectively and efficiently. It can be done through different factors such as remain positive, providing opportunity for success, providing effective method etc. These are related to reward. Reward is an important factor to motivate students and continues to flourish its effectiveness. However, despite the central role of reward is to enhance teaching/learning process, it has not been implemented effectively. So, this study is concerned with the effectiveness of reward on mathematics achievement of students of grade III.

The following research questions were answer in this study.

- Does the reward have any effect on mathematics achievement of students?
- Does students' participation and engagement increase during experiment?

Significance of the Study

Mathematics is an essential part of school curriculum. So, it is taught as compulsory subject at school level. National Educational System Plan has emphasized in making the mathematics teaching life oriented. But mathematics is still considered as a complex subject in the view of students and their parents. Most of the students fail in the exam due to the cause of mathematics. In such case, it is very difficult that how to teach mathematics meaningfully and how can we motivate the students to learn the mathematics meaningfully. Students' lack of motivation is a serious issue that many educators face. A student who is not academically motivated may experience lower achievement level.

Reward is one of the most essential factors to motivate students for teaching/learning activities. It is useful to conduct research concerning reward and its effects on mathematics achievement. Reward is the primary requirement for effective teaching of mathematics. So, the research inspires by this issue and wants to precede forward this study. Mainly the significance of this study are as follows:

- This study is useful for teachers to use reward in teaching mathematics.
- The study reveals the information about the achievement level of students by with and without using reward in teaching mathematics.

- This study helps for teachers to bring appropriates changes in teaching/learning activities.
- This study supports and gives the guidance to improve teaching/learning activities.

Objectives of the Study

The objectives of the study were as follows:

- To analyze the effect of reward in mathematics achievement of grade III students.
- To gain an insight into the student's participation in learning while using reward.

Hypothesis of the Study

Researcher had formulated hypotheses to conduct the research. Hypotheses are used in research to predict the result before a study. It means hypotheses are assumption or guesses about the population involved. Such assumptions may or may not be true. This is an experimental study. So, the researcher had used hypotheses instead of research questions. The research hypothesis and statistical hypothesis were as follows:

Research Hypothesis

In this study researcher hypothesized that the independent variable (psycho-symbolic reward with verbal reward) caused no change in dependent variable (Achievement score in mathematics).

Statistical Hypothesis

H_0: $\mu_1 = \mu_2$ (Null Hypothesis)

H_1: $\mu_1 \neq \mu_2$ (Alternative Hypothesis)

Where, μ_1 and μ_2 are the mean achievement scores of students taught by using reward and that of not using reward in teaching mathematics respectively.

Delimitations of the Study

Any study cannot cover all the fields. Each of them has some delimitation. The study also has some delimitations which were as follows:

- The study was conducted for the grade III students in public schools of Dhaibung VDC of Rasuwa district.
- The study was consisted the experiment of three weeks duration.
- Students' scores in achievement test were obtained from achievement test made by the researcher.
- The study was depended on psycho-symbolic reward such as red star, red fish, green star and green fish with verbal reward.

Operational Definition of the Terms

Effectiveness

Effectiveness is the capacity of producing a desired result such as achievement score, behaviours and participation of students in teaching/learning process.

Achievement Test

The test conducted by the researcher to test knowledge, comprehensive and skill of students on mathematics

Achievement Scores

Achievement scores are defined in terms of scores obtained by the students on mathematics test constructed by the researcher.

Experimental Group

A group of students which is taught by using reward in termed as experimental group.

Control Group

A group of students which is taught without using reward is termed as control group.

Pre-test

Pre-test is a test which measures the student's achievement before implementation of experiment.

Post-test

Post-test is a test which measures the student's achievement after implementing the experiment.

Psycho-symbolic Reward

Psycho-symbolic reward is defined as the symbol to motivate and encourage the student's learning, such rewards are red star (for those students who complete and correct 100% of the given task.), red fish (for those students who complete and correct above 90% of the given tasks), green star (for those students who complete and correct above 60% of the given tasks) green fish (for those students who complete and correct below 60% of the given tasks).

Verbal Reward

Verbal reward is the most common form of rewards that teacher compliments students when they behave in a way that is positive such as excellent, very good, good, not good etc.

Participation

The involvement of students', punctuation, students' activities and students' work habits during teaching/learning process is termed as participation.

Chapter II

REVIEW OF RELATED LITERATURE

Literature Review

A review of related literature is source of the further study of research task. It helps to conduct the research programs and gives the better idea of a surveying in the research hypothesis. Then it guides towards the conclusion. This chapter focuses on the findings of previous researches which help to examine the effectiveness of reward on mathematics achievement. Some small-scale researches done in Nepal will also be discussed besides those found in other countries.

Tolman's association M.H. Elliot (1928) conducted experiment on reward expectancy learning which means that the learner comes to anticipate the presence of a reward and if that reward is withheld or changed, behavior is disrupted. Elliot selected two equally angry groups of rats and trained them to find a reward of branmash and sunflower seed in 'T' maze. The branmash groups were called experimental group and the sunflower seed was called control groups. This training continued for nine days and on 10^{th} day sunflower seed was substituted for branmash. The experimental groups which expected branmash committed more errors and

learning was distributed. The hypothesis is that animals had come to expect branmash more desirable reward but when their expectation was not confirmed, behavior was disrupted. This study shows that the importance of reward expectancy as a factor in learning and it helps to select the design of present study.

Bandura and Waltes (1953) state that disciplinary techniques differ in their emphasis on the reward and punishment components when for examples the emphasis is almost usually on the with holding or with drawing a love, the technique emphasizes the reward component. Bandura and Richard Walters suggest that disciplinary techniques should emphasize rewards which are with drawn and withheld until the child complies with adult demands or make restitution.

Amatya (1978) did a research entitled 'A study of the Effectiveness of Teaching mathematics with and without the use of instructional materials', with the aim to find out whether instructional materials were helpful to develop the mathematical concepts and measure the difference in concept development among students in the experimental and control group of grade III. Sixty students from Lalitpur Nagar Panchyat were selected for sample. 30 students in the experimental groups were randomly selected from section A by the process of alternative sampling and thirty from section B by the similar process as experimental group. Then experimental group was taught without the use of instructional materials was taken as treatment after the experiment. The conclusion was that the performance of the students taught with the use of instructional materials was significantly improved when compared with the performance of the students taught without the use of instructional materials.

Gamson (1983) pointed out that reward systems send a powerful signal to the external actors about what an institution has been, is now, and wants to be. Reward systems present an opportunity for an institution to the differentiate itself from other institutions, to mark itself as unique.

Bandura (1988) challenged that how reward effects motivation. It is not the reward itself that is important, but rather the individual's belief about the consequences of behavior. Based on personal experiences and observation of model, people developed leaps about likely outcomes of actions. Reward is motivational because people expect that in a given fashion will be rewarded. This belief coupled with perceived importance or value of the rewards, leads people to act in ways the belief will result in reward attainment.

Yuk-Wah (1995) studied on “Rewards and punishments in school: A study of their effectiveness as perceived by secondary school students and their teachers.” The study aimed to investigate the perception of the effectiveness of reward and punishments of students and teachers in secondary schools. The questionnaire developed by R.E. Caffyn in 1987 for a study in U.K. was borrowed and adapted as the instrument in this study. The adapted questionnaire was translated into Chinese and was administered to 302 students and 85 teachers in 8 subsidized schools. Findings indicated that rewards were perceived as effective significantly more than punishment.

Upadhyay (2001) completed his dissertation on "Effect on Constuctivism on Mathematics Achievement of Grade-V students in Nepal." The aim of the research was to adopt and advocate constructivism in classroom working on the sample size of hundred eight students. From four schools involving two control and two

experimental groups, the research found the possibility of constructivism in Nepalese schools with significant difference in achievement that of students in favor of teaching method based on constructivist approach than conventional method of teaching.

Pokhrel (2007) Studied on the "Effect of Reward on Mathematics Achievement of Primary Level at Grade Three in Transitive Reward". The study based on, to confirm that the place of rewarding activities in teaching mathematics and to find out the achievement of the students taught by using rewards and without using rewards. In order to fulfill the objectives of this study, the researcher selected the Pretest-posttest equivalent group design and 150 sample of students from two public schools of Tanahun district involving experimental and control group. The experiment was conducted for two weeks duration. The conclusion was that the achievement of the students taught by using reward is better than the achievement of the students taught without using reward in teaching mathematics. So, the rewarding activities must be appropriate in teaching mathematics. This study helps to choose the topic and determined the objectives of the present study.

Neumann (2009) contends that reward systems as a set of interconnected and interacting elements that work together to regard, their contributions presents a broader perspective that the simple exchange of favor and disfavor for particular acts.

Drexler (2010) did a research entitled “Teacher’s attitudes about Reward System in the classroom.” A convenience sample of teachers was chosen from two suburban elementary schools of western New York. Results indicated that all teachers in the sample use some kind of reward in their classroom. The majority of teachers thought that research can help to increase participation and academic achievement.

Kharel (2012) did a study on "Practice of Reward in the ELT classroom." Hundred and twenty students and ten teachers of private schools from Tulsipur municipality of Dang district were selected for sample. The study was based on data analysis of the responses obtained from the respondents, classroom observation and experiment done providing one group with reward and another without reward. It concluded that practice of reward brings positive consequences in the teaching/learning process.

The above studies have been done to find out the achievement in mathematics affected by variables such as teaching method, use of instrumental materials, use of transitive reward etc. But no studies have mentioned about effectiveness of reward on mathematics achievement of grade III. So, present study aims to find out the effectiveness of reward on mathematics achievement of grade III.

Theoretical Framework

Theoretical framework sets up a road map which will guide the investigation. The Classical Conditioning Theory by Ivan Pavlov had supported for this study. Pavlov used the reward system by rewarding dogs with food after they had heard a bell. Pavlov rewarded the dogs so that the dogs associated food, the reward, with the bell. Edward L. Thorndike (1874-1949) used the reward system in order to study operant conditioning. He began by putting cats in a puzzle box and placing food outside of the box so that the cat will want to escape. The cats worked to get out of the puzzle box to get to the food. Although the cats ate the food after they escaped the box, Thorndike learned that the cats attempted to escape the box without the reward of food. Thorndike used the rewards of food and freedom in order to stimulate the reward system of the cats. Thorndike used this in order to see how the cats learned to

escape from the box. In a fundamental discovery made in 1954, researchers James Olds and Peter Milner discovered while trying to teach rats to solve problems and run mazes, stimulation of certain regions of the brain, where the stimulation was found seemed to give pleasure to the animals. They tried the same things with humans and the results were similar. From the above theories, behaviours which are rewarded, often repeated and these behaviours that are not rewarded are less likely to occur in the future. This law of effect had taken part in this study. i.e. relationship between psycho-symbolic reward and achievement scores.

Conceptual Framework

From the above theoretical framework, the researcher had conceptualized the idea for research work. The researcher had given Psycho-symbolic reward with verbal reward to the grade III students to examine its effects on mathematics achievement. The Conceptual framework specifies direct relationship between reward and many other variables like achievement score, behavior and qualification of teacher, subject matter, evaluation applied, length of the experiment, school's facilities, maturation of students teaching methods etc. The researcher depicted the relationships among them variables as shown in the diagram.

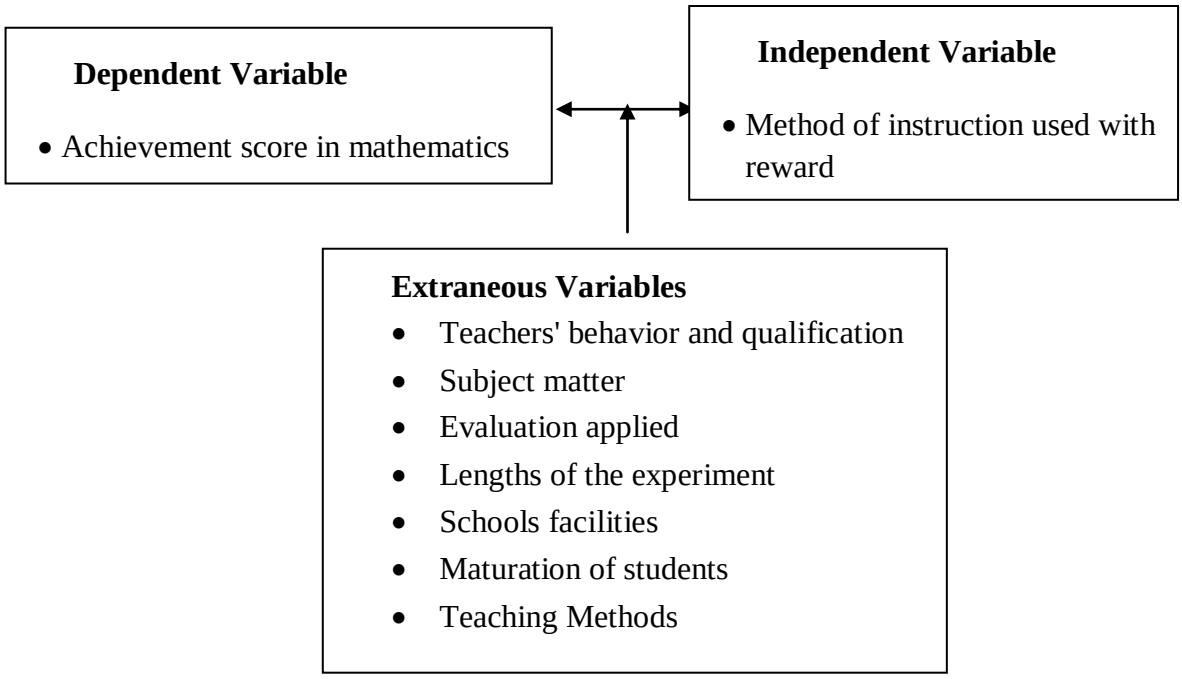

Fig No.1. Conceptual Framework of Relationship Among Reward, Achievement Scores and Extraneous Variables.

Fig. 1.shows that researcher had examined the relationship between Psycho-symbolic reward with verbal reward and mathematics achievement. During the experimentation, some possible extraneous variables which may affect on the such as experiment teacher's behaviour and qualification, subject matter, evaluation applied, length of the experiment, schools' facilities, maturation of students, teaching methods etc. were controlled by the special procedures.

Chapter III

METHODS AND PROCEDURES OF THE STUDY

This chapter presents the method and processes related to the study under the different headings which was used to achieve the objectives of the study. In this chapter, design of the study, procedure for selection of sample, intervention, variables study, method of experiment, construction of episodes, Data collection tools, validity/reliability of the tools, data collection and data analysis procedures are presented.

Design of the Study

This is an experimental study. A pre-test post-test non-equivalent group design was adopted for the purpose of this study. Any prior differences between the groups may affect the outcomes of the study. In the study, sample schools may differ in various aspects such as school's economic status, facilities of the technology, student's background, gender differences, exceptional children, teacher's qualification etc. So, the researcher had followed non-equivalent group design. The design of the study was as follows:

Table No.1

Design of the study

Group	**Pre-test**	**Treatment**	**Post-test**
E	T_1	X	T_2
C	T_1'	—	T_2'

Where,

E = Experimental Group, C = Control Group, X = Treatment given to the experimental group, — = Treatment not given to the control group, T_1 = Pre-test

given to the experimental group, T_2 = Post-test given to the experimental group, $T_1^{'}$ = Pre-test given to the control group, $T_2^{'}$ = Post-test given to the control group.

To fulfill the objectives of the study, two groups of students was formed from two different schools known as experimental and control group. The experimental group of students was taught regularly using reward (known as treatment) but the control group of students was taught regularly without using reward (without treatment). At the end of the experimentation time, an achievement test was conducted to both groups and their scores were compared.

Study Area

The study had covered the public schools of Dhaibung VDC of Rasuwa district. The major emphasis of this study was to revolve around reward system being used by teacher and student's achievement of grade III students of Dhaibung VDC of Rasuwa district.

Formation of Control Group and Experimental Group

This is an experimental study. The main purpose of this study was to examine the effectiveness of reward on mathematics achievement. As mentioned in design, this study was consisted two non-equivalent groups of students. For making two non-equivalent groups of students, the researcher visited all (seven) public schools of Dhaibung VDC and analyzed the final exam score at grade II. The researcher found Shree Manakamana Primary (SMP) and Shree Bachchhala Devi Primary (SBDP) schools were almost similar in socio-economic status, school grading, facilities of technology and number of students. In grade III, there were 19 students in SMP and 18 students in (SBDP). The researcher identified the regular and irregular students with the help of class teacher and school register. Two student of SMP and three

students of SBDP were irregular. The researcher selected the 17 students of SMP and 15 students of SBDP. A fair coin was tossed to choose experimental group and control group. The students of SMP and SBDP were decided to be experimental and control groups respectively.

Intervention

After the formulation of control and experimental groups, researcher manipulates of an independent variable that serves as an intervention. In this study, researcher had practiced psycho symbolic reward such as red star (for those students who complete and correct 100% of the given tasks), red fish (for those student who complete and correct above 90% of the given tasks), green star (for those who complete and correct above 60% of the given tasks), green fish (for those who complete and correct below 60% of the given tasks) to the experimental group according to the participation in interaction, classwork, homework and their qualities. The verbal rewards such as excellent (for those who gets red star), very good and keep it up (who gets red fish, good and do more better (who get green star) and not good, do hard labour (who gets green fish) was used with psycho-symbolic reward to encourage the learners in classroom activities. Feedback was given for wrong solution for both groups. But no intervention was taken place in control group.

Variables of the Study

The variables are integral part of research design. The overall quality of research depends not only upon the appropriateness of the research design and sampling techniques but also on the variables of the study. The variables need to be defined. In this study, there were the following types of variables which affect the validity of experiment.

Independent Variable

In this study, the independent variable which was manipulated by experimentation was method of instruction used with reward.

Dependent Variable

In this study, the dependent variable was achievement score in mathematics.

Extraneous Variable

The independent variables except reward which affects dependent variable are extraneous variables. The possible extraneous variables were teacher's behaviour and qualification, subject matter, evaluation applied, length of the experiment, school's facilities, maturation of students, teaching method etc.

Method of Experiment

This is a quasi-experimental research. So, it was carried out in the natural setting. Pre-test post-test comparison groups were made for experiment and manipulated independent variable (Psycho-symbolic reward with verbal reward) for experimental group. Open-ended questions were asked for experimental group at the end of experiment and both groups were observed before as well as after the intervention to test if the intervention made any difference.

Method of Construction of Episode

This study was set up with three episodes. This study was started with identification of problem which was be sharpened by formulating hypothesis and deducting the consequences. In this study researcher hypothesized that the

independent variable (psycho-symbolic reward with verbal reward) caused no change in dependent variable (Achievement score in mathematics).

To test a hypothesis, a researcher controlled all possible conditions (extraneous variables) except the independent variable (psycho-symbolic reward with verbal reward) which was manipulated. The researcher observed what happened to the dependent variable (Achievement score in mathematics). For this, at the experimentation time, the researcher developed lesson plans based on rewards activities (phycho-symbolic reward with verbal reward) in the teaching/learning process for experimental group. The activities were designed in the form of activities that the teacher and students both have to do during the process of teaching/learning i.e. red star was given for those who complete and correct 100% of the given task, red fish for those who complete and correct above 90% of the given tasks, green star for those who complete and correct above 60% of the given tasks and green fish for those who complete and correct below 60% of the given tasks. The verbal rewards such as excellent, very good and keep it up, good, do more better, not good, do hard labour etc. were given with psycho-symbolic reward for positive performance of students.

Finally, the researcher concluded that psycho-symbolic reward affect in mathematics achievement.

Control of Extraneous Variables

The extraneous variables such as teacher's behaviour and qualification, subject matter, evaluation applied, length of the experiment, school's facilities, student's maturation, teaching method etc. may affect in the experiment. So, the researcher had controlled these variables by the special procedures. For this, the following exercises were done to control these variables.

Teacher Behaviour and Qualification

To control the extraneous variables such as behaviour, personality, emotion and qualification of the teacher, the researcher herself taught both experimental and control groups.

Subject Matter

In both experimental and control groups, same content was taught from the same text book prescribed by government of Nepal.

Evaluation Applied

At the end of experiment, the same test (almost parallel with same difficulty level) was given to the experimental and control groups. The researcher herself marked the test papers of students.

Length of the Experiment

Researcher developed equal time duration to teach both experimental and control groups. Both groups were taught for three weeks duration by using psycho-symbolic reward with verbal reward for experimental group and without using reward in control group.

School's Facilities

Both schools were situated near to each other and almost similar in case of final exam result of students and school's facilities.

Student's Maturation

Students having the age between 7-9 and not having the regular extra class (tuition) of mathematic were selected in the sample.

Teaching Method

Both experimental and control groups were taught by using inductive and problem solving method.

Some Uncontrollable Variables in the Experiment

Student's Labour

Students may labour more or less than expected by the researcher and self-study of the students may affect in the result of research which is out of control.

Student's Home Environment

Student's home environment has great effect on student's behaviour and attitude but it cannot be controlled by the researcher.

Data Collection Tools and Techniques

An achievement test paper was the main tool for data collection. The researcher had developed two types of test papers. Both test papers were made by keeping the concern of student's level and abilities and almost parallel with same difficulty level. Each test paper was composed of 10 multiple choice questions, 8 short questions and 6 long questions, matching items pertaining to combination of learning domain i.e. the test items measured knowledge, comprehensive and skill of the students. Researcher had also taken interview with students and observed their behaviour for data collection.

Achievement Test Paper I

The test paper was consisted with full marks 50 which was consisted 10 multiple choice questions (each with 1 mark), 8 short questions (each with 2 marks), 6

long questions (each with 4 marks) based on the prescribed text book of mathematics for grade II. This paper was used for the grade III students of two public schools which were considered as experimental and control groups.

Achievement Test Paper II

The achievement test paper II was used for both experimental and control groups. The paper had contained same number of questions and carried same marks as in achievement test paper I which was based on the prescribed text book of mathematics for grade III.

Interview

Researcher uses interview to obtain a wide range of purposes. In this study, researcher had taken interview to the experimental group to determine the degree of students' satisfaction with reward. The researcher had asked the students five different open ended questions for collecting the data. The average time taken for an interview was 10 minutes.

Observation

The researcher observed carefully and recorded student's behaviours in natural setting. The recordings such as students' involvement, students' activities , students' punctuation, students' work habit etc were made during instructional period. The researcher had observed both experimental and control groups. The variety of tools and techniques like rating form, checklist were developed to observe both typical and atypical behaviors and then the researcher interpreted the theme (which were taken from rating form and checklist) in descriptive way.

Validity and Reliability of the Tools

To ascertain the validity of tools, the opinions of school's subject teacher, head teacher and supervisor were sought. To establish the reliability of the tests, pilot studies were administered among 12 students of grade III at Shree Sundhara Secondary School which was not included in actual study. The reliability of pre-test and post-test were found 0.98 and 0.96 respectively (See Appendix B and E) which was obtained by using spearmen Brown split half method.

Data Collection Procedures

For the purpose of data collection in the study, the researcher had adopted three stages of experiment.

Pre-Experimental Stage

At pre-experimental stage, achievement test (Pre-test) was administered in grade III students of two public schools Shree Manakamana Primary (SMP) and Shree Bachachhala Devi Primary (SBDP). The pre-test scores were kept to compare with the score of post-test. Researcher observed the behaviours of students of both experimental and control groups.

Experimental Stage

In this stage, the experimental group of students was taught regularly in third period (11:35-12:20) and the control group was taught in second period (10:50-11:35) from Ashadh2nd to Ashadh 25th. The experimental group was taught by using psycho-symbolic reward with verbal reward but the control group was taught by traditionally. Both groups were taught by researcher herself. After three weeks instructional activities, achievement test was administered to both groups. The time was allotted to 1.5 hrs. which was stipulated based on the calculation of average time taken by each

student in pilot testing of pre-test. At final of experiment, an open ended questions were administered to experimental group to perceive the opinion with reward and observed both groups to test if the reward made any difference.

Post-Experimental Stage

After the experimental stage, the researcher herself scored and the scores were tabulated for the analysis.

Data Analysis Procedures

Data Analysis is an important stage of the research process. In this study, the researcher had analyzed and interpreted the data by using statistical techniques. First of all, the researcher calculated the mean, variance and standard deviation of obtained marks on pre-test for both experimental and control groups. To test the significance difference between mean of the two groups, t-test was used at 0.05 level of significance by using the formula of polled variances as given at formula section. The researcher had also taken open-ended interview to the experimental group at the end of the experimentation and observed both groups at some lessons during experimentation. For interview responses, researcher coded all answers and categorized informations by classifying into meaningful analytical units based on themes and then interpreted the result in descriptive way. The same method was applied to observational informations which were obtained from checklist and rating form.

Chapter IV

ANALYSIS AND INTERPRETATION OF DATA

Analysis and interpretation of the collected data is the most important part of the study. It deals with the statistical analysis and interpretation of data obtained form achievement scores as well as responses from interview and observation of the sampled students. Those data were analyzed by using mean variance, standard deviation and t-test of quantitative data and by making theme of qualitative data. Researcher had experimentally practiced the effectiveness of psycho-symbolic reward with verbal reward in the mathematics lesson at grade III. Researcher carried out the research in three weeks in each group i.e. experimental and control group, spending forty five minutes to each period to each group. Researcher had also taken interview for experimental group and observed both experimental and control groups while experimenting her intervention. The informations obtained from interview and observation were analyzed in descriptive way.

Analysis and Interpretation of Achievement Scores of Experimental and Control Groups on Pre-test.

An achievement test (pre-test) was administered in grade III students of two public schools: Shree Manakamana Primary school (SMP) and Shree Bachachhala Devi Primary School (SBDP) at pre-experimental stage. The test paper was based on the prescribed text book of mathematics for grade III with 50 full marks. Researcher herself marked the test papers of students. The statistical calculation such as mean, variance, standard deviation of the scores for experimental and control groups on the pre-test were calculated by using the statistical formulas and the scores are given in

Appendix H. The students' mean achievement scores of experimental and control groups on pre-test be compared with the help of bar diagram as given below.

Figure No. 2

Bar Graph to show Achievement Scores on Pre-test

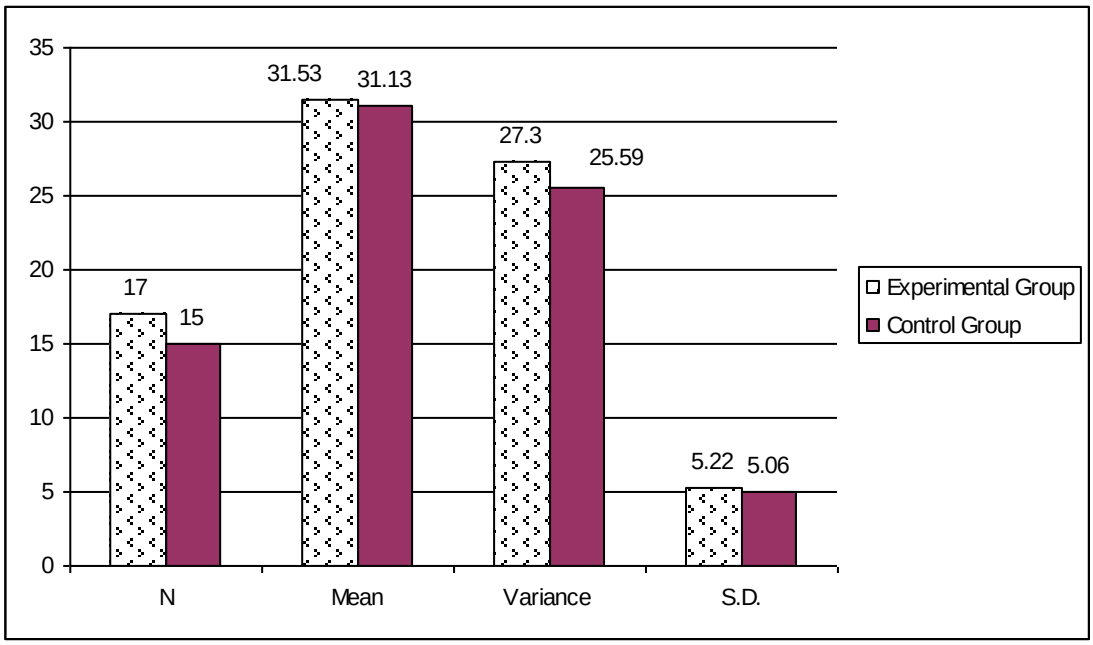

Figure 2.shows that the mean, variance and standard deviation of achievement scores obtained from experimental and control groups on pre-test. The mean scores of experimental and control group are 31.5 and 31.13 i.e. almost similar to each other. Also, the standard deviation of experimental and control groups are 5.22 and 5.06 respectively. The difference between mean and standard deviation are 0.37 and 0.16. This indicates that there is no vast difference between mean and standard deviation of both groups.

The researcher had also calculated t-value of the scores for experimental and control groups at 0.05% level of significance and t-test was done to test the

significance difference between the mean of two groups which is shown the following table.

Table No. 2

Analysis of Pre-test Result

Groups	**N**	**Mean**	**Degree of freedom**	**Level of significance**	**Calculated value of t**	**Remark**
Experimental Group	17	31.53	30	0.05	0.22	Null hypothesis is accepted
Control Group	15	31.13	30	0.05		

In the above table, the mean achievement scores of experimental and control groups were 31.53 and 31.13 respectively over the full marks 50. The mean of experimental and control group appeared approximately equal. The two mean achievements of groups were compared. Statistically using t-test with two tailed, the calculated value of t is 0.22 that is less than the tabulated value 1.96 at 0.05 level of significance with degree of freedom 30. So, the null hypothesis must be accepted and conclude that there is no significant difference between mean achievements scores of experimental and control groups on pre-test. Therefore, both groups are similar in terms of their achievement scores.

Analysis and Interpretation of Achievement Scores of Experimental and Control Groups After Experiment

The researcher had taken an achievement test (post-test) to both experimental and control groups after three weeks instructional activities with specified reward. The test paper was based on the prescribed text book of mathematics for grade III

with same number of questions and carried same marks as in the test paper of pre-test. The students' mean achievement scores of both experimental and control groups on post-test be compared with the help of bar diagram.

Figure No. 3

Bar Graph of Pre-test and Post-test Scores of Experimental Group

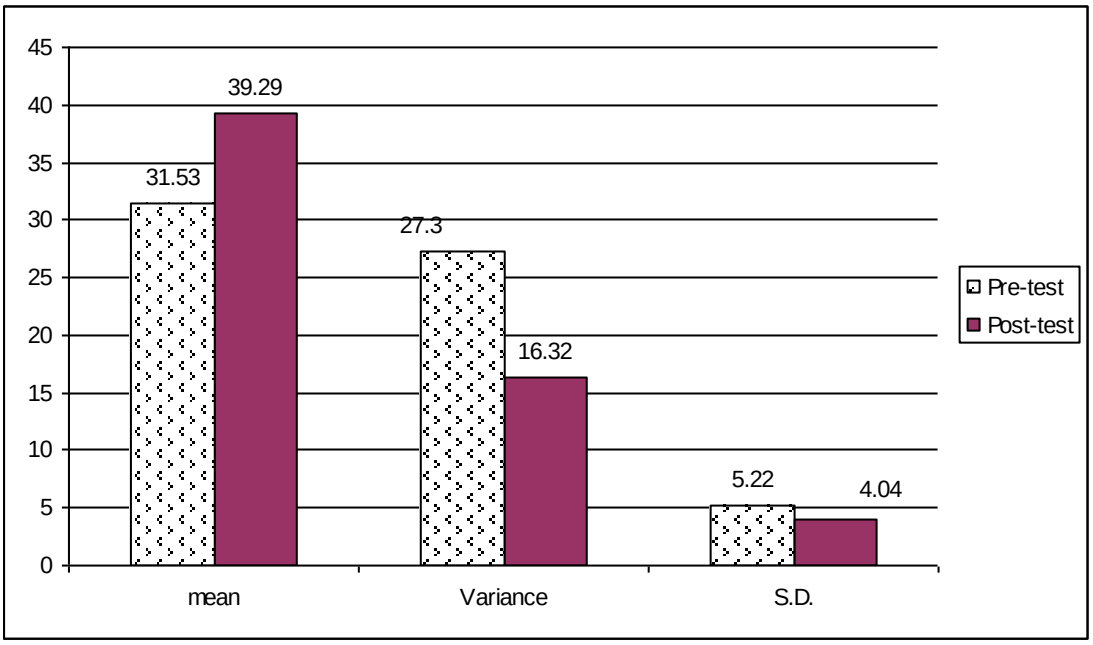

Figure 3, shows the mean, variance and standard deviation scores obtained by the students of experimental group on pre-test and post-test. The mean scores of experimental group on pre-test and post-test are 31.53 and 39.29 respectively. The mean score of experimental group on post-test is greater than the mean score on pre-test by 7.76. The variance and standard deviation on pre-test and post-test are 27.3, 16.32 and 5.22, 4.04 respectively. The variance and standard deviation are decreased on post-test. This result indicates that the achievement score of experimental group on pos test is better than the achievement score on pre-test.

Fig. No. 4

Bar Graph of Pre-test and Post-test Scores of Control Group

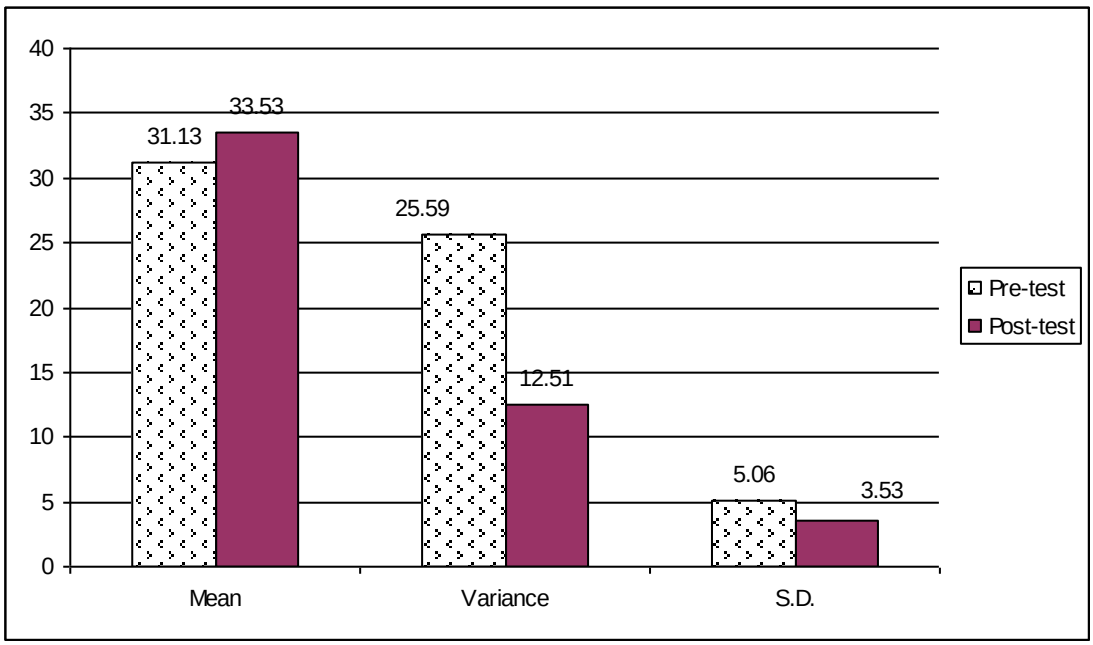

Fig. 4 shows the mean, variance and standard deviation scores obtained by the students of control group on pre-test and post-test. The mean scores of control group on pre-test and post-test are 31.13 and 33.53 respectively. The mean score on post-test is greater than pre-test by 2.40. The variance and standard deviation are decreased on post-test.

From the above data, the mean score of experimental group on post-test is increased by 7.76 than the mean score on pre-test. Similarly, the mean score of control group on post-test is greater than the mean score of pre-test by 2.40. It is seen that, there is no vast difference between the mean score of control group on pre-test and post-test. It may cause of teacher qualification, teaching method etc. But the difference between the mean scores of experimental group on pre-test and post-test is

large. So, it is clearly indicates that the mean score of experimental group is increased due to the manipulation of psycho-symbolic reward with verbal reward.

The researcher had also calculated the inferential statistical calculation t-test to judge the difference of mean scores of two groups. t-value of the scores for experimental and control groups on the post-test which is presented in table no.3 and the details scores are given in Appendix I.

Table No. 3

Analysis of Post-test Result

Groups	**N**	**Mean**	**Degree of freedom**	**Level of Significance**	**Calculated value of t**	**Remark**
Experimental	17	39.29	30	0.05	4.27	Null hypothesis is rejected
Control	15	33.53	30	0.05		

Table No. 3 shows that the two mean of achievements scores of both groups were compared statistically using t-test with two tailed. The calculated value was t is 4.27, that is greater than the tabulated value 1.96 at 0.05 level of significance with degree of freedom 30. So, the null hypothesis must be rejected and alternative hypothesis was accepted which concluded that there is significant difference between mean achievement scores of experimental and control groups on post-test.

Thus, the researcher concluded that the achievement of grade III students, who were taught by using reward, was found significantly better than the students who were taught without using reward in mathematics. So the psycho-symbolic reward can play effective role to increase students achievement scores in mathematics.

Analysis and Interpretation of Data Obtained from Open-Ended Interview and Class Room Observation.

The study had aimed for examining the effectiveness of reward on mathematics achievement and to gain an insight into students' participation in learning while using reward.

The first purpose of this study was examined by calculating the t-values of mean scores for experimental and control groups. Likewise, the researcher had taken interview to the experimental group and observed the behaviours of the students of experimental and control groups to fulfill the second objective. Researcher asked five different open-ended questions (see Appendix G) to the students of experimental group for collecting the information regarding students' views of the role of reward in primary level. The questions were formed to establish the students' views with regard to the perception of the implementation of reward and the effect of reward on learner's involvement and work habit.

Researcher also observed the behaviours of students of both experimental and control groups at some lessons during experimentation of intervention by using task behavior checklist, checklist for observing work habits and rating from of class discussion (see Appendix F). The qualitative data obtained from interview and observation are analyzed by making themes under different heading such as students' involvement, students' activities, students' punctuation and students' work habits.

Student's Involvement

Involvement of students in classroom is participation of students in classroom activities where students are learning and listening to others' ideas and comments. It also includes short exchange between instructor and students, or within small group of

students. But in this study, the involvement of students in classroom was operationally defined as the number of present students in classroom. There is generally no single reason why some students are in varying degrees uninterested and unwilling to participate in classroom. Usually a combination of factors are responsible such as one-way communication of instructor, lack of specific classroom structure, students' home problem etc. Different approaches may effective to increase the involvement of students in classroom. In this study researcher had manipulated psycho-symbolic reward with verbal reward for the students of experimental group which has been a motivational factor for the regularity of students. The researcher had asked the open-ended question related to this heading (given in Appendix G), the most frequently occurring responses were positive. To quote one of the respondent who said, *"Yes, I like to come school regular to get red star."* The majority of students had answered that they present regularly in classroom to get red star from their teacher. Researcher had also observed the involvement of students (See Appendix F) during her experimentation. During first observation time, the absent students of experimental and control groups were three and one respectively. At second observation, one student was absent in experimental group but all fifteen students were present in control group. But at third and forth observations, no students were absent in experimental group but number of absent students were increasing in control group. At fifth observation, all students out of total seventeen students were present in experimental group but four students were absent in control group.

Thus, it is concluded that here, psycho-symbolic reward with verbal reward had been a motivational factor to encourage the students in learning activities, i.e., it increases the regularity of students in learning activities. To the extent that psycho-

symbolic reward with verbal reward is allowed to operate, a high degree of involvement of students is possible.

Student's Activities

There are wide range of activities of students used both inside and outside the classroom that promote active learning. It is likely that if we are already used appropriate teaching/learning technique that helps students to engage actively in classroom activities. In this study, researcher had observed the activities done by students during her instructional periods. Researcher had observed the activities of students by using rating form of both experimental and control groups (given in Appendix F) to observe that psycho-symbolic reward with verbal reward gave any positive changes in students' activities. From the data obtained from the rating form of class activities, students of experimental group were always actively engaged in their work. They were silent and listen to each other. In majority of the classes of experimental group, students were responding to their teacher's questions frequently and seen as active participant. They most often ask good questions and seeks to conclusion. Students of experimental group had most often explained their view towards the topic. But the students of control group were most often gossiping while the teacher was correcting their homework and classroom. The murmuring sound of the students was heard. Students were not actively engaged in their work and some students were ignoring their teacher's questions. They rarely asked the questions to their teacher.

Observation in classroom was carried out for the last five days of lectures, overall the observations result showed that the majority of students in experimental group were actively engaged in classroom activities than the students of control group

i.e. psycho-symbolic reward with verbal reward occurred positive changes in students' activities.

Student's Punctuation and Enjoyment

The heading which deals with the punctuation of students while doing class work and related to the response of questions 2 and 3. The students had given the responses like feeling happy, satisfied, excited, heartful and enjoyment when they got red star. To quote one of the respondent who said, *"I feel very happy when I get red star."* None of the respondents were seem to be unhappy by red star provided by the teacher. So, the students of experimental group were more punctuation in every activities to get red star. Regarding to responses of question 2, one of the respondent said, *"Yes, I complete my class work on time to get red star."* Likewise, in the responses of students, researcher also found the same informations during observation obtained form the data of checklist for task behaviour (given in Appendix F).

Most of the students from experimental group were completed their work on time. At initial observation, most of the students from both experimental and control group were not completed their class work on time. Few students were outside the class likes, going toilet, tape and standing at ground and came to the class after around ten minutes of the bell ring. So, only few students were done their work on time. But at the 4^{th} and 5^{th} observations, researcher found that students of experimental group were so much punctual on their work. They did their class work faster than the expectation of teacher to get red star. When the teacher entered the classroom, they all were ready to study. But this changes was not found in the students of control group.

The above result indicated that psycho-symbolic reward with verbal reward made the students more punctuation for their work.

Student's Work Habit

The majority of students have to develop good work habits to perform well academically. Since academic improvements may take a while to materiailize, it may be useful to measure student's work habit in the shorter term as one way to determine whether students are on track toward improving their achievement. Expect to see the improvement in students, students' work habit may be baseline. A segment of students with extremely poor work habits may not make marked improvement. In this study, researcher had observed the work habits of students such as working co-operatively, seeks help, tries new activities, clean work space etc. Researcher had also asked the open-ended questions related to this heading. Regarding the responses of questions 4 and 5, all out of seventeen students argued for having a like to get red star. None of them were found not to like to get red star. Similarly in responses of why questions, they had given different responses. One of the respondent said, *"Yes, I like to get red star because it always encourage and motivate me to do more good works."* Similarly, another respondent said, *"Yes, I like to get red star because it inspires me to do my work."* Most of the students answered that they had done their classwork and homework daily to get red star. Same as in responses, students had done their work in similar manner.

From the data obtained from the checklist for observing work habits (given in appendix F), the students from experimental group were doing work being so much interested than the students of control group. They work co-operatively to each other and shared materials likes scale, pencil etc while doing their classwork. Experimental group gave much better performance than control group. i.e. they clearly and correctly completed their work. During the time of learning, students of control group made

more mistakes and they never tried to do new activities. Students of control group were lazy to do their homework and classwork. Only few students were completed their work. After the lesson, the students of experimental group asked for the next day's lesson they have to study. They were more laborious and competitive in their work to get red star from their teacher. But this types of work habits were not appeared in the students of control group.

From all the above informations what we can infer is students always welcome the reward given to them by their teacher at the time of teaching learning which helps to enhance their learning. If the students feel unhappy at the time of learning, it is sure that our teaching learning process goes in vain. So in order to make teaching learning process fruitful, achieving the objectives of the curriculum, reward is seen as a most important factor to be introduced. From all the data obtained during the experiment, researcher came to the conclusion that reward is one of such thing that helps to motivate students towards their learning creating interest, curiosity and feeling of competition if it is introduced properly.

Chapter V

SUMMARY, FINDING, CONCLUSION AND RECOMMENDATION

Summary

Reward is an important tool in teaching learning process. It plays vital role to achieve the goals and objectives. To examine the role of reward on mathematics achievement, the researcher selected the topic "Effectiveness of reward on mathematics achievement of grade three students". The research had intended to answer the question that do the students of grade III taught by using reward have better achievement than that of not using reward and For this purpose, the researcher developed two achievement test papers for grade III students on the basis of mathematics curriculum. Also, students involvement, activities, punctuation, work habit during experimental period were analized.

A pre-test post-test nonequivalent group design was adopted for this study Grade III students from Shree Manakamana Primary and Shree Bachchala Devi Primary were selected for sample. The t-test was applied in order to ascertain the difference between achievement scores of two groups. The researcher herself taught the selected units to both experimental and control groups. The instructional period was three weeks. Open ended questions were asked to the students of experimental group at the final stage of experimentation and both groups were observed at some lessons of the instructional period. Then the obtained data were analyzed and interpreted.

Findings of the Study

The statistical analysis of data obtained from the pre-test and post-test scores and informations from open-ended interview for the students of experimental group and observation of students' involvement, punctuation, activities and work habits of both experimental and control groups indicated the following findings of the study. The statistical analysis of the data and informations from interview and observation indicated the following finding of the study.

- The experimental and control groups were found almost similar on the basis of the pre-test result because the mean difference in their achievement scores was not found significant at 0.05 level of significance.
- The mean achievement scores in mathematics of experimental group were found better than control group on post-test. The mean difference in their achievement scores was significant at 0.05 level of significance i.e. the psycho-symbolic reward with verbal reward plays effective role to increase students' achievement scores.
- The mean achievement score of control group on post test was greater than mean achievement score on pre-test by 2.40. There were no vast difference between the mean achievement score of control group on pre-test and post-test. It may cause of teacher qualification, teaching method etc.
- The mean achievement score of experimental group on post test was increased by 7.76 than the mean achievement score on pre-test. The difference between the mean achievement scores of experimental

group on pre-test and post-test was large. So, it is clearly indicates that the mean score of experimental group is increased due to the manipulation of psycho-symbolic reward with verbal reward.

- Psycho-symbolic reward helped to increase mathematics achievement scores for grade three students.
- Practice of reward was found to create the positive consequences such as increasing students' involvement, punctuation and appropriate changes in students' activities and work habits.

Conclusion of the Study

Based on this study, researcher has withdrawn the conclusion. Good application of reward would help in motivating students toward teaching/learning activities and restoring greater confidence in the classroom. Rewards constitute part of learning enterprise when they help individuals attend to the short and long term goals that drive the students' learning. Teachers can offer different form of reward system to his/her students such as praise, token reward, tangible reward, symbolic reward etc. It is recognized that psycho-symbolic reward with verbal reward are especially valuable at the earliest ages to help students attain the habit of deferring gratification. Teachers may use psycho-symbolic reward with verbal reward to the students at primary level to motivate the students in learning activities.

Recommendation for Implication

From the conclusion, the researcher suggests the following recommendations.

- Psycho-symbolic reward with verbal reward should be used to develop the mathematical ideas and concepts.

- Students should be encouraged to get involved in active participation in the classroom activities.
- Mathematics teacher should be encouraged to use psycho-symbolic reward in mathematics teaching at primary level.
- Mathematics teacher should have good knowledge about different psychological theories and rewards.
- Different seminars, conferences and training institutes should focus on reward so that its uses in classroom will be more effective.
- The mathematics teacher should be taken him/herself as a good manager and a guide in teaching mathematics.

Areas for Further Study

On the basis of the study, the following suggestions have been given for further study.

- There is a need of this type of research to be carried out in other districts where students have low achievement in mathematics.
- There is a need to research about how the teachers carryout reward strategies in various school setting. This will give detailed picture of the adaptation of a strategy to various situation.
- It is suggested to carry out the same study on achievement of students in other subjects.

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Appendix A

Achievement Test Paper for Pre-test, Mathematics, Grade III

पूर्णाङ्क : ५०

समय : १ घण्टा ३० मिनेट

ठीक उत्तरमा चिन्ह (√) लगाऊ । (१०×१=१०)

१. तलको चित्रमा कतिवटा सिधा रेखाहरू छन् ?

(क) २ वटा (ख) ३ वटा

(ग) ४ वटा (घ) ५ वटा

२. तलको मध्ये सबै भन्दा सानो सङ्ख्या कुन हो ?

(क) ८४ (ख) ३८

(ग) ४६ (घ) ६४

३. एक हप्तामा कति दिनहरू हुन्छन् ?

(क) ७ दिन (ख) १७ दिन

(ग) ६ दिन (घ) ८ दिन

४. सङ्ख्याहरू ९, ७, ५, ८ लाई सानोदेखि ठूलो क्रममा मिलाउँदा कुन ठीक हुन्छ ?

(क) ९, ८, ७, ५ (ख) ९, ७, ८, ५

(ग) ९, ५, ७, ८ (घ) ९, ५, ८, ७

५. तिमीसँग ५ वटा कापीहरू छन् । अरु ३ वटा कापीहरू थपि दिए कतिवटा कापी होलान् ?

(क) ५ वटा (ख) ३ वटा

(ग) ८ वटा (घ) २ वटा

६. एउटा टोकरीमा १० वटा स्याउहरू थिए । ५ वटा स्याउ खाइयो भने अब कति वटा बाँकी रहलान् ?

(क) ४ वटा (ख) ५ वटा

(ग) ६ वटा (घ) ८ वटा

७. तलको खाली ठाउँमा कुन सङ्ख्या उपयुक्त हुन्छ ?

८

×३

(क) १४ (ख) १८

(ग) २४ (घ) ४२

८. तल दिएको चित्रमा छायाँ पारेको भागलाई भिन्नमा लेख्दा कति हुन्छ ?

(क) १/२ (ख) १/३

(ग) १/४ (घ) १/५

९. वर्षको पाँचौ महिना कुन हो ?

(क) असार (ख) भदौ

(ग) असोज (घ) मंसिर

१०. एक घण्टामा कति मिनेट हुन्छ ?

(क) ४० मिनेट (ख) ५० मिनेट

(ग) ६० मिनेट (घ) ७० मिनेट

११. जोड गर । (८×२=१६)

५	६	३	७
+२	१	४	२

१२. घटाउ गर ।

८	६	४	२
-३	०	२	१

१३. एउटा कलमको मूल्य रु.१५ पर्छ भने ४ वटा कलमको मूल्य कति पर्छ ?

१४. भाग गर ।

(क) १८÷३= ☐ (ख) ४८÷६= ☐

१५. रुपैयाँलाई पैसामा बदल ।

(क) रु. ५ (ख) रु.९

१६. सात वर्षमा कति महिनाहरू हुन्छन् ?

१७. देवनागरीमा लेख ।

(क) २३८ (ख) ३८०

(ग) ७९६ (घ) ९०९

१८. जोडा मिलाऊ ।

1	II
2	I
3	IV
4	III

१९. रामसँग ३० रुपैयाँ ५० पैसा छ । यदि उसले एउटा कापी १५ रुपैयाँ २० पैसामा किन्यो भने अब ऊसँग कति रकम बाँकी रहन्छ ? (६×४=२४)

२०. तल दिइएका अङ्कहरूलाई अक्षरमा लेख ।

(क) ५०३ (ख) ६२५

(ग) २०५ (घ) ८४०

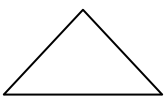
२१. तलको खाली ठाउँमा '>', '<' अथवा '=' चिन्ह लगाऊ ।

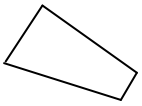
(क) ६२१ ☐ ६८० (ख) १४० ☐ १४६

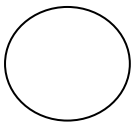
(ग) ३८४ ☐ २८४ (घ) ७५० ☐ ७५०

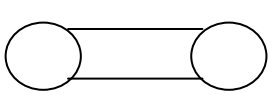
२२. तिम्रो घरमा पाउने चारवटा त्रिभुजाकार वस्तुहरूको नाम लेख ।

२३. तल दिइएका ज्यामितीय आकारहरूको नाम लेख ।

(क) 



(ख) 



(ग) (घ)

२४. एउटा त्रिभुज र एउटा वर्गको चित्र बनाऊ ।

Appendix B

Split Half Reliability Calculation for Achievement Test-I (Pre-test)

Students	Odd Correct Responses (x)	Even Correct Responses (y)	XY	X^2	Y^2
1.	20	19	380	400	361
2.	16	16	256	256	256
3.	15	16	240	225	256
4.	14	15	210	196	225
5.	14	12	168	196	144
6.	12	11	132	144	121
7.	12	11	132	144	121
8.	11	10	110	121	100
9.	10	10	100	100	100
10.	10	9	90	100	81
11.	9	8	72	81	64
12.	7	6	42	49	36
Total	150	143	1932	2012	1865

Reliability of Half Test (r_{xy}) = $$\frac{N\sum XY - \sum X \sum Y}{\sqrt{N\sum X^2 - (\sum X)^2}\sqrt{N\sum Y^2 - (\sum Y)^2}}$$

=0.97

Reliability of the whole Test (r_{tt})= $$\frac{2r_{12}}{1+r_{12}}$$

= 0.98

Appendix C

दैनिक पाठयोजना नं.१

विद्यालयको नाम : श्री मनकामना प्राथमिक विद्यालय

विषय : मेरो गणित | मिति : २०७२/०३/०२

पाठ : रेखाखण्ड | कक्षा : ३

पाठ शीर्षक : रूलर र यसको नाप | घण्टी : तेस्रो

समय : ४५ मिनेट

१. **विशिष्ट उद्देश्यहरू :** यस पाठको अन्तमा विद्यार्थीहरू निम्न लिखित कार्य गर्न सक्षम हुनेछन् :

- दिइएको रेखाखण्डलाई रूलरले नाप्न

२. **शैक्षिक सामग्रीहरू :** सिन्काहरू, विभिन्न नापका रेखाखण्डहरू भएका फ्लास कार्डहरू, रूलर

३. **शिक्षण सिकाइ क्रियाकलाप :**

- रूलरहको प्रयोग सम्बन्धी पूर्व ज्ञानको परीक्षण गर्न रूलर दायाँ र बायाँ किनारामा लेखिएका एकाइहरू बारे छलफल गर्ने । विद्यार्थीहरूलाई रूलर देखाई त्यसमा भएको इन्च र सेन्टिमिटर देखाउने र उनीहरूको रूलरमा पनि इन्च र सेन्टिमिटर खोज्न लगाउने । साथै रूलरको सेन्टिमिटरतिर कतिसम्मका सङ्ख्याहरू लेखिएका छन् सो पनि खोज्न लगाउने ।
- अब रूलरले कसरी नाप्नुपर्छ भनी सिकाउन सिन्काहरूलाई विस्तारै रूलरको सहायताले नापेर देखाउने अनि त्यस बारेमा छलफल गर्ने ।
- विद्यार्थीहरूलाई विभिन्न नापका रेखाखण्डहरू भएका फ्लास कार्डहरू दिने र उक्त रेखाखण्डहरू नाप्न लगाई छलफल गर्ने ।

(रेखाखण्डहरू नापेर सही नाप भन्नेलाई excellent, very good आदि भन्दै अझ नाप्न लगाउने र नाप्न नजान्नेलाई विस्तारै आफूले नापेर देखाउँदै सिकाउने)

४. मूल्याङ्कन

(क) कापीमा २ वटा रेखाखण्डहरू खिचेर नाप ।

(सही उत्तर दिनेलाई कापीमा red star बनाई दिँदै excellent भन्ने र कक्षा कार्य नगरी बस्नेलाई green fish दिई आवश्यकताअनुसार पृष्ठपोषण सहित red star पाउन प्रोत्साहन गर्ने ।)

५. गृहकार्य

(क) तिम्रो किताबको अभ्यास ग मा दिएका रेखाखण्डहरू रूलरले नाप र कति लामा छन् लेख ।

दैनिक पाठयोजना नं.२

विद्यालयको नाम : श्री मनकामना प्राथमिक विद्यालय

विषय : मेरो गणित | मिति : २०७२/०३/०३

पाठ : रेखाखण्ड | कक्षा : ३

पाठ शीर्षक : रेखाखण्डको नामकरण र रचना | घण्टी : तेस्रो

समय : ४५ मिनेट

१. **विशिष्ट उद्देश्यहरू :** यस पाठको अन्तमा विद्यार्थीहरू निम्न लिखित कार्य गर्न सक्षम हुनेछन् :

- दिइएको रेखाखण्डको नाम लेख्न ।
- दिइएको नापका रेखाखण्डहरू खिच्न

२. **शैक्षिक सामग्रीहरू :**रूलर, रेखाखण्डहरू बनाएका फ्लासकार्डहरू

३. **शिक्षण सिकाइ क्रियाकलाप :**

(अघिल्लो दिन दिएको गृहकार्य हेरी त्यस मध्ये सबैभन्दा उत्कृष्ट वा सबै गृहकार्य रेको र सबै मिलाएको छानी excellent भन्दै कापीमा red star बनाई दिने र अरु विद्यार्थीहरूलाई पनि जानकारी गराउँदै त्यस्तै राम्रो काम गर्न प्रेरित गर्ने, गृहकार्य नगर्ने विद्यार्थीहरूलाई green fish दिँदै आवश्यकताअनुसार पृष्ठपोषण प्रदानगर्ने । आंशिक गृहकार्य गर्ने र गृहकार्य नमिलाउने विद्यार्थीहरूलाई सोही अनुरुप red fish र green star दिने ।)

ʘ विद्यार्थीहरूलाई रेखाखण्ड खिचिएको फ्लासकार्ड देखाउँदै रेखाखण्डको बायाँ र दायाँका विन्दुहरूको नाम भन्न लगाउने ।

यहाँ रेखाखण्डको विन्दु A——————B

A र विन्दु B जोडेको हुनाले यसको नाम रेखाखण्ड AB हुन्छ भनी बताउने । साथै यसलाई सङ्केतमा $\overline{AB}$ लेखिन्छ भनी बताउने र अरु फ्लास कार्डमा खिचिएका रेखाखण्डहरू देखाउँदै नाम भन्न लगाई छलफल गर्ने ।

❍ अब रेखाखण्डको रचना गर्न सिकाउन विद्यार्थीहरूलाई कापीको बीचमा रूलर तेर्सो पारेर राखी एउटा हातले अड्याउन लगाउने र अर्को हातले रूलरको 0 र 8 मा एक एक वटा विन्दुहरू बनाउन लगाउने । अब ती दुई विन्दुहरू सिधा रखेाले जोड्न लगाई दुई छेएका विन्दुलाई A र B नाम दिन लगाउने । उक्त रेखाखण्ड 8cm लामो बन्यो भनी बताउने । यसैगरी अरु विभिन्न नापका रेखाखण्डहरू खिच्न लगाउने र विद्यार्थीहरूलाई समस्या परेमा आवश्यकताअनुसार सहयोग गर्ने ।

४. **मूल्याङ्कन** : तलका रेखाखण्डहरूको नाम लेख ।

(क) A——————————B (ख) D——————————Q

(ग) X——————————Y

(छिटो र सही उत्तर लेख्ने विद्यार्थीलाई red star बनाउँदै excellent भन्दै प्रशंसा गर्ने, ढिला गरी सही उत्तर लेख्नेलाई red fish सँगै छिटो लेख्न प्रेरित गर्ने, गल्ती गर्ने विद्यार्थीहरूलाई green star दिँदै पृष्ठपोषण प्रदान गर्ने, कक्षा कार्य नगर्नेलाई ठाउँमै गएर green fish बनाउँदै कक्षा कार्य गर्न अभिप्रेरित गर्ने ।)

५. **गृहकार्य**

(क) रूलरको प्रयोग गरी निम्न नाप भएका रेखाखण्डहरू खिच ।

(क) AB = 6 cm (ख) CD = 7cm

(ग) PG = 8cm (घ) EF = 5cm

दैनिक पाठयोजना नं.३

विद्यालयको नाम : श्री मनकामना प्राथमिक विद्यालय

विषय : मेरो गणित | मिति : २०७२/०३/०४

पाठ : रेखाखण्ड | कक्षा : ३

पाठ शीर्षक : कोणको धारणा र नामकरण | घण्टी : तेस्रो

समय : ४५ मिनेट

१. **विशिष्ट उद्देश्यहरू :** यस पाठको अन्तमा विद्यार्थीहरू निम्न लिखित कार्य गर्न सक्षम हुनेछन् :

- कोणको परिभाषा बताउन
- कोणको नामकरण गर्न

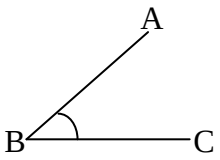
२. **शैक्षिक सामग्रीहरू :**घडी, कोणको चित्र बनाएको फ्लास कार्ड

३. **शिक्षण सिकाइ क्रियाकलाप :**

(अघिल्लो दिन दिएको गृहकार्य हेरी त्यस मध्ये सबै मिलाउने र पूरा गर्नेलाई excellent भन्दै red star बनाई दिने, आंशिक गृहकार्य गर्नेलाई क्रमशः red fish, green star बनाउँदै red star पाउन पूरा गृहकार्य नगर्ने वा थोरै मात्र गर्नेलाई green fish दिई मिहिनेत गर भन्दै गृहकार्य गर्न प्रोत्साहन गर्ने ।)

- विद्यार्थीहरूलाई घडीको मिनेट सुई र घण्टा सुईको फट्टाइ देखाउने र ती सुईहरूको फट्टाइलाई तिनीहरू बीचको कोण भनिन्छ भनी बताउने र कोणको परिभाषाको बारेमा छलफल गर्ने ।
- दुई वटा रेखाखण्डहरू कुनै एउटा विन्दुमा मिल्दा कोण बन्दछ भनी सारांशमा बताउने ।
- अब फ्लास कार्डमा बनाएको कोणको चित्र देखाउँदै कोणको नामकरण गर्न सिकाउने ।

यहाँ, दुई भुजाहरू AB र BC जोड्ने साझा विन्दु B हो त्यसलाई शीर्षविन्दु भनिन्छ । यस कोणको नाम <ABC हो भनी बताउने । यसरी नै अरु कोणको चित्र देखाई नामकरण गर्न लगाउने ।



यस कोणको नाम <ABC हो भनी बताउने । यसरी नै अरु कोणको चित्र देखाई नामकरण गर्नलगाउने ।

४. मूल्याङ्कन

- कोणको परिभाषा लेख ।

(छिटो र सही कार्य गर्नेलाई excellent का साथ red star दिने, अरुलाई पनि red star पाउन प्रोत्साहन गर्ने ।)

५. गृहकार्य : तिम्रो गणित किताबको अभ्यास १ र २ गरेर ल्याऊ ।

दैनिक पाठयोजना नं.४

विद्यालयको नाम : श्री मनकामना प्राथमिक विद्यालय

विषय : मेरो गणित | मिति : २०७२/०३/०६

पाठ : कोण | कक्षा : ३

पाठ शीर्षक : कोणहरूको तुलना | घण्टी : तेस्रो

समय : ४५ मिनेट

१. **विशिष्ट उद्देश्यहरू :** यस पाठको अन्तमा विद्यार्थीहरू निम्न लिखित कार्य गर्न सक्षम हुनेछन् :

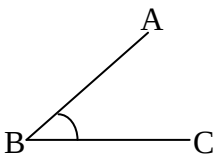
- फट्टाइको आधारमा सानो कोण र ठूलो कोण छुट्याउन ।

२. **शैक्षिक सामग्रीहरू :**कोणको चित्र कोरिएको फ्लास कार्डहरू

३. **शिक्षण सिकाइ क्रियाकलाप :**

(अघिल्लो दिन दिएको गृहकार्य हेरी राम्रा र सही गर्नेलाई स्याबास, राम्रो गर्‍यो भन्दै कपीमा red star बनाएर अरु विद्यार्थीहरूलाई पनि देखाई दिने, आंशिक गृहकार्य गर्नेलाई सोही अनुरुप red fish र green star दिँदै राम्रो गर red star पाउँछौं भन्दै हौसला दिने र गृहकार्य नमिलाउने र थोरै मात्र गर्ने वा गृहकार्य नगर्ने विद्यार्थीहरूलाई green fish दिँदै red star दिन्छु अब राम्रो गर भनी अभिप्रेरित गर्ने ।)

- अघिल्लो दिन पढाएको पाठको पुनः स्मरण गराउँदै फ्लास कार्डमा बनाएको कोणहरू देखाउने र धेरै फट्टिएको कोणलाई ठूलो कोण र थोरै फट्टिएको कोणलाई सानो कोण भनिन्छ भनी बताउने ।



- अब, विद्यार्थीहरूलाई दुईवटा कोणहरू कालोपाटीमा बनाएर कुन ठूलो कोण हो कुन सानो कोण हो भनी छलफल गर्ने । पालै पालो सानो र ठूलो कोणहरू छुट्याउन लगाउने र कोणको नाम राम्ररी भन्न नजान्नेलाई आफूले बताई दिने । यसरी चित्र देखाउँदै विस्तृत छलफल गराउने ।

४. **मूल्याङ्कन**

५. **गृहकार्य :** अभ्यास १ गरेर ल्याऊ ।

दैनिक पाठयोजना नं. ५

विद्यालयको नाम : श्री मनकामना प्राथमिक विद्यालय

विषय : मेरो गणित | मिति : २०७२/०३/०७

पाठ : कोण | कक्षा : ३

पाठ शीर्षक : कोणको रचना | घण्टी : तेस्रो

समय : ४५ मिनेट

१. **विशिष्ट उद्देश्यहरू :** यस पाठको अन्तमा विद्यार्थीहरू निम्न लिखित कार्य गर्न सक्षम हुनेछन् :

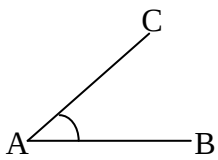
- कोणको चित्र बनाई नामकरण गर्न

२. **शैक्षिक सामग्रीहरू :**रूलर, दैनिक प्रयोग गरिने सामग्रीहरू

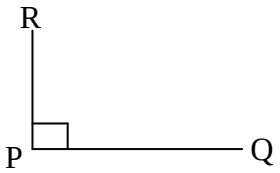
३. **शिक्षण सिकाइ क्रियाकलाप :**

(विद्याथीहरूलाई अघिल्लो दिन दिएको गृहकार्य हेरी अझै सबैलाई red star पाउन प्रोत्साहन गराउने ।)

- विद्यार्थीहरूलाई कोणको परिभाषा, नाम, ठूलो कोण, सानो कोण आदिको बारेमा पुनः एकपटक स्मरण गराउँदै आफैँ कोणको चित्र बनाई नामकरण गर्न सिकाउने ।
- आफूले कालोपाटीमा एउटा विन्दु A बाट अर्को विन्दु B सम्म रेखाखण्ड खिच्दै विद्यार्थीहरूलाई पनि कापीमा बनाउन लगाउने र A बाट पुनः अर्को रेखाखण्ड विन्दु C सम्म खिच्न लगाउने । अब कोण ABC बन्यो भनी बताउने ।



- विद्यार्थीहरूलाई <PQR बनाऊ भनेर दिएको छ भने पहिला विन्दु चिन्ह लगाउने र त्यसपछि R सम्म रेखाखण्ड कोर्ने र सोही विन्दु Q बाट अर्को रेखाखण्ड विन्दु P सम्म पनि तान्ने भनी क्रमैसँग सिकाउने ।



- यसरी विद्यार्थीहरूलाई कोणको चित्र बनाउन र नामकरण मिलाएर गर्न सिकाउने ।

४. मूल्याङ्कन

एउटा कोणको चित्र बनाऊ र त्यो भन्दा ठूलो र सानो एक-एक वटा कोणको चित्र बनाऊ ।

(कक्षा कार्य छिटो र सही गर्ने विद्यार्थीहरूलाईएकदम राम्रो छ भन्दै red star बनाएर सबैलाई देखाई दिने, अरु विद्यार्थीहरूलाई पनि गृहकार्यको स्तरअनुसार reward दिई कक्षामा कति जनाले red star पायो ? कति जनाले red fish, कतिले green star र green fish पाउने कति जना भए भनी जानकारी गराउँदै green fish पाउनेलाई red star पाउन अभिप्रेरित गर्ने ।)

५. गृहकार्य : अभ्यास २ गरेर ल्याऊ ।

दैनिक पाठयोजना नं.६

विद्यालयको नाम : श्री मनकामना प्राथमिक विद्यालय

विषय : मेरो गणित | मिति : २०७२/०३/०८

पाठ : त्रिभुज | कक्षा : ३

पाठ शीर्षक : त्रिभुज र यसका भागहरू | घण्टी : तेस्रो

समय : ४५ मिनेट

१. **विशिष्ट उद्देश्यहरू :** यस पाठको अन्तमा विद्यार्थीहरू निम्न लिखित कार्य गर्न सक्षम हुनेछन् :

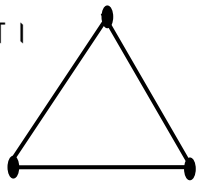
- त्रिभुजको परिभाषा बताउन ।

२. **शैक्षिक सामग्रीहरू :**सलाईका काँटीहरू, सिन्काहरू ।

३. **शिक्षण सिकाइ क्रियाकलाप :**

(अघिल्लो दिनको गृहकार्य हेरी सदा भैं reward दिने र सबैलाई सकेसम्म red star पाउन प्रोत्साहन गर्ने ।)

- तिनवटा सलाईका काँटीहरूलाई जोडेर विद्यार्थीहरूलाई त्रिभुजको अवधारणा दिने । चित्रमा कतिवटा सलाईका काँटीहरू छन्, कति वटा कुनाहरू छन् र कतिवटा कोणहरू छन् ? त्यसबारेमा क्रमैसँग छलफल गर्ने । विद्यार्थीहरूलाई प्रश्न गर्ने र सही उत्तर दिनेलाई excellent, verygood भन्दै अझै पढाईतिर ध्यानाकर्षण गराउने ।



- त्रिभुजका तिनवटा भुजाहरू, तिनवटा कुनाहरू र तिनवटा कोणहरू हुन्छ भनी बताउने र सिन्काहरू दिएर त्रिभुजको आकार बनाउन लगाउने । तिनवटा भुजाहरू मिलेर बनेको बन्द चित्रलाई त्रिभुजन भनिन्छ भनी बताई दिने ।
- त्रिभुजको बारेमा विद्यार्थीहरूसँग अझै धेरै छलफल गर्ने ।

४. **मूल्याङ्कन**

५. **गृहकार्य :** त्रिभुजको परिभाषा लेखेर ल्याऊ ।

दैनिक पाठयोजना नं.७

विद्यालयको नाम : श्री मनकामना प्राथमिक विद्यालय

विषय : मेरो गणित | मिति : २०७२/०३/०९

पाठ : त्रिभुज | कक्षा : ३

पाठ शीर्षक : त्रिभुजको नामकरण | घण्टी : तेस्रो

समय : ४५ मिनेट

१. **विशिष्ट उद्देश्यहरू :** यस पाठको अन्तमा विद्यार्थीहरू निम्न लिखित कार्य गर्न सक्षम हुनेछन् :

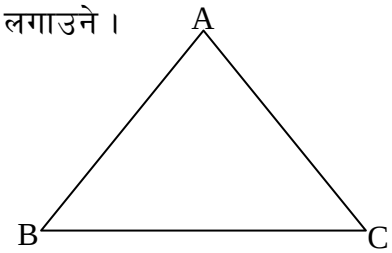
- दिएको त्रिभुजको नामकरण गर्न

२. **शैक्षिक सामग्रीहरू :**त्रिभुजको चित्र बनाएको फ्लास कार्डहरू

३. **शिक्षण सिकाइ क्रियाकलाप :**

(विद्यार्थीहरूलाई अघिल्लो दिनको गृहकार्य हेरी धेरै राम्रो गर्नेलाई अझै २ वटा red star बनाई दिने र green fish पाउनेलाई राम्ररी सम्झाएर गृहकार्य गर्न उत्प्रेरित गर्ने ।)

- विद्यार्थीहरूलाई त्रिभुजको परिभाषा पुनः स्मरण गराउने । फ्लास कार्डमा बनाइएको त्रिभुजको चित्र देखाई चित्रमा कतिवटा कुनाहरू छन् र ती कुनाहरूको नाम भन्न लगाउने ।



- चित्रमा A, B र C छन् यिनीहरूलाई शीर्षविन्दु भनिन्छ । त्रिभुजको नामकरण गर्दा कुनाहरूमा भएका अक्षरहरूलाई क्रमशः लेखिन्छ । चित्रमा भएको त्रिभुजको नाम ΔABC हुन्छ । जहाँ 'Δ' को अर्थ त्रिभुज हुन्छ । यसलाई ΔBAC र ΔCAB पनि लेख्न सकिन्छ भनी बताउने ।
- फ्लास कार्डमा भएका त्रिभुजका अरु चित्रहरू देखाउँदै विद्यार्थीहरूलाई नाम भन्न लगाउने र यसकै बारेमा कक्षामा विस्तृत छलफल गर्ने । चित्र देखाउँदै पालैपालो त्रिभुजको नामकरण गर्न लगाउने र सही उत्तर दिनेलाई excellent, very good आदि भन्दै अझै हौसला दिने । नामकरण गर्न नजान्ने विद्यार्थीहरूलाई विस्तारै सिकाई दिने ।

४. **मूल्याङ्कन**

५. **गृहकार्य :** अभ्यास १ गरेर ल्याऊ ।

दैनिक पाठयोजना नं.८

विद्यालयको नाम : श्री मनकामना प्राथमिक विद्यालय

विषय : मेरो गणित | मिति : २०७२/०३/१०

पाठ : त्रिभुज | कक्षा : ३

पाठ शीर्षक : त्रिभुजको रचना | घण्टी : तेस्रो

समय : ४५ मिनेट

१. **विशिष्ट उद्देश्यहरू :** यस पाठको अन्तमा विद्यार्थीहरू निम्न लिखित कार्य गर्न सक्षम हुनेछन् :

- त्रिभुजको चित्र बनाउन र नामाकरण गर्न ।

२. **शैक्षिक सामग्रीहरू :** रूलर, दैनिक प्रयोग हुने सामग्रीहरू

३. **शिक्षण सिकाइ क्रियाकलाप :**

(गृहकार्य सही र राम्ररी गरेका विद्यार्थीहरूलाई स्याबास, एकदम राम्रो छ भन्दै red star थप्दै जाने र पहिलाभन्दा राम्रो गरेका विद्यार्थीहरूलाई पनि very good, राम्रो गर्‍यौं भन्दै अब अझ राम्रो गर red star बनाई दिन्छु भन्दै प्रोत्साहन गर्ने, गृहकार्य पूरा नगर्नेलाई साथीहरूलाई देखाएर तिमी पनि यसरी गर red star पाउँछौं भन्दै अभिप्रेरित गर्ने ।)

- विद्यार्थीहरूलाई त्रिभुजको रचना गर्न सिकाउन कालोपाटीमा तिनवटा विन्दुहरू A, B र C बनाउन लगाउने र ती तिनवटा विन्दुहरू रूलरले क्रमैसँग जोड्ने । यसरी बनेको चित्रलाई त्रिभुज भनिन्छ भनी बताउने ।
- विद्यार्थीहरूलाई कापीमा तिनवटा विन्दुहरू चिन्ह लगाई रूलरको सहायताले क्रमैसँग जोडी त्रिभुज बनाउन लगाउने । नजान्ने विद्यार्थीहरूलाई कापीमा बनाउन सिकाउने । यस्तो अभ्यास अझै गराउने ।

४. **मूल्याङ्कन :** तलका विन्दुहरू क्रमैसँग जोड र बनेका चित्रको नाम पनि लेख ।

(क) A • B • • C

(ख) X • Y • • Z

(कक्षा कार्यको स्तर हेरी विद्यार्थीहरूलाई red star, red fish, green star, green fish दिने, धेरै राम्रो गर्नेलाई तिन, चारवटा red star समेत दिई कक्षामा सबैलाई जानकारी गराई दिने ।)

५. **गृहकार्य :** अभ्यास २ र ३ गरेर ल्याऊ ।

दैनिक पाठयोजना नं.९

विद्यालयको नाम : श्री मनकामना प्राथमिक विद्यालय

विषय : मेरो गणित — मिति : २०७२/०३/११

पाठ : त्रिभुज — कक्षा : ३

पाठ शीर्षक : त्रिभुजको रचना — घण्टी : तेस्रो

समय : ४५ मिनेट

१. **विशिष्ट उद्देश्यहरू :** यस पाठको अन्तमा विद्यार्थीहरू निम्न लिखित कार्य गर्न सक्षम हुनेछन् :

- त्रिभुजको रचना गर्न ।

२. **शैक्षिक सामग्रीहरू :**रूलर, दैनिक प्रयोग हुने सामग्रीहरू

३. **शिक्षण सिकाइ क्रियाकलाप :**

(अघिल्लो दिनको गृहकार्य हेरी सदा भैं reward दिने र विद्यार्थीहरूलाई अझै राम्रो गर्न अभिप्रेरित गर्ने ।)

- अघिल्लो दिन पठाएको पाठको पुनः स्मरण गराउँदै विद्यार्थीहरूलाई सोही अभ्यास गराई त्रिभुजको रचना गर्न अझै सक्षम बनाउने । यसका लागि कालोपाटीमा ΔABC बनाऊ भनेको छ भने अब कसरी त्रिभुज बनाउँछौं भनी प्रश्न गरी सोध्ने र उनीहरूको दिएको उत्तरमा छलफल गरी आफूले पनि कालोपाटीमा पहिला रेखाखण्ड AB कोर्ने त्यसपछि विन्दु B बाट विन्दु C सम्म अर्को रेखाखण्ड कोर्ने र सोही विन्दु A बाट विन्दु C सम्म रेखाखण्ड कोर्ने, अब त्रिभुज ABC बन्यो भनी बताउने । विद्यार्थीहरूलाई उनीहरूको कापीमा पनि त्यसैगरी त्रिभुज बनाउन लगाउने ।

- त्रिभुजको स्पष्ट र सही रचना गर्न नजान्ने विद्यार्थीहरूलाई आफैँ गएर उनीहरूको कापीमा त्रिभुज बनाई दिने र विस्तारै आफैँ त्रिभुज बनाउन लगाउने ।

४. **मूल्याङ्कन :** फरक-फरक नापका चारवटा त्रिभुजहरूबनाई नामकरण गर ।

(विद्यार्थीहरूलाई कक्षा कार्यमा बढी सक्रिय गराउँदै त्रिभुजको चित्र बनाउन अभिप्रेरित गर्ने, सही र छिटो छरितो कक्षा कार्य सक्ने विद्यार्थीहरूलाई स्तर हेरी तिन, चारवटा red star बनाउँदै हाँसेर स्याबास, राम्रो छ भन्ने, अरु विद्यार्थीहरूलाई पनि त्यसैगरी कक्षा कार्य गर्न प्रोत्साहन गर्ने र आवश्यक पृष्ठपोषण समेत दिने ।)

५. **गृहकार्य :** अभ्यास ४ र ५ गरेर ल्याऊ ।

दैनिक पाठयोजना नं.१०

विद्यालयको नाम : श्री मनकामना प्राथमिक विद्यालय

विषय : मेरो गणित | मिति : २०७२/०३/१३

पाठ : चतुर्भुज | कक्षा : ३

पाठ शीर्षक : चतुर्भुज र यसका विभिन्न भागहरू | घण्टी : तेस्रो

समय : ४५ मिनेट

१. **विशिष्ट उद्देश्यहरू :** यस पाठको अन्तमा विद्यार्थीहरू निम्न लिखित कार्य गर्न सक्षम हुनेछन् :

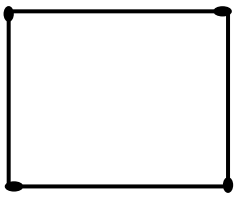
- चतुर्भुजको परिभाषा बताउन ।

२. **शैक्षिक सामग्रीहरू :**सलाईको काँटीहरू, सिन्काहरू

३. **शिक्षण सिकाइ क्रियाकलाप :**

(अघिल्लो दिन दिएको गृहकार्य हेरी आवश्यकता अनुरुप red star, red fish, green star र green fish दिने र सबैलाईred star पाउन प्रोत्साहन गर्ने ।)

- विद्यार्थीहरूलाई चतुर्भुजको धारणा सिकाउन चार वटा सलाईका काँटीहरू जोडेर फरक-फरक आकारका चारकुने चित्रहरू बनाई छलफल गर्ने ।



अब चित्रमा कति वटा भुजाहरू, कोणहरू र शीर्षविन्दुहरू छन् भनी छलफल गर्ने ।

- चारवटा भुजाहरू मिलेर बनेको बन्द चित्रलाई चतुर्भुज भनिन्छ भनी बताउने ।
- विद्यार्थीहरूलाई चारवटा सिन्काहरू दिएर चारकुने चित्रहरू बनाउन लगाई साथीहरूसँग छलफल गर्न लगाउने ।

४. **मूल्याङ्कन :** चतुर्भुजको परिभाषा लेख ।

(सबैभन्दा छिटो र सही उत्तर लेख्नेलाई red star दिने र अरुलाई पनि कक्षा कार्यको स्तर हेरी reward दिँदै छिटो र सही उत्तर लेख्न प्रोत्साहन गर्ने ।)

५. **गृहकार्य :**

Appendix D

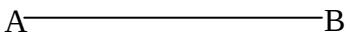
Achievement Test Paper for Post-test, Mathematics, Grade III

पूर्णाङ्क : ५०

समय : १ घण्टा ३० मिनेट

ठीक उत्तरमा चिन्ह (√) लगाऊ । (१०×१=१०)

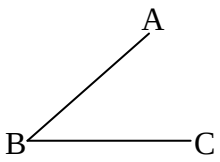
१. तलको रेखाखण्डको नाम के हो ?



(क) रेखाखण्डA (ख) रेखाखण्ड B

(ग) रेखाखण्डAB (घ) रेखाखण्ड AA

२. तल दिइएको चित्रमा कतिवटा कोण बनेका छन् ?



(क) १ वटा (ख) २ वटा

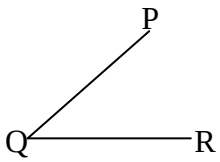
(ग) ३ वटा (घ) ४ वटा

३. एउटा कोण बन्न कतिवटा रेखाहरू चाहिन्छ ?

(क) १ वटा (ख) २ वटा

(ग) ३ वटा (घ) ४ वटा

४. चित्रमा विन्दु Qलाई के भनिन्छ ?



(क) रेखाखण्ड (ख) भुजा

(ग) विन्दु (घ) शीर्षविन्दु

५. त्रिभुजमा कति वटा कुनाहरू हुन्छन् ?

(क) २ वटा (ख) ३ वटा

(ग) ४ वटा (घ) ५ वटा

६. एउटा त्रिभुजमा कतिवटा कोणहरू हुन्छन् ?

(क) १ वटा (ख) २ वटा

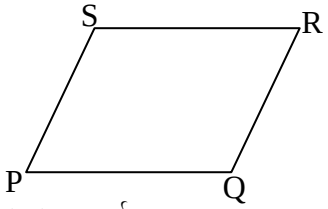
(ग) ३ वटा (घ) ४ वटा

७. तल दिइएको चित्रमा कतिवटा भुजाहरू छन् ?

(क) २ वटा (ख) ३ वटा

(ग) ४ वटा (घ) छ वटा

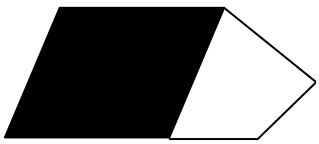
८. तल दिइएको चतुर्भुजको नाम के हो ?



(क) चतुर्भुज PQRS (ख) चतुर्भुज PRQS

(ग) चतुर्भुज SRPQ (घ) चतुर्भुज QSPR

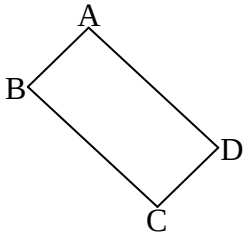
९. छायाँ पारिएको भागको आकार कस्तो छ ?



(क) त्रिभुज (ख) गोला

(ग) चतुर्भुज (घ) बेलना

१०. तलको चित्रमा कतिवटा कोणहरू छन् ?



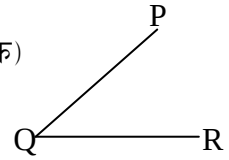
(क) ४ वटा (ख) ५ वटा

(ग) ६ वटा (घ) ७ वटा

११. रूलरको प्रयोग गरी AB = 6cm को नाप भएको रेखाखण्ड खिच ।(८×२=१६)

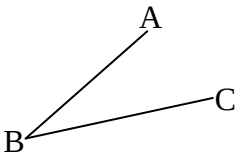
१२. तलका चित्रहरूमा बनेको कोणहरूको नाम लेख ।

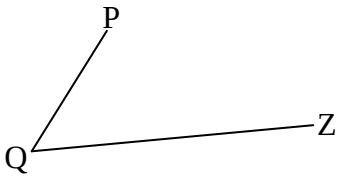
(क)



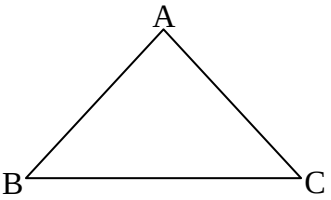
(ख)

१३. तलका जोडा चित्रमा ठूलो कोण कुन हो ?





१४. दायाँको चित्रमा कतिवटा कुनाहरू छन् ? तिनीहरूको नाम पनि लेख ।



१५. तलको विन्दुहरू क्रमैसँग जोड र बनेको चित्रको नाम लेख ।

P•

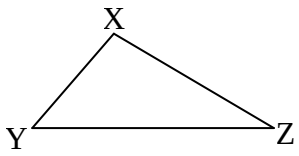
Q• •R

१६. चतुर्भुज भनेको के हो ?

१७. चतुर्भुजमा कतिवटा भुजा, शीर्षविन्दु र कोणहरू हुन्छन् ?

१८. त्रिभुजका कतिवटा भुजा, शीर्षविन्दु र कोणहरू हुन्छन् ?

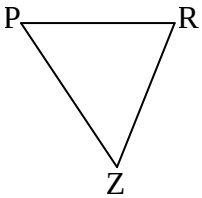
१९. तलको चित्रमा भएका रेखाखण्डहरूको नाम लेख । (६×४=२४)



२०. एउटा कोणको चित्र बनाऊ र नाम पनि लेख ।

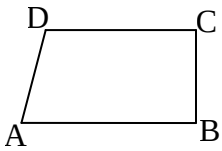
२१. कापीमा फरक-फरक नापका दुईवटा त्रिभुजहरू बनाई नामकरण गर ।

२२. दायाँको चित्रमा भएका शीर्षविन्दु, कोण र भुजाहरूको नाम लेख ।

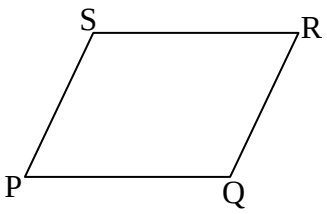


२३. तलका प्रत्येक चतुर्भुजको नाम लेख ।

(क)



(ख)



२४. कापीमा चारवटा विन्दुहरू चिनो लगाऊ । रूलरको सहायताले विन्दुहरू क्रमशः जोड्दा बनेको चित्रको नाम लेख ।

Appendix E

Split Half Reliability Calculation for Achievement Test-II (Post-test)

Students	Odd correct Responses (x)	Even correct Responses (y)	XY	X^2	Y^2
1.	20	20	400	400	400
2.	19	20	380	361	400
3.	18	19	342	324	361
4.	18	17	306	324	289
5.	17	15	255	289	225
6.	16	14	224	256	196
7.	14	11	154	196	121
8.	13	10	130	169	100
9.	10	10	90	81	100
10.	9	10	90	81	100
11.	9	9	81	81	81
12.	8	8	64	64	64
Total	171	163	2526	1645	2437

Reliability of the half Test (r_{xy}) $= \dfrac{N\sum XY - \sum X \sum Y}{\sqrt{N\sum X^2 - (\sum X)^2}\sqrt{N\sum Y^2 - (\sum Y)^2}}$

$=0.94$

Reliability of the whole Test (r_{tt})$= \dfrac{2r_{12}}{1+r_{12}}$

$= 0.96$

Appendix F

Frequency Table of Student's Involvement

Observations	Present students		Absent students		Total students	
	E.G.	C.G.	E.G.	C.G.	E.G.	C.G.
1	14	14	3	1	17	15
2	16	15	1		17	15
3	17	12		3	17	15
4	17	10		5	17	15
5	17	11		4	17	15

Frequency Table of Checklist for Task Behaviour

Obsevations	On Task		Off Task		Total Students		Note
	E.G.	C.G.	E.G.	C.G.	E.G.	C.G.	
1	8	8	6	6	14	14	3 absent in E.G.
2	10	8	6	7	16	15	1 absent in E.G.
3	15	6	2	6	17	12	3 absent in C.G.
4	16	4	1	6	17	10	5 absent in C.G.
5	16	6	1	5	17	11	4 absent in C.G.

Freqency Table of Rating Form of Class Activities

Items	Always		Most often		Seldom		Rarely or Never		Total days	
	E.G.	C.G.	E.G.	C.G.	E.G.	C.G.	E.G.	C.G.	E.G.	C.G.
1. Expain well			3			2	5		5 days	5 days
2. Keeps to topic	3		2	1		4			5 days	5 days
3. Gossiping or murmuring				5			5		5 days	5 days
4. Listen to other			5			5			5 days	5 days
5. Takes an active part	5					5			5 days	5 days
6. Ask good questions			5			5			5 days	5 days

7. Seeks conclusion			5					5	5 days	5 days

Frequency Table of Checklist for Observing Work Habits (to be marked yes/no)

Items	Yes		No		Total days	
	E.G.	**C.G.**	**E.G.**	**C.G.**	**E.G.**	**C.G.**
1. Seeks help when needed	5	3		2	5 days	5 days
2. Work co-operatively with others	3	1	2	4	5 days	5 days
3. Wait turn in using materials	3		2	5	5 days	5 days
4. Shares mateirals with others	5	3		2	5 days	5 days
5. Tries new activities	4	2	1	3	5 days	5 days
6. Clean work space	5	2		3	5 days	5 days

where, E.G. = Experiemental Group, C.G. = Control Group

Appendix G

Open-Ended Questions for Grade III Students

1. Do you like to come school regularly to get red star?
2. Do you complete your class work on time to get red star?
3. How do you feel when you get red star from your teacher?
4. Do you like to get red star? Why?
5. What do you do to get red star?

APPENDIX-H

Pre-test Scores of Students of Experimental and Control Group

(Obtained Scores Arranged in Descending Order)

S.N.	Experimental		Control Group Score	
	Score	**Frequency**	**Score**	**Frequency**
1.	42	1	41	1
2.	38	2	38	1
3.	36	2	37	1
4.	33	1	35	2
5.	32	2	32	2
6.	31	2	29	2
7.	30	2	29	2
8.	28	2	28	2
9.	26	1	26	1
10.	24	1	24	1
11.	21	1	23	1
Total students	17		15	
Mean	31.53		31.13	
Variance	27.30		25.59	
S.D.	5.22		5.06	

APPENDIX-I

Post-test Scores of Students of Experimental and Control Group

(Obtained Scores Arranged in Descending Order)

S.N.	Experimental		Control Group Score	
	Score	Frequency	Score	Frequency
1.	45	1	40	1
2.	44	2	38	2
3.	43	2	36	2
4.	41	2	35	2
5.	40	2	33	1
6.	39	2	32	2
7.	38	1	31	2
8.	37	2	29	2
9.	34	1	28	1
10.	33	1		
11.	30	1		
Total students	17		15	
Mean	39.29		33.53	
Variance	16.32		12.51	
S.D.	4.04		3.54	

Formula Section

Statistical Formula used for Data Analysis

S.N.	Subject	Notation	Formula
1.	Mean	$(\bar{x})$	$\frac{\sum fx}{N}$ Where, x = random score f = frequency N = total students
2.	Variance	(S^2)	$\frac{\sum fd^2}{N} - \left(\frac{\sum fd}{N}\right)^2$
3.	Standard Deviation	S.D	$\sqrt{\frac{\sum fd^2}{N} - \left(\frac{\sum fd}{N}\right)^2}$
4.	Pearson's correlation coefficient	r_{xy}	$\frac{N\sum XY - \sum X \sum Y}{\sqrt{N\sum X^2 - (\sum X)^2}\sqrt{N\sum Y^2 - (\sum Y)^2}}$ Where, x and y are paired scores N=number of students
5.	Spearman Brown Split Half Reliability	r_{tt}	$\frac{2.r_{12}}{1+r_{12}}$
6.	Pooled variance	Sp^2	$\frac{(N_1-1)S_1^2 + (N_2-1)S_2^2}{N_1+N_2-2}$
7.	t-test	(t)	$\frac{\overline{X}_1 - \overline{X}_2}{\sqrt{\frac{(N_1-1)S_1^2 + (N_2-1)S_2^2}{N_1+N_2-2}\left(\frac{1}{N_1}+\frac{1}{N_2}\right)}}$ Where, X_1 = Mean score of the experimental group x = Mean score of the experimental group N_1 = No. of students in experimental group N_2 = No. of student in control group S_1^2 = variance of experimental group S_2^2 =variance of control group