Chapter I

INTRODUCTION

Background of the Study

Mathematics is intimately involved in everyday life. Right from the start of human existence on this earth, the use of mathematics has been a part of human activities. It has practical values in human life. We can neither know things correctly nor can we have practical activities of calculation, unless we have knowledge of mathematics. It helps man to give exact interpretation to his ideas and conclusion. Benjamin Pierce one of the American trained mathematics said, "Mathematics is the science that draws necessary conclusion."

According to Sidhu (1990), "*Mathematics is the numerical calculation related to human life and knowledge. It enables us to solve mathematics problem in our daily life, developmental discipline through cultivating the habit of concentration and self-reliance, prepare for technical service such as accounts, mathematics teaching, auditing, engineering etc, and reasoning so we take mathematics as a way of thinking, means of communication and tools of reflexive thinking. "Mathematics has been taken as the sciences of all science and technology.*

In the recent year certain technological resources for written and pictorial communication have come into general use in elementary school like computer, overhead projector etc. they make team preparation work of visual document much easier and provide while class with a good quality picture the use of some structured materials created with reform has also become more general some of their materials are technique embodies in material from and are related to abacus for e.g. multi- base

block, counting frames, minicomputer and other are investigatory instruments. There after very expensive materials have been suggested as being expensive to new style of teaching and are for some greater source of profit sophisticated materials make in class as the need arise, would probably be better suited in many cases. In this context instructional materials are essential for the mathematics teachers are spokes for the chef. They are necessary in learning mathematics pleasant; satisfying excellence models, pamphlets, films given that would be difficult topic to obtain in any other ways.

Thus, mathematics like a language is a basic tool of communication. It is an essential part of the development of science and technology. Thus, mathematics like a language is a basic tool of communication. It is an essential tool for everyday life. It also plays a vital role for the development of science and technology. Mathematics is widely famous and most useable subject in world. In the recent period, it is highly develop in any field of human life. But most of the people have no good understanding about mathematics. In Nepalese school, recent most of the teachers are unworn about new concept of mathematics. Teachers who were having no good understanding about the mathematics topic they were unable to provide the concept about the topic. So every teacher most uses mathematics materials for providing the good concept of mathematics by such activity student can develop their understanding and they were interested in learning mathematics. Every activity in mathematics was taught with related to daily activity but it most difficult work to do such work in the entire topic.

Rickard (1994), pointed out that the important of the concrete materials in meaningful understanding of much abstract relationship in mathematics in the

following way, *"These of visual materials plays an important role in mastering abstract or generates concepts. Visual materials play an important role in mastering abstract or generate concepts. Visual materials are aids to think in abstract terms and to seeing abstract relationship. They are not helpful because we want an accurate image of the thing used and they make it easier to concentrate or see relationship. Thus facilitate learning because we can attend to concrete things more reading that image things". In the context of instructional materials Dinese says " the use of concrete materials in the classroom to buildup mathematical imagery. Such imagery once builds up, can be manipulated without the* aid *of concrete objects".*

The vision of school mathematics in Principles and Standards is based on students learning mathematics with understanding. Unfortunately, learning mathematics without understanding has long been a common outcome of school mathematics instruction. In fact learning without understanding has been a persistence problem since at least the 1930s, and it has been the subject of much discussion and research by psychologists and educators over the years.

Mathematics is widely used and more applicable subject in any field of human life. Mathematics is essential subject; it is also included in school curriculum and teaches in every school of world. It is also useful in psychology, geography, economics, management etc. So it is necessary to provide mathematics knowledge and skill further development of human thinking.

Mathematics has been accepted as an integral part of formal education system. Modern education was begun from 1959 A. D. after rectum of Rana Prime Minister Janga Bahadur Rana from England. He opened the first school at Goal Baithak at Thapathali with the help of some European and Indian teachers. The same type of

school was opened later in Hanuman Dhoka Durbar. Durbar high school started to teach mathematics but there was not a good planned program. National Education system Plan (NESP-1971 A.D.) emphasized that mathematics. Besides compulsory mathematics, optional mathematics has been also offered to mathematics at primary level 20% and 30% is allotted at lower and secondary level school curriculum respectively.

After the re-establishment of democracy, National Education Commission 2049 B.S. has given some significant suggestions about how to improve the standard of education and also importance for the improvement of school level mathematics curriculum. By the recommendation of NEC (1992) and Higher Level NEC (1998) the school curriculum is being revised in accordance to international trends, recent political change to meet their demand of present situation. Nation education system Plan (NESP-2028 B.S.) emphasized the instructional material in the following way- " to make modern, effective and scientific teaching more instructional materials should be used either those material or it will provide sample to other in preparation of such material. Such sample books direct what sort of materials should be prepared. Training will enable the teacher to prepare the instructional materials themselves".

For all such important, we develop our understanding and provide concrete concept about any topic. Therefore, mathematics is easy if it is taught by using materials. Teacher most provides concrete concept about any mathematics activity with connection their daily activity. The algebra is most famous topic in mathematics and uses every field of human life and any subject. So everyone can understand concretely about algebraic solution. Most of the teacher provides the knowledge about topic by theoretically not depend upon the concrete way. Therefore, every sector and

every activity in algebra most joined to other area and provide the concept of these topics with understanding.

Mathematics achievement was defined in terms of obtained score from taught curriculum examination. Thus, the mathematics achievement of children is obtained score from the taught mathematics curriculum examination. According to the dictionary of psychology, “accomplishment, or attainment that which has been attained a specific level of proficiency in scholastic or academic work”. In the development country, achievement is going on broad not only limited with educational achievement, it is considered in the field of psychology, *industries*, business, and medicine.

Statement of the Problem

In Nepalese context, generally teachers are using their own conventional methods and students do not get chance to construct their own knowledge. In addition, there is a lack of knowledge about the relationship between teaching method and the achievement of students in mathematics. Therefore, there is a need to bring radical change in its teaching methods.

This study is mainly concerned with the achievement of the students of Grade eight due to the effective teaching with geometrical concept for algebra teaching. Teacher’s activity is most important factor of mathematics achievement. Most of the teacher cannot provide the concrete concept about algebra and most of the student cannot say how the result derived. Most of the researcher in mathematics only depends on theory of learning but they cannot join the mathematics concept with concretely. The teacher in school also has no concrete knowledge about algebraic expression.

For the natural and conceptual learning of mathematics, students must get good way of concept derived by their teacher at lower secondary level. Such activity student increases their thinking and they develop their own concept about any topic. Student also makes interest in learning mathematics. Student can share their knowledge with their friends and compare their activity with real situation. These activities develop their knowledge and better achievement in mathematics. This study has taken into consideration to the lower secondary level students and concrete concept provide by the teacher in mathematics learning process. Especially this study would focus the answer to the following questions.

- Does teaching algebra by using algebraic tile produce better result than conventional approach in student's achievement?
- How teacher were effectively teach algebra in Grade VIII?

Significance of the Study

Mathematics is an essential part of school curriculum, so every student should study at. It has been taught for all pupils as a compulsory subject at school level as well as optional subject. Teaching mathematics is a difficult and challenging because it's nature, course content, social need, student interest and explosion of new field of knowledge.

Students need to construct their own understanding of each mathematical concept, so that the primary role of teaching is not to lecture, explain, to transfer mathematical knowledge, but to create situations for the students that will helps to make necessary metal constructions. This study would helpful to get information about the effect of concrete materials in mathematics learning.

- This study would helpful to find out the effect of algebraic tile in teaching algebra.
- It would also help to the teacher, parents, and other common people to create better environment and awareness to provide positive attitude towards teaching.
- It would helpful to build of knowledge by concretely.
- This study would also help to know the effect of different materials in mathematics achievement.

Objectives of the study

This study intended to accomplish the following objectives:

- To compare the achievement scores of the students taught by using algebraic tile and conventional method.
- To analyze and explores effect of teaching algebra by using algebraic tile in mathematics.

Hypothesis of the study

Null Hypothesis (H_0):

There is no significant difference between mean scores of the students taught by using algebraic tile of and conventional method. (H_o: $\mu_1=\mu_2$)

Alternative Hypothesis (H_1):

There is significant difference between mean scores of the students taught by using algebraic tile and conventional method. (H_1: $\mu_1\neq\mu_2$)

Delimitation of the Study

The limitation of the study was as follows:

- This study was limited on Achham district.
- This was limited for only mathematics students of Grade VIII.
- This study only depend on the algebraic addition, subtraction, multiplication, division, factorization and solving equation in algebra topics.
- Some of the variables like as age, level of teacher, social status, classroom environment, and teacher experiences would ignore by researcher.
- Two-government school of Achham district was select purposively.
- The researcher was analyzed by mean score and achievement test.

Definition of the Related Terms

Algebraic Tile:- The squares and rectangles with different colored sides that are used to represent units and variables.

Achievement: - In this study, student's achievement means the score obtained by the students on the test which is prepared by the researcher.

Government School: - The school run by government rules, regulation and financial support,

Lower-Secondary level: -The level in which class 6 to 8 taught.

Achievements score: -The obtained score of the student on achievement test constructed by the researcher. Numerical value of learning takes place in students.

Test: - Standardized instrumental develop by researcher with the help of text book and curriculum to determine the achievements of the students.

Experiment class;- Classroom teaching by using algebraic tile.

Pre-test score; - The obtained score of the student in achievement test paper before researcher started to experimental teaching.

Post-test score; - The obtained score of the student in achievement test paper after researcher completed to experimental teaching.

Transmission;- Knowledge, skills and experience share within learners.

Chapter II

Review of Related Literature and Conceptual Framework

Review of related literature helps to find out what work have been done and what work has not been done in the area of study being under taken. From the different research researcher had found mathematical materials are so important for increasing the achievement score. But no research attempts under the algebraic materials for teaching mathematics. Teaching and learning are two way process. The related literature of this study is given below.

Empirical literature review

Amatya (1978), conducted a researcher on "A study of the effectiveness of teaching learning with and without the use of instructional materials" with the aims to find out whether instructional materials are helpful to develop the mathematical concepts and to measure the difference in concept development among students in the experimental and control group of Grade III. Sixty students from Lalitpur Nagar Panchayat were selected by using systematic sampling and the experiment was conducted for four weeks duration. The t- test was applied to conclude that the mean difference at 0.05% level of significance. The conclusion was that the performance of the student 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.

Pandey (1995), did an experimental researcher work on "Use of visual aids in teaching fraction". Development of teaching models for teaching fraction in Grade VI selecting proper aids and are how effective the prepared model was. A teaching model was visual aids and a plain verbal exposition model was prepared. His researcher

showed that the teaching model with visual aids was found to be more effective than the plain verbal exposition model.

Kehkashan (1998), conducted the research entitled "Student's Perceptions about the Symbols, letters and Signs in Algebra and how do these affect their Learning of Algebra" this empirical research done through this study has revealed that the students have many misconceptions in the use of symbols in Algebra which have bearings on their learning of Algebra. It appears that the problems encountered by the students appeared to have connection with their lack of conceptual knowledge and might have been result of teaching they experience in learning Algebra at the secondary schooling level. Some of the findings also suggest that teachers appeared to have difficulties with their own content knowledge. Here one can also see that textbooks are also not presenting content in such an elaborate way that these could have provided sufficient room for students to develop their relational knowledge and conceptual understanding of Algebra.

Moreover, this study investigates student's difficulty in translating word problems in algebraic and symbolic form. They usually follow phrase- to- phrase strategy in translating word problem from English to Urdu. This process of translating the word problem from English to their own language appears to have hindered in the correct use of symbols in Algebra. The findings have some important implications for the teaching of Algebra that might help to develop symbol sense in both students and teachers. By the help of symbol sense, they can use symbols properly; understand the nature of symbols in different situations, like, in functions, in variables and in relationships between algebraic representations. This study will contribute to future research on similar topics.

The tool for the study was interview schedule, classroom observation form. Teaching materials survey form, and researcher's reflective diary notes. The study found that the lecture, question answer, and illustration were the major approaches of teaching. This report conducted that trained and experienced teachers had inadequate interaction in the classroom environment. The projects suggest collecting the feedback about the curriculum**.**

Sharma (2001), conducted a research on "A study on the availability and use of instructional materials in teaching mathematics of the primary school of Parbat district in Nepal". In his research he aimed to investigate the availability and use of instructional materials in teaching mathematics at the primary level. For this research, 25 teachers teaching primary level mathematics were interviewed. For collecting the data interview was the main tools for the study. For data analysis simple percentage, reporting was applied to conclude that the availability of the materials was not found very encouraging. The using materials were meter-scale, compass, clock model and abacus etc.

Gautam (2005), conducted a study on "The Effectiveness of Instructional Materials in Teaching Menstruation at secondary level", with the aim to find out the effectiveness of instructional materials in teaching menstruation at secondary level mathematics achievement of boys and girls in content menstruations. For experimental and control group he taught by using instructional materials for experimental and without instructional materials for control groups of tenth Grade. For fulfillment of his thesis, he purposively selects the school then randomly decides control group and experimental group. For data analysis, he used mean score, standard deviations, and t- test. He concludes that the performance of the students

taught with the use of instructional materials was significantly better than the students taught without the use of instructional materials.

Ghimire (2005), conducted the research entitled “A study on the effectiveness of teaching algebra by using model at lower secondary level” with the objectives to explore the effectiveness of models in teaching algebra at lower secondary level. The study conducted pretest and posts equivalent group design. The investigator change order develops the test consisting of seventeen multiple-choice question and ten subjective items based on the prescribed textbook of mathematics of Grade eight. The final sample contained sixty student of Grade eight. The mean, variance, and two-tailed t- test were used, as statistical tool for the mean achievement of the student taught by using models was significantly greater than the mean score of the achievement of the student of the student taught without using models.

GorackeM. A.(2009), the research in " The Role of Manipulative in the Eighth Grade Mathematics Classroom". In this action research study of eighth Grade mathematics, researcher use of manipulative and its impact on student attitude and understanding. Researcher discovered that overall, students enjoy using manipulative, not necessarily for the benefit of learning, but because it actively engages them in each lesson. He also found that students did perform better on exams when students were asked to solve problems using manipulative in place of formal written representations of situations. In the course of this investigation, researcher also uncovered that student attitude toward mathematics improved when greater manipulative use was infused into the lessons. Students felt more confident that they understood the material, which translated into a better attitude regarding math class. As a result of this research, researcher plan to find ways to implement manipulative in

my teaching on a more regular basis. He intend to create lessons with manipulative that will engage both hands and minds for the learners.

Sheretha (2011), conducted the research entitled “effectiveness of instructional materials in teaching trigonometry at secondary level.” which was aimed to find the effectiveness of teaching materials in teaching trigonometry at secondary level. For the study researcher has followed experimental research by selecting two government schools of Sindhupalchok district using purposive sampling procedure. Thirty- six students were selected by random sampling in each of the sample schools. For experimental period researcher applied experimental group with teaching materials and the control group were without materials. After sixteen days, posttest was administrating as the main tools for the collection of data. The pretest and posttest score of the student were tabulated and analyzed by using statistical formulas T-test and F- test. Finally the researcher has found that the use of instructional materials helps teachers while trigonometry at secondary level effectively.

Chaudhary (2011), conducted a research on the topic “Effectiveness of instructional materials on teaching menstruation at secondary level.” The researcher was amid to find out the effectiveness of instructional materials on teaching menstruation and to compare the student achievement by teaching with and without materials. The design of the study was pretest posttest equivalent group design. In order to fulfill these objectives the research selected one school randomly in Siraha district. From the school 44 students from Grade X were selected for sample of the study. The experimental and control group was determined by tossing coin. His experiment was run during of 15 days. Before and after test was conducted. For data analysis researcher used t- test, which was at 0.05 level of significance. Finally, the

rescuer concludes that the achievement of student in experimental group was better than the achievement of control group.

Theoretical Review

The research mostly base on any theory for study and we can move our thesis without any theory also. The researcher selects their theory by relating his/ her research topic. The research in ancient period was not depending on any theory because of the lack of proper theory related to their problem of the study. But now this period maximum theories were developed so we can use any related theory for our problem of the study. This research based on teaching learning activity with materials to develop the mathematical concept so the researcher used cognitive theories of concept learning and transmission theory.

Cognitive Theories of Concept Learning

According to Ausubel learners' positive concept should be developed to make mathematical concept for mathematical concept learning, after that mathematical concepts should be described on the basis of the nature of the mathematical concept and teaching materials should be used according to learners' mental development than it will be meaningful learning. Such types of method s are known as expository method.

According to dines, mathematical concepts are learned through game playing system. The game play system stepwise i.e. free play games, searching for commonalities, representing, formalization, or generalization. According to the Gagne, mathematical concept learned through the union of definition, examples, and non-examples of mathematical concept. According to the Skemp, mathematical

concept should be learned through previous experiences, naming of the concept, classification of concept, transfer of concept where mental scheme plays vital role.

For all this above concept, learning is learning to recognize common properties of concern objects or event and responding to this objective and event as a class. In one sense, concept learning is the opposite of discrimination learning. Whereas discriminate learning requires that the learners distinguish among objects according to their different characteristics, concept learning involves classifying objects into sets according to a common characteristics and responding to the common property. Concept learning refers to learning task in which a human or learners trained to classify mathematical objects; mathematical attributes by being show the set of examples objects along with their class labels. Mathematical concept learning encompasses learning how to discriminate and categorized properties or things. It also involves recall of instances' and integration of new examples and sub-categorization concept formation is not related to recall, it must be constructed.

Concept learning is a process is a process of making mental ability for reaching and problem solving. People learn concept through experience or activities and they try to relate the concept with correspondence attributes before storing concept learning is not simple recall or discrimination learning is development or mathematical concept learning is based on information processing theory and cognitive psychology.

Theory of Transmission

Vygotsky defined those who are to teach as the "More Knowledgeable Other." The MKO is anyone who has a better understanding or a higher ability level than the learner, particularly in regards to a specific task, concept, or process. Conventionally the MKO is thought of as a teacher or an older adult. However, this is not always the

case. Other possibilities for the MKO could be a peer, sibling, a younger person, or even a computer. The key to MKO is that they must have more knowledge about the topic being learned than the learner does. Teachers or more capable peers can raise the student's competence through the zone of proximal development (ZPD).

Vygotsky's findings suggest methodological procedures for the classroom. "In Vygotskian perspective, the ideal role of the teacher is that of providing scaffolding (collaborative dialogue) to assist students on tasks within their zones of proximal development." During scaffolding, the first step is to build interest and engage the learner. Once the learner is actively participating, the given task should be simplified by breaking it into smaller subtasks. During this task, the teacher needs to keep the learner focused, while concentrating on the most important ideas of the assignment. One of the integral steps in scaffolding consists of keeping the learner from becoming frustrated. The final task associated with scaffolding involves the teacher modeling possible ways of completing tasks, which the learner can then imitate and eventually indiependentize.

Vygotsky recommended a social context wherein a more competent learner would be paired with a less competent one, so that the former can elevate the latter's competence. This social context promotes sustained achievement and cognitive growth for less competent students."Accordingly, students need to work together to construct their learning, teach each other so to speak, in a socio-cultural environment. In-class opportunities for collaboration on difficult problem-solving tasks will offer support to students who are struggling with the material. By interacting with more capable students who continue to mediate transactions between the struggling students and the content, all students will benefit.

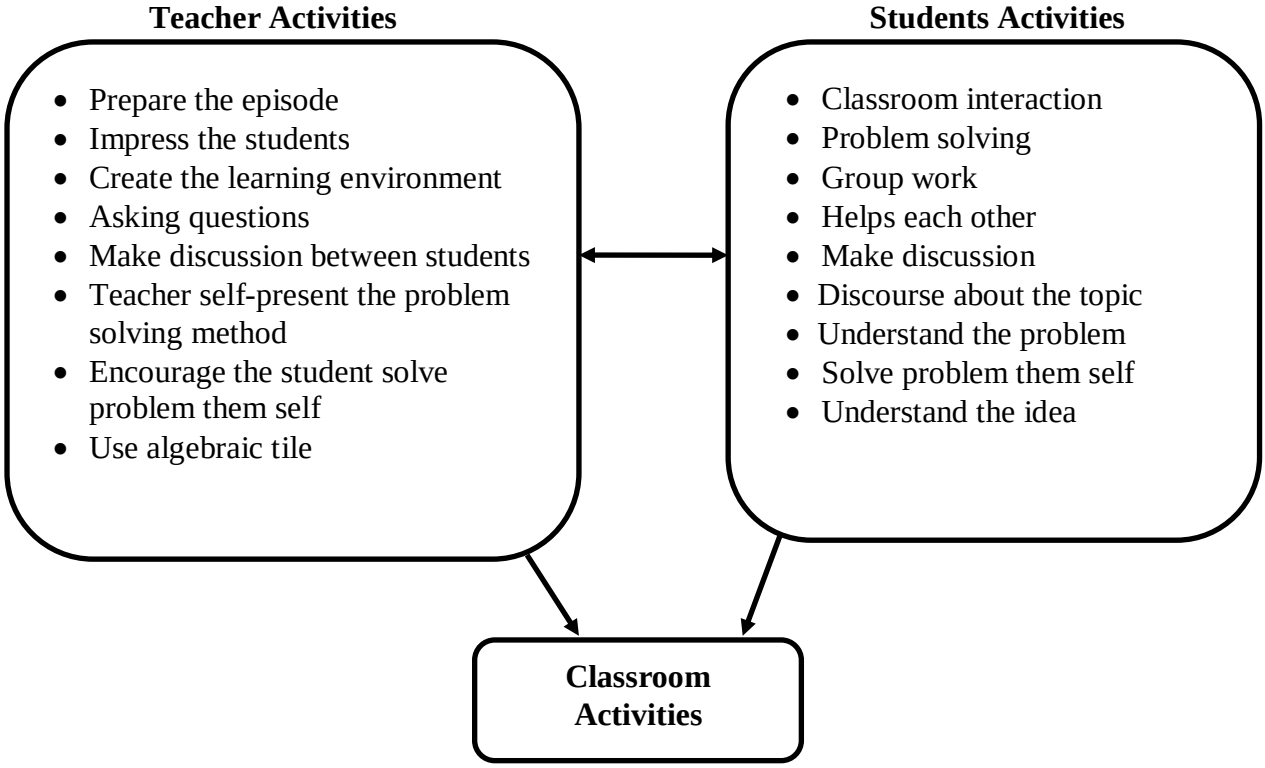
The implications of Vygotsky's theories and observations for educators are several and significant. In Vygotsky's view, the teacher has the collaborative "task of guiding and directing the child's activity Children can then solve novel problems "on the basis of a model he [sic] has been shown in class." In other words, children learn by solving problems with the help of the teacher, who models processes for them and his or her peers, in a classroom environment that is directed by the teacher. In essence, "the child imitates the teacher through a process of re-creating previous classroom collaboration. It is important to note that the teacher does not control the class with rule and structure; rather, the teacher collaborates with the students and provides support and direction.

Assignments and activities that can be accurately completed by a student without assistance indicate that the student has previously mastered the necessary prior knowledge. In the majority of classrooms, this would be the conclusion of a unit; however, this is Vygotsky's entry point. However, as previously mentioned, the teacher must carefully group the student that "can potentially develop in collaboration with a more capable person." In our research, we found limited references to Vygotsky's specific views on curriculum content. One exception involves the teaching of writing to preschoolers. According to Garton and Pratt, Vygotsky argued for shifting the teaching of writing to preschool. They explain that Vygotsky differentiated between two forms of speech: spoken and written. Vygotsky, as cited by Garton and Pratt, asserts that a child develops an understanding that spoken speech can be symbolized in writing by progressing from "drawing things to drawing speech."Vygotsky suggested then that the preschool curriculum should be designed so that it was organized to "ease child's transition from drawing things to drawing speech."

In sum, Vygotsky's findings suggest that the curriculum should generally challenge and stretch learner's competence. The curriculum should provide many opportunities to apply previous skills, knowledge, and experiences, with "authentic activities connected to real-life environment since children learn much through interaction, curricula should be designed to emphasize interaction between learners and learning tasks.

Conceptual Framework

In every research, conceptual framework is the most important part for finalized the research .Conceptual framework decided how to forward the research and research mostly depend upon the conceptual framework. Conceptual framework derived the entire thesis from initial to final. It provides the way of method, analysis of the research. It also presents the graphical representation of the study. For finalized the thesis I would derived the following process;



This framework shows that the plane of the research. These connect the objectives, theory and the methodology of the study. In this frame there were the activity of teacher and students with the teaching materials algebraic tile. For the period of experiment researcher first prepare the teaching episode. Then researcher teaches in the classroom of experiment group by using the algebraic tile and make satisfaction in teaching learning activity by impressing the students. Researcher asked different question about the topic and make discussion under the question, first researcher encourage the students to solve the problem themselves then finally researcher solve the problem himself by using the algebraic tile and provide the clearer concept about the topic.

For the students activity students were actively participate in the classroom activity. The problem related to the topic was solved by discussion and students were encourage to solve the problem themselves. Researcher focused to the students for their group work. And students were helps each other for doing the class work. Students were encouraged to solve the problem by using the algebraic tiles. By using the tile students were made very active and all the students made participate in learning activity by their own interest.

By the above process all the activity of the experimental period was depended. By the above process the data were collected and the tabulate the data then found the result by using the statistical tools. Then calculate the result of the study and analyzed the result by the score. After all this activity the findings and research question was matches.

Chapter III

METHODS AND PROCEDURES

This chapter was described the design, plan, and procedure of study. The present research would focus on "Achievement of student in algebra by teaching using and without using algebraic tile at Grade VIII". This chapter explains overall research methods and process of this research which includes research design, sample and sampling process, data collection tools, reliability and validity of tools, data collection procedure and data analysis procedure.

Design of the Study

This experimental study based on concept learning approach. This is experimental research with builds on descriptive data that has been collected in the field. The study was specially focused in the student achievement by teaching concept learning. This study based on pretest and posttest model. The design of the study would be as follows.

Group	Pre -Test	Treatment	Post-Test
E	E_1	Teaching by using Algebraic Tile	E_2
C	C_1	Teaching by Conventional method	C_2

E_1 - pretest of Experimental Group, E_2- test after teaching by using algebraic tile

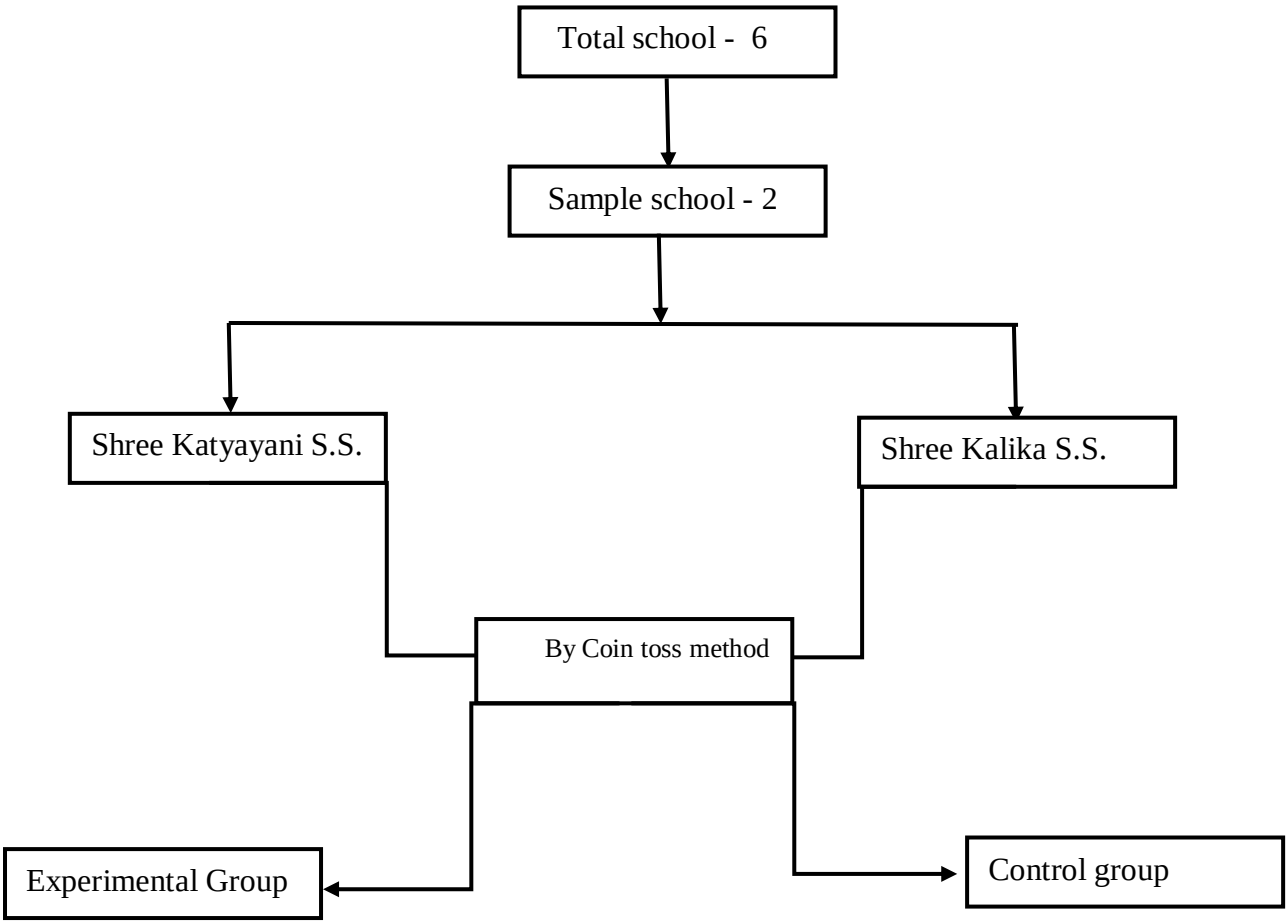
C_1-pretestof Control Group, C_2- test after teaching by conventional teaching

Population of the Study

The population of the study include the student of Grade VIII from two different VDC Birpath and Bannatoli in Achham district. There were 13 schools in these two VDC then only the 6 different schools were secondary level so the population of the study includes only the Grade 8 students from this school. Remaining 7 schools were only for primary level. The researcher would be completed and finalized the research.

Sample of Study

For the research, researcher cannot coverall units of the study. So for finalized the research it is necessary to take the representative sample. Therefore, this study would be taken the representative sample from the school of Achham district. The purposive sampling would be used to select the school for the research. The Coin toss method would use to select the school for experimental and control groups. The students group in school was non equivalent in both schools. The sample school for experimental was Shree Katyayani Secondary School and control group was Kalika Secondary School.



Instrument/Tools of the Study

The main instrument for this study was achievement test paper. Therefore, the researcher was developed an achievement test paper from the mathematics textbook of Grade VIII, prescribed by the government of Nepal. It would include algebraic multiplication with variable, their sum, multiplication, and factorization. The achievement test paper of the researcher would contain of items from knowledge level, comprehensive level and application level. Most important tools of this study would be teaching episode with concept learning process. Test papers would also important instrument for the study.

Variables

In this study independent variables was try to control by the researcher using random sample and using same test paper. There were some independent variable histories, maturation, testing, time etc which affects the mathematics achievement of the students, some of them would try to control.

For controlling the external variables, researcher selects the school from equal social-economic condition and same geographical area. In the case of socio-economic condition, all students would likely from farmer and poor economic condition. In addition, the schools are equally reputed in terms of result. The independent variable would try to control by using same test paper, same teacher, same content would be taught. This study would conduct in three stages.

Pre Experimental Stages

In this stage, first researcher would develop achievement test paper for pre test, which would be reform by pilot test than standardized by subject expert and subject teacher. In addition, instructional materials would collect. Teaching episodes would prepare.

Post Experimental Stages

In this stage, the researcher would conduct post test and collect the data for analysis and interpretation by using statistical tools and technique.

Experimental Stages

In this stage, the researcher would teach the experimental group with algebraic tile and control group without materials**.** For this, school would random select for experimental and control group. Then experimental group would be algebraic tile under the basis of teaching episode. This period would run for 3 weeks.

Reliability and Validity of the Instrument

For the validity of the test, the researcher would take a specification chart of Grade VIII and take a question from different area which fulfils the objectives of the study. Also the question was valid by the help of subject export, math teacher of the school and my supervisor. All the questions were subjective types but the question were very short, short and long question answer design.

For the reliability of the test, taking a pilot study of the prepared test to 15 students of Grade VIII of Achham district. Before administrating the test paper, the investigator would instruct to students about the methods of responding for the test paper. After collecting the answer sheet of the students researcher scored of the answer sheet then divided in to odd and even items. By this process the researcher test the reliability by using split-half method correlation test. By checking the reliability score was 0.95 (APPENDIX- B) which shows that the test paper has more reliable for the student's checking. The final selection of the test items was prepared then the researcher used for pre test and also use post test by making parallel form of question just like pre test question. The test would refine by eliminating and modifying the inappropriate item.

Data Collection Procedure

Prior to the administration of the achievement test, the researcher would visit selected school. The researcher meets the headmasters and would explain in details the purpose of the visit. Before administering the test paper, the researcher would explain the data collection procedure of mathematics achievement test to the students. After the time duration of examination the answer sheets would collect and scored by the researcher. Then scored were tabulate for the analysis.

The scoring procedure of the question as follows; (See APPENDIX- A)

Types of Questions	No of Questions	Score of Each Question
Very Short	10	10 × 1 = 10
Short	10	10 × 2 = 20
Long	5	5 × 4 = 20

Data Analysis Procedure

The collected data would analyze by using different statistical techniques, which were mean and SD. The T-test at 0.05 levels of significances would used to compare the mathematics achievement of students taught by algebraic tile and without materials.

Two-sample t-test at the .05 significance level was used to analyze the data collected from both the pretest and the posttest. A significant difference that is less than or equal to the alpha level of .05 would result in the rejection of the null hypothesis and would indicate that there was reason to believe that the use of the manipulative (Algebraic tiles) has influence on the learning of algebra. A positive significant difference will be essential for choosing manipulative (Algebraic tiles).

The second objective of this research was analyzed by the help of the score result from the test and the class activity in experimental period the qualitative analysis was triangulate. By the result the effect of the teaching method were described for their importance or the effect in teaching activity.

Chapter IV

ANALYSIS AND INTERPRETATION

The study was experimental in nature. The achievement test was the basic tool for the data collection. The study was intended to explore the effect of the manipulative materials in teaching algebraic tiles. The effect of manipulative materials has been assessed on the basis of post-test scores obtained by experimental and control group. The group ware compared on pre-test scores. So, as to compare then at the beginning of the experiment. The analysis has been made under the following heads.

Analysis of Pretest Result

Scores of the pretest of students of the experimental and control groups have given in Appendix-A together with the statistical calculation of mean, standard, deviation and variance. The t-test analysis for the comparison of the mean achievements scores of pretest has been summarized in following table.

Table No. 2

Comparison of Experimental and Control Groups on Pre test Scores

Groups	N	Mean	Standard Deviation	Variance	Calculated t-value	Tabulated t-value	Level of significance
Experimental	25	17.72	5.92	35.05	-1.146	1.645	0.05
Control	21	19.76	6.11	37.33			

The above table reveals that mean, variance and standard deviation of pre-test scores of experimental and control groups 17.72, 35.05, 5.92 and 19.76, 37.33 and 6.11 respectively. The mean scores indicate that the experimental group and control

group were have less different. The mean score of control group was less greater than experimental group result.

The results showed a t-value of -1.146, critical t was 1.64 with 44 degrees of freedom at the .05 level of significance. The null hypothesis that was tested follows: No significant difference would be found in achievement levels between the groups using manipulative (Algebraic Tiles) and those being taught by a more conventional method. Based on the results of the t-test the null hypothesis was accepted. The groups were therefore determined to be at equal achievement levels at the conclusion of the study due to the fits that 1.94< 1.64 at the.05 level of significance.

Analysis of Posttest Result

The posttest was administered to both experimental and control group after the treatment was given. The posttest scores of students of experimental and control groups have been presented in Appendix-B. The calculation of mean, standard deviation and variance has also been made to calculate t-value as mentioned in Appendix. The summary of the t-test analysis for the comparison of mean scores of experimental and control groups on posttest been given in table 3.

Table No. 3

Comparison of Experimental and Control Groups on Posttest Scores

Groups	N	Mean	SD	Variance	Calculated t-value	Tabulated t-value	Level of significance
Experimental	25	25.52	8.47	71.74	1.94	1.64	0.05
Control	21	20.47	9.01	81.18			

The table 3 indicates that both mean and standard deviation of both groups are different. The mean scores experimental group was 25.52 and mean scores control group was 20.47 and standard deviation are 8.47 and 9.01respectively. There is significance difference in mean score of two groups. The result shows that the mean score of experimental group was more than the control group. For the test of t-value the result shows as the following curve; The results showed a t-value of 1.94, critical t was 1.64 with 44 degrees of freedom at the .05 level of significance. The groups were therefore determined to not be at equal achievement levels at the conclusion of the study due to the fits that 1.94> 1.64 at the.05 level of significance.

The null hypothesis that was tested follows: No significant difference would be found in achievement levels between the groups using manipulative (Algebraic Tiles) and those being taught by a more conventional method. Based on the results of the t-test the null hypothesis must be rejected and the alternate hypothesis accepted. The alternate hypothesis that is accepted follows: There will be significant difference in achievement levels between the groups using manipulative (Algebraic Tiles) and those being taught by a more conventional method.

The Qualitative Analysis for the Effect of Algebraic Tiles in Teaching Algebra

By the research process all the data were collected and analyzed by using statistical analysis. By the collected data for pretest score of mean for experimental and control group were 17.72, 19.76. which shows that the mean score between this group were have no significance difference. The SD of the experimental and control group were 5.92 and 6.11 which shows that the distribution from the mean score of the students. The distribution of both the group was likely present it means the score of the both group were equally distributed, by the t-test of pre test score the calculated

t-value was -1.14 but the tabulated mean t- value was 1.64 which shows that the null hypothesis was accepted. It means the taking group for experimental and control group were had no significance difference in mean score of the students. Both the group were equal in condition of mean achievement score. The result shows that the null hypothesis was supported.

In the same way after the experiment period the data were collected then calculated mean, standard deviation and variation. By the result the mean score of the students in experimental and control group were respectively 25.52, 20.47 which shows that there was significance difference between the mean score of both experimental and control group. It means that the experimental group with teaching by using materials had higher mean score of the group of control by teaching conventional method. The SD and variance of experimental and control group were respectively 8.47, 71.74 and 9.01, 81.18. This shows that the standard deviation of control group was higher than the experimental group. The score in control group was more distributed score then the experimental group. The t-test of statistics, the calculated t- value was 1.94 and tabulated t-value with the level of significance 0.05 was 1.64. This shows that the null hypothesis was rejected; it means that the teaching group with teaching material has high mean achievement score than the teaching with conventional method in control group. It decided that the teaching with material was more effective than the without materials.

After the analysis the group of students in experiment had better achievement than the control group. By the result the mean score of experimental group was higher than the mean score of experimental group. This part of analysis depends only up one the results and affecting factor of tiles in teaching. What are algebraic tiles? How it format? How it produce better achievement? So this part we analyzed by short

description about tiles and important facts and why this material be useful effective in teaching.

The algebraic tiles, which students help make, consist of small squares, large squares, and rectangles. The number 1, the unit tile, is represented by the small square; the large square represents x^2; and the rectangle represents x. The sizing of these homemade tiles is similar to that of commercially made tiles. The side of the x^2tile is equal to the length of the x tile. The length of the x tile is not an integral multiple of the side length of the unit tile. The width of the x tile is equal to the side length of the unit tile. Commercially made plastic algebra tiles are constructed with one side of one color and the other side of another color. Algebra Lab Gear (Picciotto1990), for example, also contains x-y blocks. The homemade tiles are not plastic and consist of only two colors: one color to show positive values and another to show negative values.

Manipulating algebraic tiles combines an algebraic and a geometric approach to algebraic concepts using an array-multiplication model similar to that employed in many elementary school classrooms. Our experience leads us to believe that students benefit from seeing algebra concepts developed from such a geometric perspective. Furthermore, we believe that we reach a broader group of students by sequencing instruction from the concrete level, through the pictorial level and finally to the abstract—or symbolic—level. Such sequencing gives students several modes, in addition to just abstract manipulations, that help them understand and solve algebraic problems. The algebra tiles give a frame of reference to students who are not abstract thinkers.

Before using the algebra tiles, make clear to students what your expectations are regarding the appropriate use of the tiles. You should also build in some

exploration time so that students can make creative designs, satisfy their curiosities about the tiles, and get the "play out of their systems." To send a message that manipulating the tiles is an important part of the teaching-learning process, model the problems on the overhead projector or on the magnetic board. When most algebraic concepts are introduced, neither the teacher nor students should do abstract work but should rely on the tiles to solve problems and answer questions. Students should just manipulate the tiles and write the answers to the problems. At the next stage, students should manipulate the tiles and draw a brief sketch. The sketch should not be tedious. Eventually, the sketches will become mental visual representations that enable students to understand paper-and-pencil manipulations of algebraic symbols.

The importance of using the algebra tiles is to give students a visual, hands-on way of exploring patterns at the introductory stage for a new concept. This hands-on approach, using as a student center style for explaining situations, allows students to state the rules of integers and algebra from their own experience as they communicate with each other. Once students have seen the patterns and stated the rules, the tiles can be put aside. Students then extend rules to more complicated examples using only the symbolic form. It is not intended that complex examples be modeled. By the time student's work with the complex examples, the concept should be understood intuitively. The concrete → pictorial → symbolic sequence promotes understanding of algebra concepts that often elude students if only the symbolic stage is used. The concrete stage consists of manipulating shapes. The results will be described by whole numbers, shape, size, and color.

Manipulating algebra tiles combines an algebraic and a geometric approach to algebraic concepts using an array-multiplication model similar to that employed in many elementary school classrooms. By the result leads us to believe that students

benefit from seeing algebra concepts developed from such a geometric perspective. Furthermore, we believe that we reach a broader group of students by sequencing instruction from the concrete level, through the pictorial level and finally to the abstract—or symbolic—level. Such sequencing gives students several modes, in addition to just abstract manipulations, that help them understand and solve algebraic problems. The algebra tiles give a frame of reference to students who are not abstract thinkers.

Although it takes more time to include the concrete and pictorial stages, students understand the concepts at the intuitive level, which saves the time often devoted to drill, review, and re-teaching later. By leading the students, through careful ordering of examples and questions, to the point where they state the patterns being followed in an operation, students 'own' the new concepts, and feel empowered to learn mathematics on their own. Their images of themselves as independent learners of mathematics become more positive.

When using a model, it is important to be consistent in all of the situations in which you use a model. To help develop a consistent use of the algebra tiles model, there are suggested Guiding Questions. (Break the question into smaller pieces if no answer is forthcoming from the class.) Refer students back to the model for clarification or to have them add more detail to their first responses. It is important to structure and time the questions so that students give the answers that have been suggested. This process results in the students' owning of the progress in the class. They see that the results of symbolic situations are logical and based on the situations they have modeled. Once students verbalize the appropriate pattern, write the pattern down so that they can make a note of the ideas involved.

By the research there is significance difference between the learning by algebraic tile and tradition method. The post test total means score shows that the students of experimental group had higher score then control group. Based on the results of this investigation the manipulative algebra tiles have potential as a tool to aid instruction in algebra courses. Indications are that students of teaching algebraic tiles are well served by this method of instruction using concrete materials.

The research in this study would claim that the algebraic tile was effective because students enjoyed it and expressed a positive attitude to the algebraic tiles units, results for unit's tests were good and students generally felt that they had a better understanding of the concepts. During the instructional strategies some students commented that they wanted to do more individual activities.

Chapter V

SUMMARY, FINDING AND RECOMMENDATIONS

After the analysis and interpretation of collected data an attempt has been made to summarize the finding and recommendation for further study. The chapter presents the statistical analysis results of testing the study hypotheses as well as interpretation and implications of these results in the light of the literature review and purposes of the study. It also includes recommendations pertinent to the findings of the program and concludes with the suggestion for further research related to the use of concrete manipulative materials in mathematics education. The first section of this chapter presents the summary of the research and the second section presents its finding, third section present conclusion and last section present recommendation based in finding.

Summary

The purpose of this study was to investigate the effects of two instructional strategies on student achievement in Algebra. Teaching by using algebraic tile and teaching by conventional way without using algebraic tile.

- The control group was taught using the conventional method.
- The experimental group was taught by using algebraic tile.

This research was based on pre test post test non equivalent group design. For the fulfill of the thesis, researcher take experimental design with sample of two schools. Among the two schools Katyayani secondary was for experimental and Kalika secondary school for control group. First researcher develop the test paper and take a pilot test in Jalpa secondary school in Achham district by the help of the prescribed curriculum of government school.

The experimental and control group was decided by tossing coin. The researcher was adopt pretest beginning of the experiment and collect pre test score of both experimental and control groups. A two-sample t-test was used to analyze the pretest scores at the .05 level of significance by the analysis there was no significant difference in achievement of both the group at the beginning of the study. The total students of experimental group were 25 and control group was 21.

After the pre test experimental period was run. In this period the researcher was developed the episode and regular taught algebra topic related to addition, subtraction, multiplication and fraction to the student by using algebraic tiles. This activity runs for three weeks.

A pre test equivalent set of question was given for the pos test at the end of the experimental period. A two-sample t-test was used to analyze the post test scores. At the 0.05 level of significance there difference in achievement level at the conclusion of the study. This resulted in the null hypothesis being rejected and the alternate hypothesis being accepted. For the analysis of the result the researcher also used mean, standard deviation, variance was also used.

Findings

By the collection and analysis of pre test and post test score the major findings of the study were as follows.

- There is significant difference in mathematics achievement of students taught by using algebraic tiles and conventional method.
- The maximum number of students increases their achievement level in experimental group then the students of control group.

- By the post test result the student in experimental group were hade high mean score then the student's in control group.

- The t-test of pre test and post test, from the pre test null hypothesis was accepted but the post test result null hypothesis reject. It means that the post test result accept the research hypothesis that is there is significance difference in mathematics achievements.

- By the post test t-value and mean score we can say that the achievement score of the students of experimental group has high achievement score.

- After the statistical analysis we can say that the effect of algebraic tiles in mathematics achievement was positively increased.

- By the result we say that the materials in teaching algebra increased the achievement level of students

- The algebraic tiles in algebra are more important materials for providing the real concept of mathematics activities.

- Results of this study indicate that students felt that their level of understanding was enhanced by use of concrete materials.

Conclusions

The analysis of the data did indicate a significant difference in achievement levels of experimental and control group, however in examining the post test mean scores of the experimental and control group, the mean score of experimental was higher than the mean score of control group. This implied that the students in control group, has low achievement than experimental group, who did not use the

manipulative algebraic tiles. In order to concrete materials such as algebraic tiles to become more prevalent in lower secondary class room. For the teaching by using concrete materials teachers need to trend in the effective use of manipulative materials, text book and curriculum need to be restructured away from more conventional approaches. The positive attitude and high success rate of the large majority of the students by using algebraic tiles regard less of learning styles to this instructional process was very gratifying, if this study has even partially achieved what it set out to do that is to develop a course of instruction using manipulative materials which would be beneficial to the learning of all students than it has successful and worth doing.

Recommendations

Further research is needed on the effects of using manipulative algebraic tiles at the lower secondary level. The following recommendations are made for further study.

- This kind of the study should be conducted at all level of school and other area of mathematics like arithmetic, algebra, geometry etc.
- Study was limited to the student of Grade VIII in Achham district. So this type of research can be done in other subject and Grades as well.
- Conduct the study over one whole academic year, including many topics instead of only one topic.
- A larger sampler size should be used.

Education Implications

The outcome of this study leads me to believe that the regular use of manipulative would increase student understanding and achievement score. As a result, greater understanding would increase confidence and attitude toward mathematics. It is apparent that students not only gain valuable experiences from using the manipulative, but also it allows them to create their own understandings and affords them the socialization that middle school students desire.

When the students used manipulative they had fewer problems to solve. The reduction in problems allowed the students the time to really understand what was happening. Researcher believe that the more manipulative are infused into daily instruction, the more students would see success and create their own understanding of the math concepts that they are engaging in. This strategy does not require concrete objects, making it more time efficient but still has the desired outcome. Students who are creative thinkers would benefit from an additional teaching strategy as well as those students who struggle. This practice would help them organize and compartmentalize information when solving math problems.

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Appendix: A

Pre- test question for students

Candidates are required to give their answer in their own words as for as practicable. The figure in the margin indicate full marks.

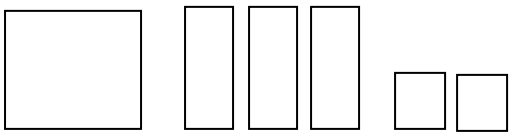
Class : VIII | Full Marks : 50

Time : 2:00 hrs | Pass Marks : 20

Attempt all questions.

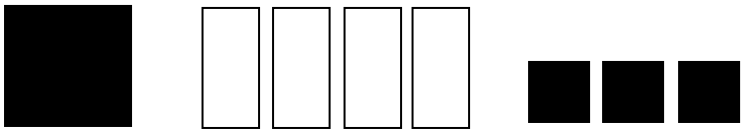
Group 'A' (10×1=10)

1. Write the following in algebraic form

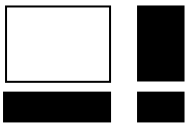


2. Adding x^2+x with x using the algebraic tile.
3. which of the following shows the addition of 2x+1 and x+2 ?

4. Write the following in algebraic form



5. Subtract x^2+2 by $2x^2+3$ by using algebraic tile.

6.  write it's correct factor ?

7. What is the multiplication of 2x(x + 3) use the algebraic tile.

8. Divide x^2+4x by x by using algebraic tile.

9. Factor this x^2+2x+1 use algebraic tile.
10. Solve this 5y+3=13 .

Group B (10×2=20)

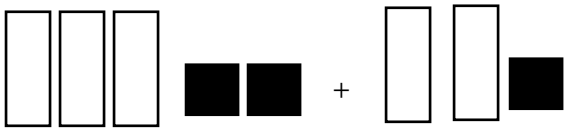
1 1. What is Tile ?

12. Adding linear terms by using algebraic tile.
(3x+1) + (2x+3)

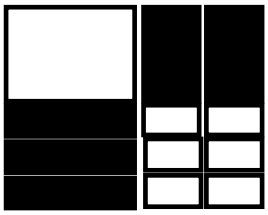
13. Subtracting linear terms by using algebraic tile. (4x+3) - (2x+1)

14. Solving one variable equations by using algebraic tile. 2x = 4

1 5. Find the equation from algebraic tile.

 =…….

1 6. Multiply of (2x+2) - (x+1) by using algebraic tile.

17. Write in equation from algebraic tile. 

18. write the algebraic tile in equation x^2+2x+1 .
19. Solve $2x^2 + 1 = 9$ use the algebraic tile.
20. Devide $2x^2 + 4x$ by 2x by using algebraic tile.

Group 'C' (5×4=20)

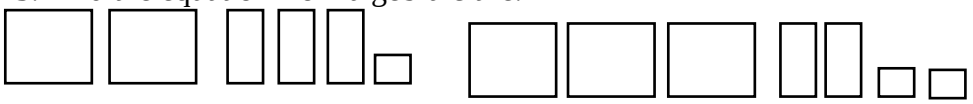
21. Solving the two variable equations by using algebraic tile.

$x + y = 2$

$x - y = 4$

22. Multiply (x+2) and (x+3) by using algebraic tile.

23. Find the equation from algebraic tile.

 = ?

24. Explain the Algebra Tile pieces in order to represent the polynomial $a^2 – 2ab + b^2$.
25. Factorization polynomials $x^2 + 2x - 3$ by using algebraic tile.

Appendix: B

Post- test question for students

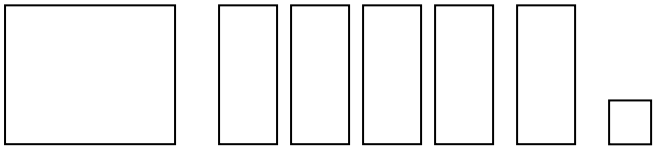
Candidates are required to give their answer in their own words as for as practicable. The figure in margin indicates full marks.

Class : VIII | Full Marks : 50
Time : 2:00 hrs | Pass Marks : 20

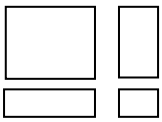
Attempt all questions.

Group 'A' (10×1=10)

1. Write the following in algebraic form



2. Adding $2x^2+2x$ with $x+1$ use the algebraic tile.
3. Adding $x^2 + xy - y^2$ with x^2-2y^2 by using algebraic tile.
4. Write the following in algebraic form

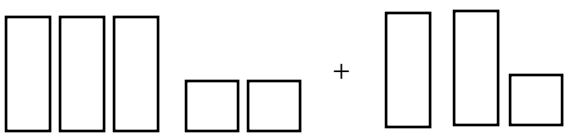
5. Subtract $5x-4$ by $7x+3$ use the algebraic tile.
6. which of the following shows the subtract x^2+2 by $2x^2+3$?
7.  write it's correct factor ?
8. Multiply x and $2x+x$ use the algebraic tile.
9. Divide x^2+4x by x use the algebraic tile.
10. Factor this $2x^2- x-1$ use the algebraic tile.

Group 'B' (10×2=20)

11. What is Algebraic Tile ?
12. Adding linear terms by using algebraic tile ?

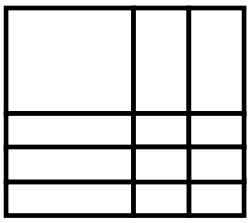
    (3x+1) + (2x+3)

13. Subtracting linear terms by using algebraic tile. (4x+3) - (2x+1)
14. Solving one variable equations by using algebraic tile. 2x = 4
15. Find the equation from algebraic tile.

 =…….

16. Multiply of (2x+2) - (x+1) by using algebraic tile.

17. Write in equation from algebraic tile.



18. Divide x^2+4x by x by using algebraic tile.

19. Factor this x^2+2x+1 by using algebaraic tile.

20. Solve this 2x+1=3 by using algebraic tile.

Group 'C' (5×4=20)

21. Solving the two variable equations by using algebraic tile.

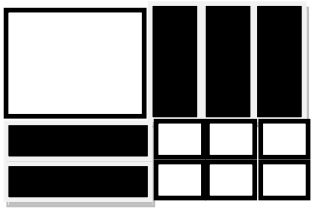
$2x + y = 4$

$X - 2y = 2$

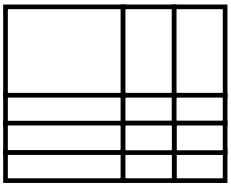
22. Multiply (x+2y) and (x+3y) by using algebraic tile.

23. Find the equation from algebraic tile.

a)



b)



24. Explain the Algebra Tile pieces in order to represent the polynomial

$4a^2 - 2ab + 2b^2$.

25. Factorization polynomials $x^2 + 5x + 6$ by using algebraic tile.

Appendix : C

Split Half Reliability Test

(Obtained Score Arranged in Descending Order)

Students	Odd(X)	Even(Y)	x^2	y^2	xy
1	19	21	361	441	399
2	19	18	361	324	342
3	18	16	324	256	288
4	15	14	225	196	210
5	11	13	121	169	143
6	12	10	144	100	120
7	9	10	81	100	90
8	10	9	100	81	90
9	9	9	81	81	81
10	8	6	64	36	48
11	10	8	100	64	80
12	7	4	49	16	28
13	5	6	25	36	30
14	4	3	16	9	12
15	7	6	49	36	42
Total	$\sum x=163$	$\sum y=153$	$\sum x^2=2101$	$\sum y^2=1945$	$\sum xy=2003$

$$r = \frac{N\sum XY - \sum X \sum Y}{\sqrt{N\sum X^2 - (\sum X)^2}\sqrt{N\sum Y^2 - (\sum Y)^2}}$$

$= 0.95$

APPENDIX : D

Pre-test Scores of the Students in Experimental and Control Groups

(Obtained Score Arranged in Decending Order)

Pretest			
S.N.	**Experimental Groups Score**	**S.N.**	**Control Groups Score**
1	32	1	33
2	28	2	30
3	26	3	27
4	25	4	25
5	25	5	23
6	21	6	23
7	21	7	21
8	21	8	20
9	20	9	20
10	19	10	19
11	17	11	19
12	16	12	18
13	16	13	17
14	16	14	16
15	16	15	16
16	15	16	16
17	15	17	16
18	15	18	16
19	14	19	13
20	13	20	13
21	13	21	12
22	12		
23	10		
24	9		
25	8		
N=25	**Mean = 17.72** **S.D. = 5.92** **Varience = 35.05**	**N= 21**	**Mean = 19.76** **S.D. = 6.11** **Varience = 37.33**

APPENDIX : E

Post-test Scores of the Students in Experimental and Control Groups

(Obtained Score Arranged in Descending Order)

Posttest			
S.N.	**Experimental Groups Score**	**S.N.**	**Control Groups Score**
1	43	1	38
2	40	2	35
3	39	3	32
4	37	4	30
5	35	5	28
6	34	6	27
7	30	7	25
8	30	8	24
9	28	9	23
10	27	10	21
11	25	11	20
12	25	12	20
13	24	13	19
14	24	14	17
15	24	15	15
16	22	16	12
17	21	17	12
18	20	18	10
19	18	19	9
20	17	20	8
21	16	21	5
22	15		
23	15		
24	15		
25	14		
N=25	**Mean = 25.52 S.D. = 8.47 Varience = 71.7409**	**N= 21**	**Mean = 20.47 S.D. = 9.01 Varience = 81.1801**

APPENDIX : F

Teaching episode - 1

Subject : Compulsory Mathematics **Date : 2072-05-04**

Unit : Algebra **Class : 8**

Name of School : Shree Katyayani S.S. Birpath-9, Achham **Time : Min.**

Topic : Addition of Binomials

Specific Objectives:

To add the algebraic tile easily.

To solve the problem related to algebraic addition.

Introduction;

At initial teacher should prepare students mentally for learn algebraic addition. Then activate the student to learn.

Then first introduce for the algebraic tile so asked about related question.

- Do you know about the algebraic tiles?
- Can you use in solving algebraic addition?
- How you make such tile?
- Do you know about it?

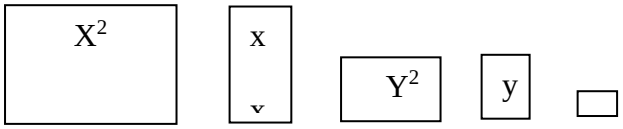
By such question discuss about tile and after that teacher introduce the algebraic tile to the student by the following way.

Algebra tiles

Algebraic tile are square and rectangle-shaped tiles that represent numbers and variables. Using algebra tiles provides a more visual way for us to solve our problems. It helps us to see just what quantities we're working with. It's like we are using building blocks to help us.

Each square tile stands for the number one. If we have two tiles, then we have the number two. If our numbers are negative, then our square tiles can be a different color to show the difference. For example, blue square bricks can be positive numbers and red square bricks can be negative numbers. The rectangle tiles stand for our variable. If we have one x, then we have one rectangle tile. If we have $2x$, then we will have two rectangle tiles.

The format of the tiles for addition as follows



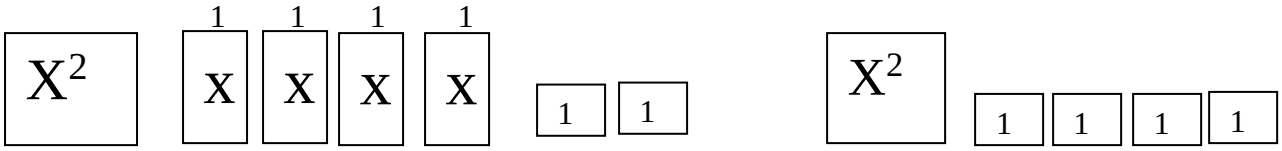
The entire additional tile was whit color.

Discussion

By the above process student learn algebraic addition by algebraic tile. So teacher should provide the different activity for different examples.

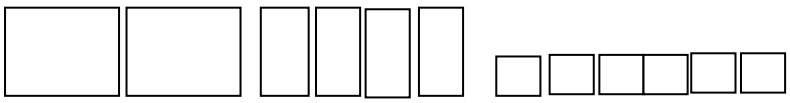
Example first x^2+4x+2 and x^2+4

First we need to model combining like terms with the students in preparation for the next few problems. Place this on the overhead and ask how we provide the result by this tile?



Name of all such tiles and count same tile each others

Now the total sum of the algebraic representation represent by the algebraic tiles as follows



Now we write it in algebraic form as follows;

$2x^2+4x+6$

By this process all the addition activity done by the algebraic tiles.

Next example for addition $2x^2+x+2$ and $y^2+y+x+1$

1. At first teacher encourage the students to make a algebraic tile ass in the algebraic form.
2. After that the same size tiles were puts in sequence.
3. Then count of different size tiles with related tiles.

5. Finally teacher prepare the students how such problem we can do and provide clearer concept then write addition problems result as

$$2x^2+y^2 +2x+y+3$$

By such way all the problem can done for addition.

Reflection:

For this activity students can make tiles related to problem and student easily distinguish the different size and they count and write in algebraic form,

Such types of activity student can't be forgotten how we add each other and they also distinguish the different variable by their size. So students also ask two different variables we cannot join each other because of their different size characteristics.

Teaching episode - 2

Subject : Compulsory Mathematics **Date : 2072-05-06**

Unit : Algebra **Class : 8**

Name of School : Shree Katyayani S.S. Birpath-9, Achham **Time : Min.**

Topic : Addition of Trimonial

Specific Objectives:

To add the algebraic tile easily.

To solve the problem related to algebraic addition.

ACTIVITIES :

Activity - 1 **:** To collect the home work of the students.

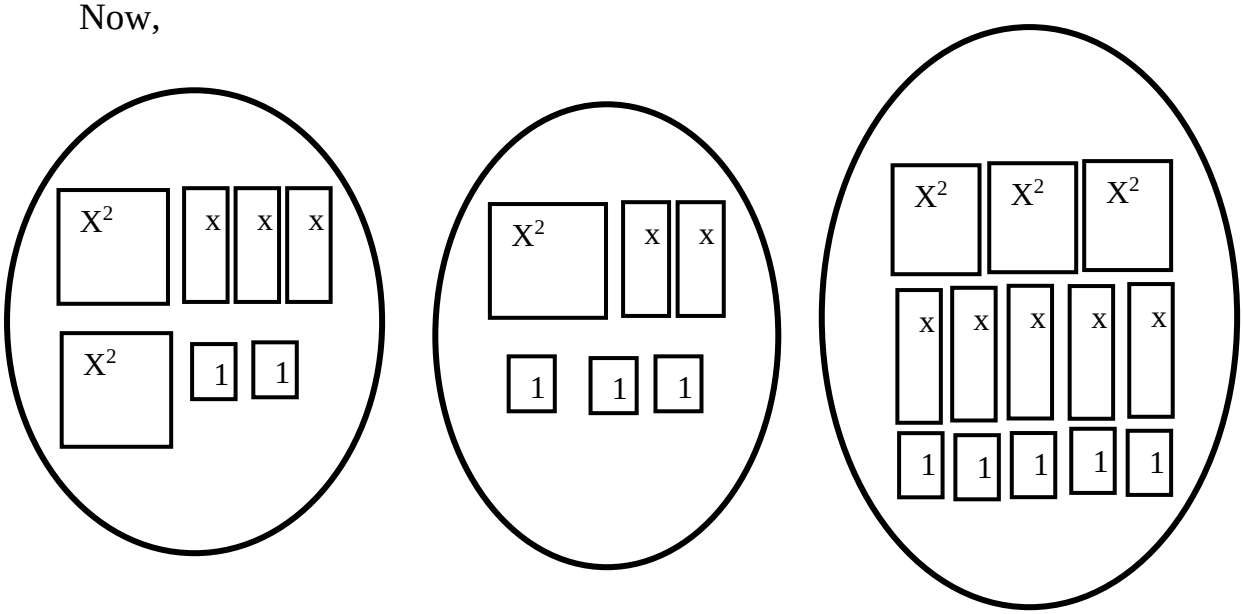
Activity -2 **:** Teacher will ask to the students about their difficulties of the previous lesson and solve those problems of the students.

Activity - 3 **:** Teacher will suggest to the student about new problem and take the ideas of the s students about it.

Activity - 4 **:** After taking ideas of the students, teacher will be clarifying their ideas briefly.

Activity - 5 : Addition $2x^2+3x+2$ and x^2+2x+3

Now,



So, ($2x^2+3x+2) + (x^2+2x+3) = 3x^2 +5x+ 5$

Teaching Episode - 3

Subject : Compulsory Mathematics **Date : 2072-05-08**

Unit : Algebra **Class : 8**

Name of School : Shree Katyayani S.S. Birpath-9, Achham **Time : Min.**

Topic : Subtracting of Binomials

Specific Objectives;

- Student can solve the subtracting problem by algebraic tile.
- To identify the algebraic problem by algebraic tile and solve the problem.

Introduction

At first all the students were prepare for the study t5hen encourage them about the study topic by asking some question discussion.

- Can you solve subtraction by algebraic tiles?
- Is all the tiles of negative and positive variables denoted by same tile?
- How we identify negative and positive tile?
- Can you solve subtraction without help?

By asking this question discusses between students and say ask their view under this question. Make discussion between teacher and students and finally teacher provides the cleared concept as following;

Such types of figure decide which shows negative and positive variables. We can also use different colors here to represent positive and negative variables. For example, positive rectangle or square tiles can represent positive variables and black rectangle tiles can represent negative variables. To use algebra tiles, we place square and rectangle tiles on either side of our equation until we have all the numbers and variables covered.

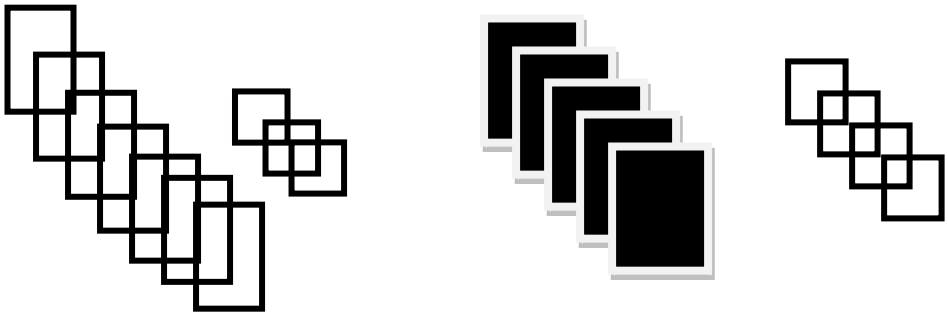
Discussion;

By the above activity students were ready to solve the related problems so the following examples solve by using algebraic tiles with discussion between the students.

Subtract 5x-4 by 7x +3 is

It means 7x+3-5x +4

At firs ask the students to make tiles as in problem like as;



Now by visual representation make student cleared about which one is subtract and which is added. For the same variable with negative and positive variables can add and subtract so in this problem we can subtract 5x by 7x and added 4 and 3.

Now the remaining figure;

After the subtraction we have to find

2x+7 is real answer.

By the same process we can solve further problems

Reflection;

In the final condition students were clear for how to use algebraic tile in solving subtracting problems. All the students make clear concept how to use algebraic tile and calculate the result without confusion.

Teaching Episode - 4

Subject : Compulsory Mathematics **Date : 2072-05-10**

Unit : Algebra **Class : 8**

Name of School : Shree Katyayani S.S. Birpath-9, Achham **Time : Min.**

Topic : Subtracting of Trinomial

Specific Objectives;

- Student can solve the subtracting problem by algebraic tile.
- To identify the algebraic problem by algebraic tile and solve the problem.

ACTIVITIES :

Activity - 1 **:** To collect the home work of the students.

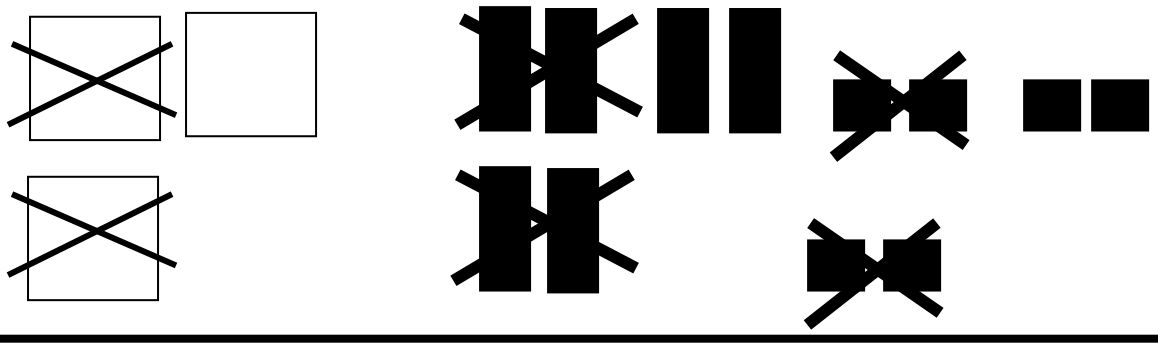
Activity -2 **:** Teacher will ask to the students about their difficulties of the previous lesson and solve those problems of the students.

Activity - 3 **:** Teacher will suggest to the student about new problem and take the ideas of the students about it.

Activity - 4 **:** After taking ideas of the students, teacher will be clarifying their ideas briefly.

Activity - 5 : Subtracting $2x^2-4x-4$ and x^2-2x-2

Now, $(2x^2 - 4x- 4) - (x^2 - 2x - 2)$



So, $(2x^2 - 4x- 4) - (x^2 - 2x - 2) = x^2 - 2x - 2$

Teaching Episode - 5

Subject: Compulsory Mathematics **Date : 2072-05-11**

Unit: Algebra **Class : 8**

Name of School: Shree Katyayani S.S. Birpath-9, Achham **Time : Min.**

Topic: Multiplication of binomials

Activities:-

Activity - 1 **:** To collect the home work of the students.

Activity -2 **:** Teacher will ask to the students about their difficulties of the previous lesson and solve those problems of the students.

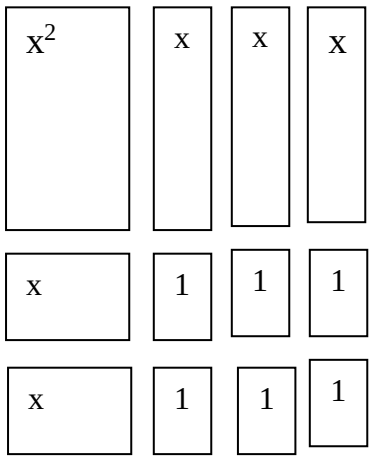
Activity - 3 **:** Teacher will suggest to the student about new problem and take the ideas of the students about it.

Activity - 4 **:** After taking ideas of the students, teacher will be clarifying their ideas briefly.

Activity - 5 **:** Multiply (x+3) and (x+2) by using algebraic tile.

Here, $(x+3)(x+2) = x^2 + 3x + 2x + 6 = x^2 + 5x + 6$

Now,



=

x^2	x	x	x
x	1	1	1
x	1	1	1

Which is complete multiply.

For homework , 11.5.2

Teaching Episode - 6

Subject: Compulsory Mathematics **Date : 2072-05-13**

Unit: Algebra **Class : 8**

Name of School: Shree Katyayani S.S. Birpath-9, Achham **Time : Min.**

Topic: Multiplication of Trinomials

Activities:-

Activity - 1 **:** To collect the home work of the students.

Activity -2 **:** Teacher will ask to the students about their difficulties of the previous lesson and solve those problems of the students.

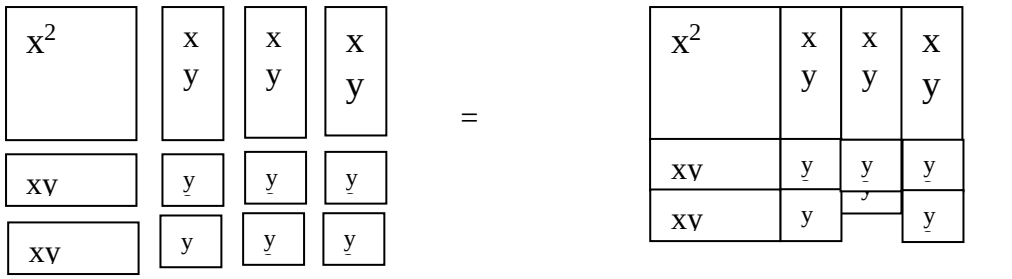
Activity - 3 **:** Teacher will suggest to the student about new problem and take the ideas of the students about it.

Activity - 4 **:** After taking ideas of the students, teacher will be clarifying their ideas briefly.

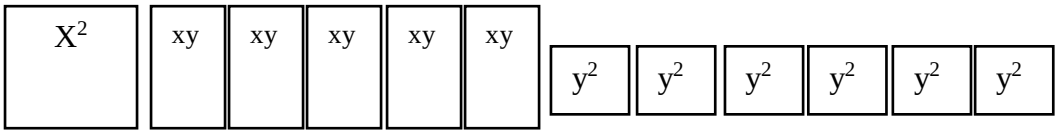
Activity - 5 **:** Multiply (x+2y) and (x+3y) by using algebraic tile.

Here, $(x+2y)(x+3y) = x^2 + 3xy + 2xy + 6y^2 = x^2 + 5xy + 6y^2$

Now,



So,



$= x^2 + 5xy + 6y^2$

Which is complete multiply.

For homework , 11.5.2

Teaching Episode - 7

Subject : Compulsory Mathematics **Date : 2072-05-15**

Unit: Algebra **Class : 8**

Name of School : Shree Katyayani S.S. Birpath-9, Achham **Time : Min.**

Topic : Dividing a Polynomial by a Binomial

Objectives: By the end of the day, students should be able to divide Binomials.
Materials: A class set of algebra tiles, overhead algebra tiles, overhead projector, handout and, answer key, rulers, and color pencils. Outlined Instruction:
Activity

Activity : 1 **:** To collect the home work of the students.

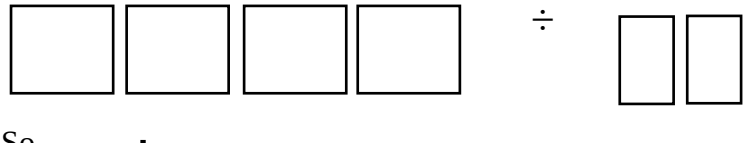
Activity -2 : Teacher will ask to the students about their difficulties of the previous lesson and solve those problems of the students.

Activity - 3 : Teacher will suggest to the student about new problem and take the ideas of the students about it.

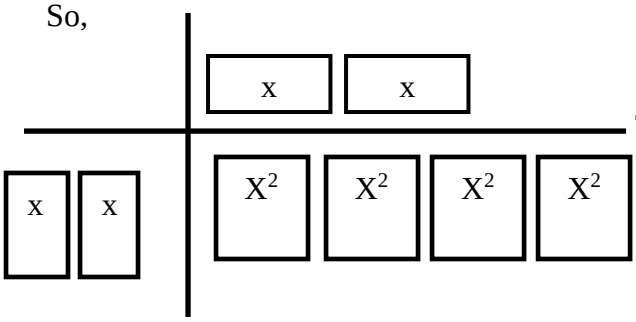
Activity - 4 : After taking ideas of the students, teacher will be clarifying their ideas briefly.

Activity - 5 : At first taking one example : $4x^2 \div 2x$

Now , to solve this problem by using algebraic tile.



So,



Therefore, $4x^2 \div 2x = 2x$

For homework , exercise 11.3.1

Teaching Episode - 8

Subject : Compulsory Mathematics **Date : 2072-05-16**

Unit : Algebra **Class : 8**

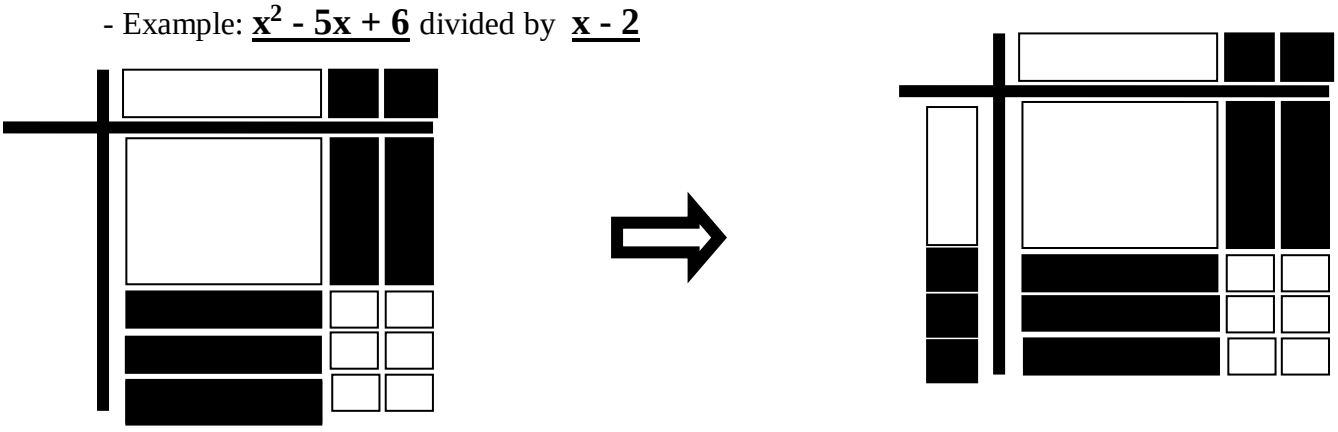
Name of School : Shree Katyayani S.S. Birpath-9, Achham **Time : Min.**

Topic : Dividing a Polynomial by a Binomial

Objectives: By the end of the day, students should be able to divide polynomials. Materials: A class set of algebra tiles, overhead algebra tiles, overhead projector, handout and, answer key, rulers, and color pencils. Outlined Instruction:

1. Explain to students that when dividing polynomials, it's simply working backwards from multiplying polynomials. I will set up in the "L" bracket the polynomial for which I want to divide into, but it must be rearranged in such a way to form one big rectangle. Then, I will set up on the left or the top of the "L" bracket the polynomial that I want to divide by. Next, I will explain that the dimensions of the polynomial that we must find (the other factor) must be such that it will provide the polynomial inside the "L" bracket. In addition, tell the students that "zero pairs" may be needed inside the "L" bracket for it to be possible to divide.

- Example: **$x^2 - 5x + 6$** divided by **$x - 2$**



$X^2-5x+6 \div x-2 = x-3$

2. Since this is all about practice in rearranging the algebra tiles, I will pass out handout again and have them work on a few problems from handout . Problems they do not finish in class will be done for homework. Because this lesson will take much more thinking on the student's part, I will have them work in pairs, so that they may assist each other as I walk around to assess their understanding.

Teaching Episode - 9

Subject : Compulsory Mathematics **Date : 2072-05-18**

Topic : Algebra **Class : 8**

Name of School : Shree Katyayani S.S. Birpath-9, Achham **Time : Min.**

Unit : Factorization

Activity :-

Activity - 1 **:** To collect the home work of the students.

Activity -2 **:** Teacher will ask to the students about their difficulties of the previous lesson and solve those problems of the students.

Activity - 3 **:** Teacher will suggest to the student about new problem and take the ideas of the students about it.

Activity - 4 **:** After taking ideas of the students, teacher will be clarifying their ideas briefly.

Activity - 5 **:** At first definition of factorization : The factorization means multiplication of multiple to polynomials by the changing process.

For example, $2x^2 + 12x$

Now, $2x^2 = 2 \times x \times x$

$12x = 2 \times 2 \times 3 \times x$

Common multiplication $= 2 \times x = 2x$

Therefore, $2 \times x \times x + 2 \times 2 \times 3 \times x$

$= 2x (x + 6)$

Activity - 6 : For evaluation of students , $6mx - 9my$.

For home-work : Exercise 11.5.3

Teaching Episode - 10

Subject : Compulsory Mathematics **Date : 2072-05-20**

Unit : Algebra **Class : 8**

Name of School : Shree Katyayani S.S. Birpath-9, Achham **Time : Min.**

Topic : Factorization

Specific Objectives;

- Student can solve the factorization by using algebraic tile.
- To identify the algebraic problem by algebraic tile and solve the problem.

ACTIVITIES :

Activity - 1 : To collect the home work of the students.

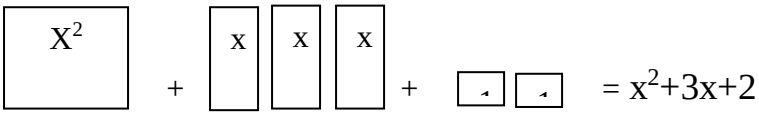
Activity -2 : Teacher will ask to the students about their difficulties of the previous lesson and solve those problems of the students.

Activity - 3 : Teacher will suggest to the student about new problem and take the ideas of the students about it.

Activity - 4 : After taking ideas of the students, teacher will be clarifying their ideas briefly.

Activity - 5 : Factorization x^2+3x+2 by using algebraic tile.

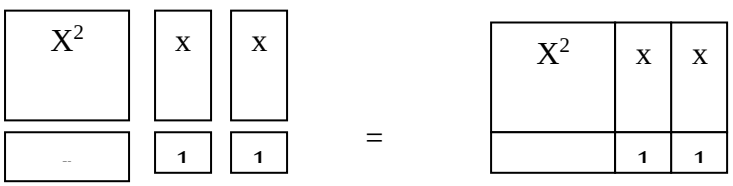
Now, The tile is



Here, The polynomials equation contained area of square or rectangle.

We know the area of rectangle is length × breath

Again,



Therefore , (x + 2) and (x + 1)

$x^2+3x+2 = x^2 + 2x + x + 2 = x(x+ 2) + 1 (x + 2) =$ **(x + 2) (x+ 1)**

For home-work : Exercise 11.5.4

Teaching Episode - 11

Subject : Compulsory Mathematics **Date : 2072-05-21**

Unit : Algebra **Class : 8**

Name of School : Shree Katyayani S.S. Birpath-9, Achham **Time : Min.**

Topic : Factorization of Polynomial

Activity :-

Activity - 1 **:** To collect the home work of the students.

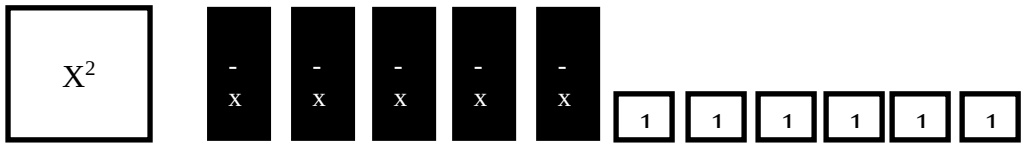
Activity -2 : Teacher will ask to the students about their difficulties of the previous lesson and solve those problems of the students.

Activity - 3 : Teacher will suggest to the student about new problem and take the ideas of the students about it.

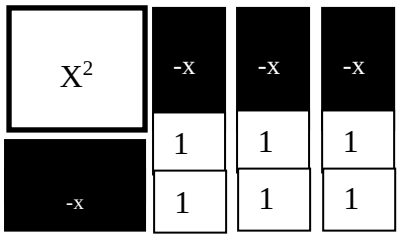
Activity - 4 : After taking ideas of the students, teacher will be clarifying their ideas briefly.

Activity - 5 : Factorization x2 - 5x + 6 by using algebraic tile.

Here,



= **x^2 - 5x + 6**



Therefore, the length is (x-3) and breath is (x-2).

Both terms multiplication is or L × B = complete rectangle

So, (x-3) (x-2) = x^2 -2x - 3x + 6 = x^2 - 5x + 6

Note : The factor of expression must be square or rectangle.

Teaching Episode - 12

Subject : Compulsory Mathematics **Date : 2072-05-22**

Unit : Algebra **Class : 8**

Name of School : Shree Katyayani S.S. Birpath-9, Achham **Time : Min.**

Topic : Factorization of Polynomial

Activity

Activity - 1 **:** To collect the home work of the students.

Activity -2 **:** Teacher will ask to the students about their difficulties of the previous lesson and solve those problems of the students.

Activity - 3 **:** Teacher will suggest to the student about new problem and take the ideas of the students about it.

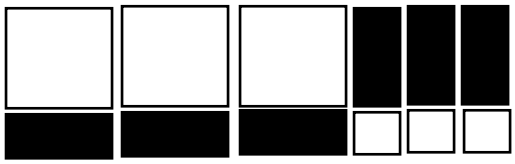
Activity - 4 **:** After taking ideas of the students, teacher will be clarifying their ideas briefly.

Activity - 5 **:** Factorization $3x^2 - 6x + 3$ by using algebraic tile.

Now,

$= 3x^2 - 6x + 3$ **$= x^2 + x^2 + x^2 - x - x - x - x - x + 1 + 1 + 1$**

The above tile is join each other then must be rectangle.



Therefore, the length is above rectangle is (3x - 3) and the breath is (x - 1) , which is complete factorization of $3x^2 - 6x + 3$**.**

Finally, $3x^2 - 6x + 3 = 3x^2 - 3x - 3x + 3 = 3x(x - 1) - 3(x - 1) = (x - 1)(3x - 3)$

For homework , exercise 11.5.5

Teaching Episode - 13

Subject : Compulsory Mathematics **Date : 2072-05-24**

Unit : Algebra **Class : 8**

Name of School : Shree Katyayani S.S. Birpath-9, Achham **Time : Min.**

Topic : Solving Binomial Equation

Specific Objectives;

- Student can solve the equation by using algebraic tile.
- To identify the algebraic problem by algebraic tile and solve the problem.

ACTIVITIES :

Activity - 1 : To collect the home work of the students.

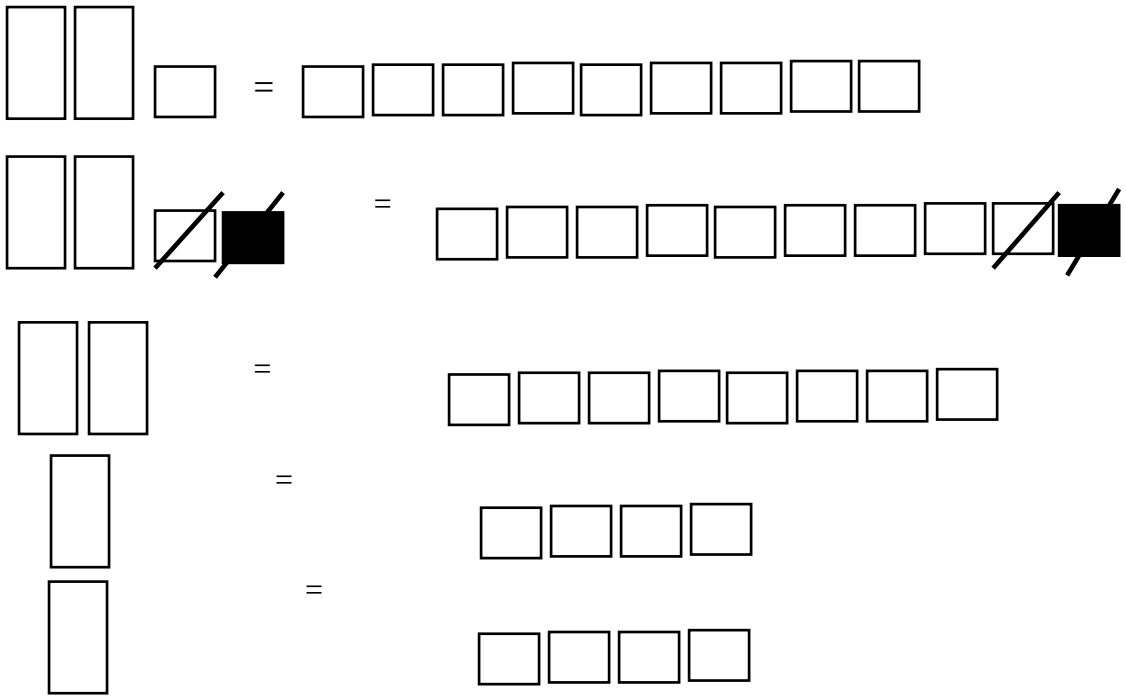
Activity -2 : Teacher will ask to the students about their difficulties of the previous lesson and solve those problems of the students.

Activity - 3 : Teacher will suggest to the student about new problem and take the ideas of the students about it.

Activity - 4 : After taking ideas of the students, teacher will be clarifying their ideas briefly.

Activity - 5 : Solve $2x + 1 = 9$ by using algebraic tile.

Now,



Therefore, $x = 4$.

Homework , exercise 12.1

Teaching Episode - 14

Subject : Compulsory Mathematics **Date : 2072-05-27**

Unit : Algebra **Class : 8**

Name of School : Shree Katyayani S.S. Birpath-9, Achham **Time : Min.**

Topic : Solving of Two Variable Equation

Activities

Activity - 1 : To collect the home work of the students.

Activity -2 : Teacher will ask to the students about their difficulties of the previous lesson and solve those problems of the students.

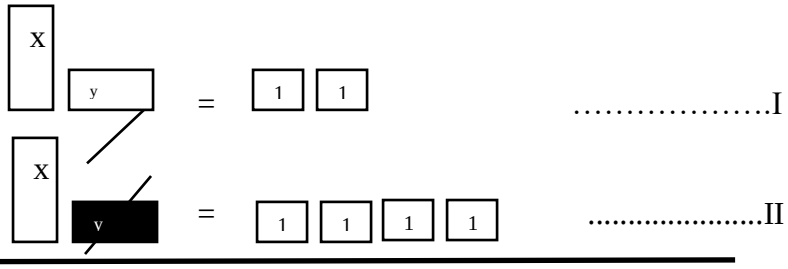
Activity - 3 : Teacher will suggest to the student about new problem and take the ideas of the students about it.

Activity - 4 : After taking ideas of the students, teacher will be clarifying their ideas briefly.

Activity - 5 : Solve $x + y = 2$

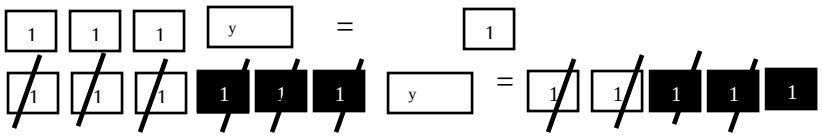
$x - y = 4$ by using algebraic tile.

Now,



So, x = 1 1 1 and x = 1 1 1 Therefore, x = 3.

Again, putting the value of x = 1 1 1 in eq. …… (I)



So, y = 1

Therefore, y = -1.