MS RESEARCH THESIS

EFFECT OF ROTATION MODEL ON ACHIEVEMENT IN MATHEMATICS OF STUDENTS AT PRIMARY LEVEL

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A thesis submitted in partial fulfillment of the requirement for the degree of MS Education

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APPROVAL SHEET

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AUTHOR'S DECLARATION

Hajra Bibi Regd. No.9-FOE/MSEDU/S23 as a student of MS Teacher Education at Islamic University Islamabad. Do hereby declared that thesis entitled "Effect of rotation model on achievement in mathematics of students at primary level" submitted for the partial in fulfillment for the degree of MS Education. This thesis is in its present form is the original work of the author except those which are acknowledged in the text. The material included in the thesis has not been submitted wholly or partially for award of any other academic certification than for which it is being presented.

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SUPERVISOR'S CERTIFICATE

The thesis titled ''Effect of rotation model on achievement in mathematics of students at primary level" submitted by Ms. Hajra Bibi 9-FOE/MSEDU/S23 is partial fulfillment of MS degree in Education, has been completed under my guidance and supervision. I am satisfied with the quality of student's research work and allow her to submit this for further process as per IIUI rules and regulations.

Dr. Zarina Akhtar

DEDICATION

TO

MY BELOVED PARENTS AND FAMILY

(FOR THEIR UNCONDITIONAL LOVE, SUPPORT AND ENCOURAGMENT THROUGHOUT THIS JOURNEY)

&

MY SUPERVISOR

(FOR HER GUIDANCE, INSPIRATION AND PATIENCE IN SHAPING THIS WORK)

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Abstract

Mathematics plays a crucial role in the advancement of science and technology and serves as a foundational subject across various disciplines. To improve mathematics instruction and foster better understanding among primary school students, this study investigates the effectiveness of the station rotation model of blended learning. This model integrated traditional in-person instruction and collaborative learning activities to provide a dynamic and personalized learning experience. The study focuses on teaching the concepts of fractions and number operators to third-grade students at Govt. School Thatha Khalil. The research adopts a quasi-experimental design with pre-test and post-test assessments administered to both control and experimental groups. The experimental group is exposed to the station rotation model, while the control group receives traditional teaching methods. The rotation model involves students rotating between different learning stations, including instructional videos, small group collaborations, and teacher-led instruction. The objectives were to find out the achievement of students in mathematics of experiment group taught through rotation model, to find out the achievement of students in mathematics of control group taught through traditional method, to compare the mean score on mathematics achievement test of students taught through experimental model and traditional model. Pre-test and post-test scores were analyzed using statistical methods to determine the impact of the instructional strategies. The study's significance lies in its potential to inform teachers and students about innovative teaching methods that can enhance students' learning outcomes in mathematics. The findings were the mean scores of pretests of experiment group was 2.27. And the posttest scores of mean is 8.27. And the mean scores of pretests of control group of mean was 2.23. And the posttest scores of mean is 4.58. It was concluded that rotation model classroom had positive impact on the achievement in mathematics of students. The rotation model was found to be successful in achievement in mathematics among students. Researcher recommended that teacher may be implemented this model at primary level because it makes the students active learners as well as allows the teachers to update their knowledge and teachers practices according to the teaching standards of modern world.

Keywords: Mathematics education, Blended learning, Rotation model, Primary school, Instructional strategies, Student achievement, Fractions, Number operator

TABLE OF CONTENTS

LIST OF TABLES

CHAPTER 1

INTRODUCTION

Mathematics has an important role in the development of science and technology. Mathematics is essential for understanding in every discipline. Mathematics is the gate key to all sciences. As a fundamental topic in the sciences and other facets of human existence, mathematics requires excellent instruction in order to promote learning and correct comprehension. Blended learning in mathematics combines online resources, traditional in-person instruction, and technology to provide a dynamic and personalized learning experience. Grade level mathematical goals and objectives for learning, teaching, and practice are introduced by teachers to the class as a whole. An instructor gives instruction in person. A style of education where a teacher provides direct instruction for a portion of the lesson and uses online learning for the remaining portion. The time, location, and pace of the online learning portion of the curriculum are somewhat at the discretion of the students. Throughout a class period, the rotation model enables students to acquire mathematical knowledge while utilizing several learning modalities (Ogunleye, 2009).

Learning is more pleasurable and engaging when flexibility and personalization are enhanced by the rotation model. The station rotation style of education allows for flexibility in grouping, gives slow learners extra time and attention from the teacher, gives each student the teacher's full attention, and encourages students to use the many creative applications of technology. Different methods used to enhance mathematics achievement like Blended learning is the combination of in-person training and student- teacher contact with the use of the Internet and digital media. A La Carte, rotation, flex, and enhanced virtual models are examples of blended learning models. The integrated learning rotation model is the main topic of this work. The Rotation Model of instruction, which was employed in this study to teach /mathematics to primary school pupils, was inspired by this concept. Using a rotation model, students walk to several stations with various teaching and learning techniques

to finish a task and the entire cycle of activities, which includes instructional films, collaborative exercises, and small group instruction led by the teacher (Mondragon, 2023).

1.1 Background of the Study

A blended learning approach is one that incorporates more modern internet message boards and other resources with conventional classroom instruction, in-person meetings, email interaction, and hard copy study materials. A blended learning strategy may make it easier for certain pupils to participate and learn at their own pace. Students who struggle to focus during in-person teaching can work on their studies on their own time, independently, and without an instructor's help with this learning method. Pupils who experience an increase in interest and engagement as a result of blended learning are likely to witness an improvement in their academic achievement as well (Bawaneh, 2011).

By combining in-person and online training, several blended learning approaches have been proposed. The blended learning approach known as the Station Rotation Model (SRM), which combines in-person, online, and collaborative learning, is the subject of this study. According to the study, students' performance and accomplishment in arithmetic would increase if they were exposed to these three distinct learning environments (Nagy, 2018).

The use of the station rotation learning paradigm has the ability to significantly impact students' academic performance on their interest and altering their perspective on the subject matter. Station rotation is a simple model that allows teachers to have more time with individual students. A rotation model is where students rotate between learning stations in or outside the classroom. A few characteristics of station rotation models are explained by researchers. First, a classroom is divided into different stations to allow students to rotate between them. Second, the teacher sets the rotation schedule and sits at one station to give direct instructions. Third, each station consists of different activities even though it has the same learning objective. The task in the stations can be done individually, in groups or with the teacher. Lastly, there is at least one station which adopts the online learning approach. Station rotation model learning can be applied to all the subjects, especially chemistry subjects, or

science-related subjects for that matter. There are many reports on the benefits of blended learning. An additional crucial concept in education is attitude. One type of blended learning is the station rotation style of education, which uses technology to combine the internet with a more conventional classroom environment. The station rotation model of training combines a range of online resources with a traditional classroom teaching methodology. As part of the station rotation style of education, students must be divided into several groups and go from one learning division to another as a unit. Online teaching, cooperative learning, and teacher-led instruction are all offered at the rotating stations (Akinoso, 2020).

1.2 Problem Statement

In everyday life, students face different problems in learning mathematics, especially in understanding the concept of Fraction and Number operator at primary level. These are the basic concepts at this level and help to learn problem solving skills for future. The students have different misconception and less understanding of these concept. The reason may be the way of teaching and assigning the task and address their diverse learning needs. This study was designed to study this effect of the rotation model, comprising on different activities such as instructional videos, small group collaboration, and teacher-led instruction to clear this concept of the students.

1.3 Objectives of the Study

The objective of the study were to:

i. Find out the achievement of students in mathematics of experiment group taught through rotation model.

ii. Find out the achievement of students in mathematics of control group taught through traditional methods.

iii. Compare the mean score of students taught through rotation model and traditional model.

1.4 Research Questions

i. What is the achievement in mathematics among students in the experimental group taught through the rotation model?

ii. What is the achievement in mathematics among students in the control group taught through traditional methods?

1.5 Hypothesis of the Study

H_{O1}.There is no significant difference in the effect of mathematics learning between the Rotation Model and traditional instruction at the primary level.

1.6 Significance of the Study

This work is important because it has the potential to make theoretical and practical contributions to the field of primary mathematics instruction. This study holds significant value for both teachers and students. For teachers, it provides insights into the effectiveness of the rotation model as an innovative instructional strategy, offering a practical framework to enhance engagement, individualized instruction, and collaborative learning in mathematics classrooms. By understanding how different learning stations cater to diverse learning needs, teachers can create a more dynamic and student-centered learning environment that fosters better academic outcomes. For students, the rotation model encourages active participation, self-paced learning, and the development of problem-solving skills, making mathematics more accessible and enjoyable.

1.7 Delimitation of the Study

The study was delimited to the following factors:

1. Blended learning by using station rotation model.
2. Students of grade 3 from Govt. Girls High School Thatha Khalil Tehsil Taxila District Rawalpindi.
3. Unit number 3 and 4 that is Fraction and Number Operator from class 3 mathematics book.

1.8 Operational Definitions

1.8.1 Rotation Model

The term "Rotation Model" is an educational strategy in which students move between different learning stations or tasks, participating in

teacher-led teaching, small-group work and instruction, and technology-enhanced learning. Within the framework of teaching primary-level mathematics, organized rotations including these various instructional modalities will be used to operationalize the rotation model in this study.

1.8.2 Achievement in Mathematics

Scores or grades attained by the students in assessment in mathematics are termed as academic achievement. On the basis of these scores' students classified into the categories of above average, average and below average.

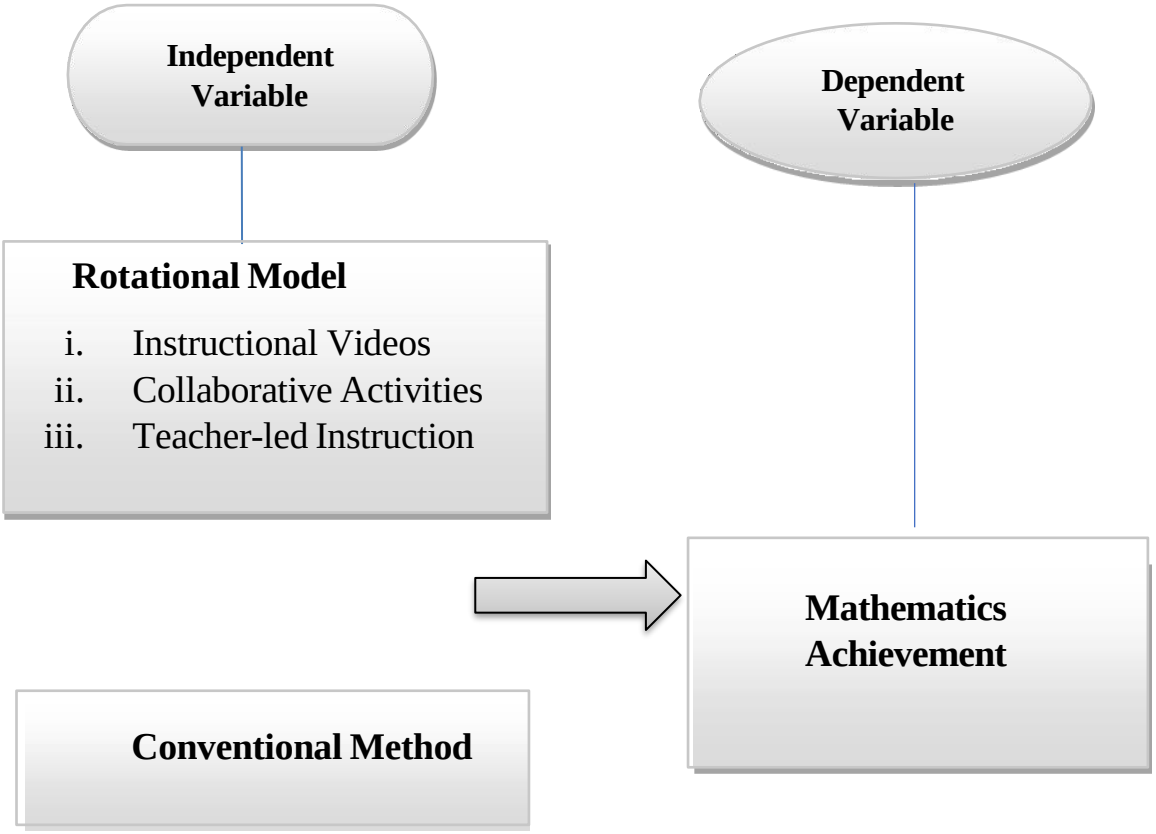
1.9 Theoretical Framework

According to Graham and Gibbons (2014), The rotation model has four sub- models, which can be stated as follows: Individual rotation model: the learner moves between learning stations individually, without being assigned to a specific group. This transfer normally occurs within a predetermined schedule, taking into account what is appropriate for his talents, without the need for him to pass through all of the current stations. The flipped classroom model: in which the student goes between classroom apps under the supervision of the teacher while at school, and learns via the Internet by transferring the content to home in one of the various ways. Laboratory rotation model: in which students rotate between multiple sites within school buildings according to a predetermined timetable, rather than within stations in one classroom or home, as in prior models. This study is anchored in the Blended Learning Theoretical Framework**,** specifically through the Station Rotation Model (SRM)**,** a sub-model that integrates both traditional and technology-enhanced learning within a face-to-face classroom setting. As supported by prior literature, the SRM allows for structured movement between stations such as teacher-led instruction, collaborative tasks, and digital learning—without requiring full online infrastructure. Unlike other blended learning models like the Flipped Classroom or Fully Online Models**,** which rely heavily on students accessing content at home through the internet or LMS platforms, the SRM keeps all instructional activities within the school environment. This is a critical consideration in the context of this research, as the participating school did not have access to reliable online equipment or home internet connectivity**.**

Therefore, the Station Rotation Model was intentionally selected for its flexibility, feasibility, and capacity to combine digital and face-to-face methods within a traditional classroom setting. This model also aligns with constructivist learning principles, where students actively construct knowledge through diverse activities and formats, promoting deeper understanding in subjects like mathematics. By grounding the study in this theoretical approach, the research responds to the need for adaptable instructional models in low- resource settings while still leveraging the pedagogical strengths of blended learning.

1.10 Conceptual Framework

Figure 1.1



The conceptual framework was developed by the researcher to provide an overview of the topic. In this research study was Rotational model and students' achievement in mathematics. Rotational model including factors like instructional videos, collaborative activities and teacher-led instruction while on the other hand mathematics achievement include Fraction and Number operator.

CHAPTER 2

LITERATURE REVIEW

This section was covering the existing body of research related to the effects of Rotational Model on achievement in mathematics of students at primary level. It was finding the effectiveness of Rotation Model which is included Instructional videos, Collaborative activities, Teacher-led instructions.

2.1 Review of the Related Literature

It has been suggested that the world is so unstable, unpredictable, complicated, and ambiguous that anything may happen at any time to prevent pupils from gathering in a classroom. Learning must continue, even if it does not occur in the same way as it did in the past. To develop a strong understanding of the subject, students will require instructional strategies that enhance learning through technology-based skills. One example is the recent pandemic, which forced many students' education to shift from traditional classroom settings to alternative modes, often online or through e-learning. However, a global crisis is not necessary for pupils to benefit from using technology to improve learning (Akinoso, 2015)

North American schools employ a variety of program instruction techniques. A range of techniques can be used in teaching methods and styles. Additionally, there are numerous "pull out" programs, including gifted classes, music, resource withdrawal, special education, and many more. In elementary schools, both these special programs and ordinary classroom courses are implemented using a range of timetables. In Ontario, grade 8 mathematics is taught in elementary schools to the great majority of students. The two most popular methods of teaching mathematics in the elementary school system are home room and rotation. The potential effects of rotational education on student achievement in comparison to home room instruction have not been thoroughly studied (Canady & Rettig, 1996).

2.2 Effect of Rotation Model on Students in Mathematics Achievement

According to the study, students in the experimental group who used

the blended learning strategy performed better academically than those who used traditional face-to-face settings. This shows that blended learning is a more effective way to enhance math academic improvement, especially for students who need extra help during the school year. the impact of an educational strategy for integrated learning on math achievement in a small urban school district in the northeastern United States of America. The study used a quasi-experimental approach to compare the means of the mathematics scale scores for sixth and seventh grade children in the blended learning instruction treatment group with those in the traditional education control group. According to the research, sixth-grade pupils using the blended learning model outperformed their traditional classroom peers in terms of test scores. However, even though grade 7 pupils' results were higher numerically, there was no statistically significant difference between them (Marima, 2024).

The rotation model is a widely utilized blended learning approach applicable across several academic disciplines, wherein students transition between learning stations based on a predetermined timetable established by the instructor (Heather & Michael, 2012) In addition, Graham and Gibbons (2014) believe that this model integrates the advantages of traditional and electronic learning, allowing the learner to acquire knowledge in the subject of study and develop his skills.

The rotation model has four sub-models, which can be stated as follows: Individual rotation model: the learner moves between learning stations individually, without being assigned to a specific group. This transfer normally occurs within a predetermined schedule, taking into account what is appropriate for his talents, without the need for him to pass through all of the current stations. The flipped classroom model: in which the student goes between classroom apps under the supervision of the teacher while at school, and learns via the Internet by transferring the content to home in one of the various ways. Laboratory rotation model: in which students rotate between multiple sites within school buildings according to a predetermined timetable, rather than within stations in one classroom or home, as in prior models. It enables the teacher to use and benefit from all of the information that the pupils gather while in the laboratory. Including in the traditional lesson sessions. (Graham &

Gibbons, 2014).

Rotation model for blended learning stations: This model comprises various learning stations, as long as one of these stations is electronic and equipped with multiple educational methods, such as learning through small groups, whole class or project learning, worksheets, homework, and other learning methods prepared in advance by the teacher. Students move between those stations that are equipped with various digital and non-digital activities. This allows for multifaceted interaction between students and the teacher as well as between themselves Owing to the wide range of educational settings, experts have discovered several forms of blended learning to provide educators with flexibility that allows them to use additional contexts that fit their learning environment and their skills (Al-Rababa, 2019). Traditional schooling naturally leads to blended learning. It blends e-learning and traditional education without doing away with either. In order to create a non-dual combination, it combines the two educational lines into a single line (Al-Sayyab, 2023).

2.3 Effect of Instructional Videos

YouTube is an educational resource that is available to everyone. Students can watch videos from any location with an internet connection, allowing for flexible and personalized learning options. This accessibility will be especially helpful to students who need additional resources or who prefer self-paced learning. Students can access the content whenever it's convenient for them thanks to the vast library of instructional videos it provides on a variety of mathematical topics. Students can rewind, pause, and replay videos as needed in YouTube's self-paced learning environment. Students can take control of their education and gain a greater understanding of mathematical concepts at their own speed with this flexibility. Furthermore, YouTube's user-friendly layout makes it easy to use and enables students to revisit and examine specific content as needed. YouTube offers unparalleled accessibility and convenience to both educators and learners. YouTube videos can be particularly beneficial for a range of learners, including those who are learning English or have learning disabilities. Closed captions, subtitles, and video transcripts enhance accessibility and comprehension for students with varying needs. YouTube videos have become an excellent teaching tool in mathematics education

because they offer accessibility, engagement, and flexibility that traditional teaching methods might not be able to offer. Teach everyone. Teachers can create a more productive and welcoming learning environment where everyone can learn mathematics and enjoy it with the aid of this flexible platform (Khan et al., 2023).

Teachers can employ technology to relate mathematical concepts to real world problems, allowing students to explore mathematical concepts. Additionally, students are more engaged with mathematics when technology is used in the classroom. More and more electronic resources are available to educators and learners. Teachers must develop innovative applications to optimize the advantages of technology-assisted learning settings for their students. 35% of primary school teachers use digital games in the classroom, and 88% of them say that student participation has increased, according to a Project Tomorrow poll. These results lend support to the theory. The usage of technical instruments in mathematics education is growing daily (Khan et al., 2023).

Digital technologies and educational resources lead to blended learning. Lesson plans, lectures, textbooks, assignments, software, tests, quizzes, internet-based video and audio content, and social media platforms like Facebook, YouTube, and Twitter may all be accessed through online means including computers, books, and apps (Watling, 2012).

1. Meanwhile, employed the term "digital learning tool" to describe digital resources utilized in blended learning, such as: High-tech digital learning tools: These comprise applications, experimental software, interactive whiteboards, digital teaching software, digital textbooks, and mobile devices (tablet or smartphone) that aid in student learning.
2. Traditional digital tools: Digital video support, aerial video projectors, engaging content, digital assemblies with interactive resources, and academic resources like dictionaries and textbooks are examples of traditional digital tools (Lazar et al. 2020).

2.4 Effect of Collaborative Activities

All elementary schools across the nation should reevaluate their math

curricula with the goal of slowing down the rate at which kids forget the fundamentals of math and expanding the subject's application beyond simple number operations. The report highlights that future curricula and textbooks should discourage the tendency that is ingrained in primary mathematics curricula and textbooks to expedite children's mathematical skills by teaching them mechanical rules at the expense of understanding and intelligent application (Mangal et al., 2023).

2.5 Effect of Teacher-Led Instruction

After a comprehensive review of the research literature involving a wide range of teacher instructional practices, one overarching theme was identified that enables each instructional practice to be classified into one of two primary categories: teacher- directed instructional practices or student-centered instructional practices. instructor- directed instructional approaches have their roots in the classical view of learning, which maintains that the best way for learning to take place is for the instructor to actively transfer knowledge to the students, who are largely passive during the process. As a result, teacher-directed classrooms tend to have less interactions overall, especially between students. The main goal of teacher-directed instructional approaches, especially in math classes, is to assist students acquire fundamental skills and knowledge by giving them content-related materials like definitions, instructions, and examples. In a teacher-directed mathematics session, the teacher uses procedural instruction to demonstrate the mathematical processes required to solve each type of problem. Following this usually brief, straightforward lecture, the teacher moves around the classroom monitoring the pupils and offering assistance as necessary while they practice the steps independently with similar problems, frequently using worksheets (Osborne, 2021).

The Rotation Model has gained popularity in primary mathematics instruction due to its capacity to improve student learning results. Primary school students exposed to the Rotation Model demonstrated statistically significant improvements in their mathematical skills as compared to those in traditional educational environments. This demonstrates how the Rotation Model, which blends instructional movies, group projects, and teacher-led instruction, may improve students' understanding of fractions and numerical operations (Bayazit

& Ozel, 2016).

Teachers can improve the Rotation Model to create a cooperative learning atmosphere where students can exchange ideas and learn from each other's perspectives. When it came to solving math problems, elementary school students who worked in groups did better than those who worked alone. Collaborative exercises not only help students improve their communication and teamwork skills but also encourage them to think of alternative methods for solving mathematical problems (Doyle et al., 2016).

Teacher-led instruction enables the provision of scaffolded support and guidance to students in their understanding of fractions and number operators. Teachers can give each student individualized feedback and support based on their learning needs when they use the Rotation Model in conjunction with teacher-led instruction (Cobb et al., 2017).

During the era of one-room schoolhouses, teachers were used to teaching kids differently, yet these institutions were ineffective in teaching a bigger student body. Since teachers could teach the same subjects in the same way and at the same pace if kids were grouped by grade level and then batched in classrooms, a standardized, factory model of education was developed in order to educate a greater number of primary school pupils. The factory model served our educational objectives well in the past, but many students today find the conventional one-size-fits-all approach to be counterproductive. Since all children in a normally diverse classroom are expected to acquire these skills, the Common Core Standards' rigor and 21st Century Skills present a challenge for educators. Teachers must provide the resources and instruction to fulfill the requirements of each student because all students must master the same standards. Students with special needs, students who are above or below grade level, and students with a variety of interests and backgrounds can all be found in an elementary school classroom. It might be difficult for teachers to make the curriculum accessible to all students because of the diversity in the classroom (Horn & Staker, 2015).

Researcher provided a case study on how the use of a blended learning paradigm with station rotation affected the mathematical proficiency of primary

school pupils. Teachers in 24 second through fourth grade classrooms taught math every day using a combination of in-person and online instruction. Instructors divided their students into two groups. One group worked on the digital component. If students grasped the material, they might advance to increasingly difficult mathematical ideas more rapidly, and those who had trouble could get help and feedback (Zearn, 2017)

As a type of blended learning, the station rotation model of instruction combines a traditional classroom teaching approach with a range of online resources. It also uses technology to connect the internet with more conventional classroom settings. Students must be divided into various groups and move from one learning division to another as part of the station rotation model of education. Online instruction, group projects, and teacher-led instruction are all included in the rotating stations (Kerres & Witt, 2003).

Believed that as technology advances, instruction is increasingly shifting from in-person to online settings, where students read, watch, or listen, work through problems or respond to inquiries, investigate resources and simulations, and work together with classmates (Yusuf, 2020).

Researchers like Zuvic, (2011) concluded that the utilization of multimedia, the provision of self-assessment tests, the availability of digital literature, and cooperative activities have little effect. As will be further discussed, students appreciate the thoroughness, structure, and design of the course materials as well as the online participation of the teachers, particularly when it comes to effective e-course management. The viability and feasibility of online instruction will be ensured by thorough and ongoing assessment of student satisfaction. Students have access to more activities, learn through teacher-led instruction, collaborate with peers, and have access to a computer with internet. The station rotation model of instruction systems alters how teachers teach as well as how students learn.

2.6 Effect of Rotation Model on Fraction

This study primarily focuses on the Station Rotation Model (SRM). In Brunei Darussalam, teachers receive extensive support and educational resources to implement Blended Learning (BL) in their classrooms. One of the

Ministry of Education's initiatives to enhance students' numeracy skills is the Literacy and Numeracy Coaching Program (LNCP, 2017), which applies the Teaching for Mathematics Mastery Framework. This program emphasizes students' enjoyment of learning mathematics, their confidence in solving arithmetic problems, and their ability to apply learned concepts to new situations. Under the Brunei Teachers' Standards Teacher's Performance Appraisal framework (Ministry of Education, 2015), teachers are expected to provide a variety of student activities to inspire, engage, and deepen students' conceptual understanding. Furthermore, teachers must design appropriate collaborative learning tasks to encourage students to collaborate and work together effectively.

2.7 Attitude

Effective learning of a subject like mathematics can be greatly influenced by the mindset of the students. In addition to cognitive aspects, affective variables such as motivation, attitude, and beliefs can have an impact on students' mathematical achievement (Zan, 2006).

A person's attitude toward learning might be either favorable or bad (Zan & di Martino, 2007). Students' performance may benefit if they have an optimistic attitude or a strong desire to learn mathematics, but their performance may suffer if they have negative emotions. (Agoro, 2017) Claimed that a person's attitude, a taught predisposition, influences how they react to situations, objects, and concepts. This, in turn, plays a key role in deciding how a person reacts to a particular item. (Adeniyi,2019) Students at the University of Lagos have a favorable view toward online courses, according to a study on their effectiveness and attitudes. Similarly, showed that there is proof of a connection between computer- supported leisure activities, favorable attitudes toward mathematics, enhanced mathematical learning, and student achievement when technology is used in the classroom (Mohd, 2003). Studying the effect of the use of multimedia on students' performance in secondary school mathematics concluded that the academic performance of students in mathematics was positively influenced by the use of multimedia (Akinoso, 2018).

Stated that teachers in a sample of third-grade Danish classes that integrated technology into their teaching self-reported being more proficient in using this assessment, and that students reported being able to enhance their mathematics grasp. This resource discussed the ramifications of blended learning and how incorporating technology could improve students' educational experiences (Akinoso, 2018).

iPad and digital curricula were given to participating instructors to help them better address the needs of K–2 children. Minicozzi employed two questionnaires and a case study methodology to gain a better quantitative understanding of how instructors have been prepared to use technology in the classroom. Minicozzi et al. employed focus group interviews in the study's qualitative section to investigate how teachers utilized iPads to better serve K–2 children' learning requirements. Minicozzi discovered that in order to properly prepare K–2 teachers, technology integration must be integrated into teacher preparation courses. Additionally, instructors can successfully incorporate iPads into classes that enhance student learning if they receive the necessary training (Minicozzi, 2018).

Examined the potential effects of one-on-one technology on student motivation and achievement. Participants in Harris et al.'s (2016) study were fourth graders from two distinct classrooms in a Title 1 elementary school. Harris et al. collected information using topic examinations from the Pearson Vision Math series, attendance records, and Discovery Education evaluation reports. They discovered that student motivation to learn and academic success may be influenced by one-on-one technology. Since blended learning is a popular teaching strategy in schools, their findings are significant (Harris, 2016).

2.8 Teacher Perception

Researcher could be challenging to implement educational reforms because many instructors still employ outdated teaching strategies while taking part in professional development related to new approaches. How well a teacher integrates blended learning into the classroom may depend on how comfortable they are with the rotation model (Anderson, 2018).

Researcher can be impacted by teachers' attitudes about new teaching methods. Forty instructors from eight different school districts participated in the mixed-methods study that the authors undertook. Anderson et al. collected data for the study through interviews, instructor reflections, lesson observations, and student achievement growth. In order for the chosen math teachers to alter their teaching methods, Anderson et al. discovered that a shift in the teachers' perspective on innovative teaching methods was crucial. Teachers must be open to changing the way they teach mathematics in order for educational reforms to be successful. Student achievement may be directly impacted by this (Anderson et al. 2018).

Differentiation is a way of thinking about teaching and learning that is based on a set of beliefs to address the diversity within a classroom. Within those beliefs, (Tomlinson, 2000) stated:

"The differences in students are significant enough to make a major impact on what students need to learn, the pace at which they need to learn it, and the support they need from the teachers and others to learn it well (p. 6). "

The five fundamental elements of differentiation learning environment, curriculum, assessment, instruction, and classroom leadership and management guide a teacher's proactive reaction to the needs of their students (Tomlinson, 2013). According to Tomlinson (2013), Using a range of instructional methodologies, teachers can differentiate teaching based on the readiness, interests, and/or learning profiles of their students in terms of content, process, product, and environment. Using technology to deliver some of a student's education is one teaching method that can assist teachers. By following these five guidelines, blended learning the use of technology to deliver some instruction can support differentiation. Technology may help teachers quickly identify learning gaps and differentiate training, and blended learning models can put students at the center of the learning process (Powell et al., 2015).

To find out how differentiation affects student learning, numerous studies have been conducted. One such study on digital differentiation in biology classrooms discovered that students' performance was slightly improved by digital differentiation. (Haelermans et al., 2014). (Burns et al.,2012) have

conducted research on the impact of using technology to differentiate instruction in math, particularly as a math intervention for students in the third and fourth grades. The results show that the third and fourth grade pupils who were recognized as at risk improved their math skills thanks to the technology used (Burns et al., 2012). Differentiation using a clever tutor-assisted method, and they discovered that this strategy helped primary school pupils who struggled with math. Following individualized teaching using the intelligent tutor-assisted intervention, the math learning-disabled children demonstrated a notable improvement on a standardized assessment's problem-solving subtest (Xin et al., 2017). It can be difficult for a single teacher to differentiate education for a large number of kids in a classroom; technology can help teachers with this.The author, teacher, student, method, technology, and math are the elements of integrated learning from a mathematical standpoint. The author is the one who develops the course and specifies the function of every element in it. One of the main goals of blended learning is to improve the relationships between students, teachers, and other stakeholders within the learning process. To create assignments and finish math tests for their pupils, authors can combine pedagogy with a variety of technologies (Kashefi et al., 2017).

Three of the five components of blended learning are online, and two are in-person (Alammary,2019). Among these units are:

1. Instructor-led in-person: students attend a class where the instructor teaches the material, with minimal opportunity for practice, interaction, or practical learning.
2. Face-to-face collaboration: It motivates students to engage in class tasks together.
3. Instructor-led online learning: the instructor conducts the instruction and evaluates students' learning progress and interactions during the process.
4. Encourages students to engage in online learning activities through online collaboration.
5. Self-paced online learning: gives students the freedom to study whenever and wherever they want.
6. Online instructor-led: the teaching process is accomplished online with the

teacher's assessment of the learning progress and interactions throughout the learning process.

Kerzic et al. (2019) proposed that A sophisticated teaching approach that complements in-person instruction while also encouraging students to work on projects, participate in other activities, and contribute to the learning process is known as effective blended learning. In an online classroom, students require ongoing supervision.

According to Poon (2013), Kerzic et al. (2019), Zhang & Zhu (2017), these factors can be divided into three groups:

i. Student factors, such as information accessibility, trust in technology knowledge and experience, self-disciplined learning style, and accountability for learning outcomes.

ii. Teacher characteristics, such as personality, ICT proficiency, teaching methods, facilities, feedback, course design, online instruction, communication quality, and information quality.

iii. Adoption of technology and technical assistance, encompassing accessibility, usability, and technical support.

Online teaching tools supplement in-person instruction by adding additional reading to complete the process. A self-evaluation of the ideas and content of the online course comes next. Teachers also ask students to evaluate the quality of their work and provide comments on assignments that include lengthy projects Kashefi et al., 2012; Umek et al., 2015). Barros et al. (2017) and Kerzic et al. (2019) . Additionally, the findings of these tests provide pupils with the knowledge they require and an indication of their level of learning. Additionally, teachers can assess how well students understand the lesson, and they must interpret and track the kids' learning needs to track their development (Adiguzel et al., 2020; Barros et al., 2017; Kerzic et al., 2019).

According to study by Kashefi et al. (2012, 2017), classroom activities, assessment, computer and web aids, and techniques are all components of blended learning instruction for mathematics education in particular. In order to construct educational activities and different learning methodologies for math instruction, (Rifa'i & Sugiman2018).

When it comes to high school courses, credit recovery is a means for students to get credit back after failing the first subject. When a student is able to master all of the requirements where they were lacking at the end of the first course, they obtain a pass/fail score. Credit recovery enables students to retake the portions of a course that they did not master when they first took it. In high school, blended and online credit recovery solutions have taken center stage. Credit recovery is a strategy used by the majority of school districts to raise graduation rates. One indicator of the skill level of the American workforce is the high school graduation rate (Heckman & LaFontaine, 2010). Many ninth-graders have poor cognitive abilities, and they frequently fail classes the first time around (Murnane, 2013). According to a Cooper (2018) study, dropout rates are often lower than 60% for students of race and those with low incomes. Dropout recover, or credit recovery programs for "at-risk" students, are popular strategies for addressing this issue.

The educational landscape is evolving from traditional classroom instruction to a blend of online learning and discovery, allowing students to learn at any time and from any location. The world is now a global village where students and teachers can connect with people anywhere in the world to access the best educational system possible, learn from video lectures from around the world, and ask or submit questions when needed for clarification. There should be what is known as globalization, which fosters awareness and knowledge of global interconnectedness, in order for students to interact with their colleagues throughout the world, become informed, and develop into responsible global citizens. It also brings them closer to all regions of the world. Reading, writing, and math alone cannot be the only focus of any program's instruction. said that the goal of globalization is to replace the teaching-learning process with communication, teamwork, critical thinking, and creative problem-solving instead of reading, writing, and math. Additionally, technology has replaced traditional classroom instruction, and online learning offers additional advantages in the areas of communication, teamwork, critical thinking, and creative problem-solving. Every day, technology improves, and students can participate in virtual learning from anywhere in the globe by connecting to the internet. Zoom, Google, and other platforms can be used to hold many types of

meetings as though students were in a hallway (Panneer Selvam ,2014).

The use of information and communication technology (ICT) helps to create a rapidly expanding civilization. According to Shashikala (2019), e-learning includes teaching and learning that is facilitated by electronic means. Conventional learning undoubtedly has its benefits, but online, or e-learning, is well-known and used for flexible, open, and remote learning but only in certain circumstances. Additionally, combining regular classroom settings with online learning can be quite beneficial, particularly in an emergency. Odumosu et.al, (2012) have proposed that for the best learning outcomes, today's students must be exposed to contemporary technologies. For instance, according to Ogunleye (2010) computer literacy and attitude toward computers are predictors of chemistry teachers' use of technology. He felt that teaching chemistry shouldn't be restricted to using traditional texts or conventional teaching, which is a teacher-centered approach, but should also include the use of technology. This technology can be used to teach and learn other courses, such as mathematics, in addition to chemistry.

Tavangarian (2004) underlined that the information and communication system is a particular medium to carry out the learning process, whether or not it is networked. This concept highlights the significance of the station rotation model of instruction in the teaching profession. Yusuf (2020) supported the combination by arguing that as technology advances, instruction is progressively shifting from in-person to online settings where students read, watch, or listen, solve issues or respond to inquiries, investigate simulations and resources, and work together with classmates.

2.9 Students' Learning in a Blended Learning Classroom

The concept of station rotation may result in teachers spending a considerable amount of time with each student. Students move between learning stations located both inside and outside the school while using a rotation technique. Researchers have identified a number of characteristics of station rotation models. To allow pupils to walk between the stations, the classroom is first partitioned into several sections. The second aspect is that the

instructor chooses the rotation and takes up a station to conduct one-on- one instruction. In the third stage of the characteristics, each station has a unique assignment, but they all aim to achieve the same learning objective. These exercises can be completed solo, in groups, or with the instructor present at each station. Lastly,there is one station that uses online education. There are many different disciplines where blended learning can be applied. The benefits of blended learning, which is founded on the station rotation paradigm, have been the subject of numerous studies. For example, Alsahi, (2019) examined the impact of blended learning on the scientific performance of ninth-grade pupils. The findings demonstrated that the science test scores of intermediate school pupils were considerably impacted by blended learning.

Additionally, Truitt and Ku (2018) investigated the Station Rotation model. In addition to five positive themes technology, education, a diversity of tasks, asking for help, and having fun their study found two conflicting themes: technology and demanding work Pow-ell et al (2015). Suggested a model of station rotation for each of the main subjects of their investigation. They used a case study as the basis for their approach. All levels and topics saw improvements in the blended learning program's test scores on the Pennsylvania System of School Assessment (PSSA). Additionally, they used the station rotation strategy to help their kids become more proficient in math and English. According to the study's findings, pupils' performance on state math tests has improved thanks to the station rotation strategy. It shows an increase in student growth. Another study examined how station rotation affected students' learning (Govindaraj, 2017).

The study involved 150 college students who were majoring in physics. The findings showed that the kids could communicate with both their teachers and their peers. Students' experiences also get better when they engage in a variety of activities at various stations. Just 11% of students thought that this learning approach made their learning more effective for a variety of reasons. An intriguing case study on the SRM's application in a third-grade classroom was carried out by (Truitt, 2018).

A group of third graders took part in student focus group interviews and filled out student surveys as part of the semester-long evaluation, which produced five positive and two negative themes pertaining to the SRM. The five positive themes were content, technology, fear, having fun, and asking for help, whereas the other opposite themes were hard work and technology. An evocative guideline (Larsari et al., 2022) for writing outcomes, writing assessments, an effective writing rating rubric, and writing examples were used to analyze the data. The results showed that participants did better in the areas of organization, correctness, fluency, introspection, and concept brainstorming. Additionally, the findings showed somewhat higher levels of language acquisition.

From the four specific models the station rotation model is selected for the review of past studies to conduct a blended learning classroom. It is because the classroom can be split into two, three or even four different stations based on the needs of the students and teachers. Meanwhile, the research by Truiit reported that teachers witnessed an increase of 21% in the performance of students during the math block lessons using four different stations of the station rotation model. Their students' math scores improved significantly. They stated that this learning is not only effective for a short period of implementation, but it is also sustainable for longer periods. In this research, the station rotation model was selected for further studies. Furthermore, Truiit stated that the major reasons the station rotation model was selected are so that the teachers have more flexibility to work with their students. For example, a teacher can break the classes into different sizes of groups, give them collaborative assignments or distribute independent work to every student (Truitt, 2016).

2.1.0. Critical Summary

The literature provides a comprehensive examination of various teaching methods and their effects on mathematics instruction. Although the effects vary by grade level, it has been shown that the station rotation model of blended learning enhances sixth-grade students' math ability. Students of diverse backgrounds can participate in flexible, self-paced learning with YouTube videos. Using digital games and other technological resources in the classroom increases student interest and participation. In order to encourage

deeper comprehension rather than rote learning, it is recommended to employ collaborative activities and curriculum adjustments. Traditional teacher-led training places a strong emphasis on procedural learning, but it could lack sufficient engaging or interactive elements. Collectively, these studies show the advantages and disadvantages of different teaching approaches, highlighting the necessity of tailored approaches to improve students' mathematical competency and understanding. The literature presents a thorough exploration of blended learning, particularly through the Station Rotation Model (SRM), emphasizing its integration of technology with traditional teaching methods. It highlights the benefits of digital learning tools, both high-tech and traditional, in enhancing student engagement and academic performance. The SRM is portrayed as an effective method that balances face-to-face and online instruction, offering flexibility and personalized learning. Studies underline the importance of students' attitudes, motivation, and teacher perceptions in the success of blended learning. Research shows that positive teacher and student attitudes towards technology, coupled with differentiated instruction and effective use of multimedia, can significantly improve learning outcomes, particularly in subjects like mathematics and science. Despite these benefits, challenges such as the need for ongoing teacher training, the integration of technology, and managing student engagement remain. The literature also discusses the potential of blended to learning foster student collaboration and self-paced learning, which are essential in modern educational settings. However, the impact of blended learning on performance can vary, and its success largely depends on thoughtful implementation, teacher readiness, and consistent assessment practices.

CHAPTER 3

RESEARCH METHODOLOGY

This chapter presents the research methodology of the study used in conducting this research. It included the research design of the study, details of the population, sample, instruments, data collection and data analysis technique.

3.1 Research Design

The purpose of the study was to see the effect of rotational model learning on achievement of students in mathematics at primary level. Quasi-experimental research design was adopted. This design includes non-random assignment of subject to groups. Non-Equivalent Pretest and the Posttest Control group design was used to measure the difference in the achievement of students. Data were analyzed by using SPSS.

3.2 Population and Sample

The population of the study was 4 schools of 192 students of grade 3 from tehsil Taxila. The Sample of the study was including of 52 students of 3rd grade s from Govt. High School Thatha Khalil. Two intact sections of class 3rd were presented. One group named as experimental group (26) and other group as a control group (26).

Table 3.1

Detail of Group

Groups	Section	No. of Students
Treatment Group	3rd A	26
Control Group	3rd Bs	26
Total		52

3.3 Instruments

There were two instruments pre-test and the post-test. Pre-test was used

to formulate the groups, constructed from 3rd class mathematics book from fraction and number operator. Test was conducted by the researcher, keeping in view levels of cognitive domains of Blooms Taxonomy. The test was of total 10 marks having 10 items. Post-test was used to access the effect of experiment. Pre-test and Post-test was used to measure the baseline knowledge and learning outcomes of primary students in mathematics. The pre-test was administered before the implementation of the rotation model. While the post-test was administered at the end of treatment i.e. eight weeks only for August and mid of the September. Pre-test and Post-test MCQ's based test was used. Pre-test to all participants before any instructional intervention. This pre-test may cover the key topics that were addressed in the study. While the post-test were administered after eight weeks of both teaching methods. When the researcher taught through Rotational model method which were include different activities e.g. Instructional Videos, Collaborative activities and teacher-led instruction. All the students participated in classroom activities designed by the researcher and activities were given in Appendix D.

3.3.1 Pre-Test

It was a general test for grouping that was developed from prescribed mathematics text book to assess the previous knowledge of students. The pre-test was a MCQ'S test with ten questions. Test is given in appendix-A. On the basis of pre-test students were assigned non-randomly in both groups. The pre-test was administered in the beginning of experiment on students in classroom.

3.3.2 Post-Test

The purpose of the study was to know the effect of target instructional framework on student's achievements in Mathematics. The experimental group were taught two units (Fraction, Number Operator) from mathematics text book for class 3rd for a period of eight weeks. 19 The lesson plan was developed according to the teaching model. And at the end of the experiment researcher take the post test of both groups in which included the mcqs based test for the chapter of 3 and 4 that is fraction and number operator. All the students have appeared in posttest.

Table 3.2

Table of Specification for Pre-Test on Fractions and Number Operators

The table of specification outlines the distribution of questions based on cognitive levels and content areas.

Content Area	Know	Comp	App	Total
Fractions				
Understanding Fractions	1			1
Adding Fractions		1		1
Proper and Equivalent Fractions		2		2
Subtracting Fractions			2	2
Comparing Fractions		2		2
Multiplying Fractions			1	1
Fractions in Real Life	1			1
Total Questions	2	5	3	10

Table 3.3

T*able of Specification for Post-Test on Fractions and Number Operators*

The distribution of questions based on cognitive levels and content areas.

Content Area Questions	**Know**	**Comp**	**Appl**	**Total**
Fractions				
Definition of Unit Fractions	1			1
Representation of Unit Fractions		2		2
Ordering Unit Fractions			3	3
Adding Fractions			2	2
Fraction in Real-Life Scenario	2			2
Total				10
Number Operators				
Simple Addition	2			2
Division as Sharing		5		5
Multiplication Equation			3	3
Total Questions	2	5	3	10

3.4 Procedure (Validity, Pilot testing & Reliability)

Reliability of the pre-test and post-test was checked by split half. And the validity of pre-test and post-test will be checked through expert opinion, subject teacher of particular schools and table of specification. The split half value of pretest was .71 and the posttest was .80.

The instrument was undergone pilot testing to assess its clarity, appropriateness, and effectiveness in measuring students' mathematics achievement. Content validity of the Pre-test and the Post-test was determined by the questions to the exercises of thunit “Fraction and Number Operator”. The question included in pre-test and post-test will be from the same units. Initially, researcher developed a test containing 10 mcq’s for each level of Bloom Taxonomy from the selected unit of mathematics book. The test was validated after discussing with the subject specialist from Govt. School Thatha Khalil. Experiments was continued for the duration of 8 academic weeks. Researcher taught the two units of mathematics and designed 19 lesson plans according to cognitive domains of Bloom’s Taxonomy.

Table 3.4

3.5 Threats to Validity

Threats	Steps to Control these Threats
Maturation	It was controlled as the study had two groups and change in participants of all groups occurred at same rate.
Selection	Selection threats will remove through non-randomization selection.
Instruments	Two different tests were used, one for pre-test and the other is post-test.
Regression	Mean differences eradicated the effect. Randomization allocation of subjects to groups, the people of same IQ and differences were found in control and experimental group.

3.6 Data Collection (Practicalities)

Time Needed: The time needed to collect data was eight weeks duration of exposure to rotational model and traditional teaching methods before administering the post-test. Typically, data collection eight weeks to allow for sufficient instructional time and implementation of both teaching methods.

Participant Contact: Participants were contacted through their respective school will be obtained from student's school principal prior to participation in the study. School administrators and teachers were also be contacted to facilitate the data collection process and ensure cooperation.

3.7 Data Collection

Data were collected by administering pretest and posttest to both group before and after the experiment.

3.8 Data Analysis

The collected data were analyzed by using statistical techniques including mean and inferential statistics t-tests to compare mean scores of the pre-test and post-test scores between the rotational model of teaching and conventional teaching method. Calculating mean scores of students in both groups.t-test was applied in order to compare the results of groups.

3.9 Teaching Condition

Researcher was the teacher of both groups and taught experimental group by using rotation model and control group by using lecture method. Experiment was continued for the duration of eight academic weeks. Researcher taught the two units of Mathematics and designed lesson plan for each class. 19 Lesson plan were designed according to levels of cognitive domain of BLOOM's Taxonomy and time duration of each lesson plan was 2 days and the class timing was 35 minutes. Format of rotation lesson plan was different from non-rotation lesson plan. The experimental group was taught using the Station Rotation Model (SRM)**,** integrating technology and collaborative learning, while the control group received instruction through the conventional lecture-based method**.** All instructional materials, lesson plans, and assessments were standardized and prepared in advance to ensure both groups received instruction on the same content and learning objectives.

In this study, the researcher assumed the teaching responsibility for both the experimental and control groups. This decision was made due to the unavailability of another qualified teacher to instruct the classes during the research period. As a result, to ensure the continuity and integrity of the instructional process, the researcher personally conducted the teaching for both groups.

3.10. Experimental Setting

Researcher got administrative approval from principal of Govt Girls High School Thatha Khalil. Experiment was duration of 19th Aug,2024 to 14th Oct,2024. I was start of academic session 2024. Before applying the treatment (Rotation), two intact sections of 3rd class were pretested. Both groups got almost same results in pretest. This study follows "Conventional and Rotation model

classroom". A conventional method for a mathematics teacher refers to traditional teaching approaches that have been widely used in classrooms. These methods emphasize direct instruction, rote memorization, step-by-step problem-solving, and practice-based learning. Researcher informed experimental group about rotation concept before the start of experiment. Rotation model needs educational technology in-side and outside class. Researcher use the educational technology like laptop, multimedia and other things use in classroom activities like flash cards, dice role, fraction cards making groups for educational games. After the delivery of instructions, experiment was started. Immediately when experiment ended both groups were posttest. Here, details of activities carried out during experiment are mentioned:

Day1: Introduction to Addition

Control Group

The teacher introduced addition using textbook explanations and direct instruction. Students copied notes and solved basic problems from their workbooks. A few students asked questions, but overall engagement was low.

Experimental Group

A video was shown for 20 minutes explaining addition using real-life examples. Students actively participated in a discussion after the video. Many students seemed excited and grasped the concept quickly.

Day 2: Addition

Control Group

Students practiced solving addition problems from the textbook. The teacher solved two examples on the board, and students individually completed exercises.

Experimental Group

Students worked in pairs using counters and flashcards to solve addition problems. They shared their strategies with the class, leading to peer learning and better understanding.

Day 3: Teacher-Led Lesson on Addition with Regrouping

Control Group

The teacher explained addition with regrouping on the board, and students copied the steps into their notebooks. A few students struggled but had little interaction.

Experimental Group

The teacher used interactive questioning and guided students step by step through regrouping problems. Students were more engaged, asking questions, and trying different methods.

Day 4: Subtraction Introduction

Control Group

The teacher introduced subtraction using direct instruction and solved a few problems on the board. Students followed along passively.

Experimental Group

A video was shown for 20 minutes demonstrating subtraction with real-life scenarios. Students discussed the key takeaways, and many found it easier to understand compared to the traditional method.

Day 5: Subtraction with Objects

Control Group

Students completed subtraction exercises from the textbook without any interactive elements. Some students lost focus.

Experimental Group

Students worked in small groups using manipulatives (blocks, counters) to visualize subtraction. Group discussions helped reinforce the concept.

Day 6: Teacher-Led Lesson on Subtraction with Borrowing

Control Group

The teacher demonstrated subtraction with borrowing using the chalkboard, and students copied the steps. Some students made errors but had

minimal peer interaction.

Experimental Group

The teacher used storytelling and real-life problems to explain borrowing. Students actively engaged, asked questions, and corrected each other's mistakes.

Day 7: Multiplication as Repeated Addition

Control Group

The teacher explained multiplication as repeated addition. Students wrote down notes but showed little engagement.

Experimental Group

A video on multiplication arrays and repeated addition was shown. The visuals helped students understand the concept more easily.

Day 8: Group Activity for Multiplication

Control Group

Students solved multiplication problems in their notebooks with minimal discussion.

Experimental Group

Students worked in pairs to create multiplication arrays using objects and shared their findings. This interactive approach enhanced understanding.

Day 9: Teacher-Led Lesson on Multiplication Strategies

Control Group

The teacher explained multiplication strategies using the chalkboard. Students copied notes but had little participation.

Experimental Group

The teacher demonstrated different multiplication strategies interactively, asking students to participate in problem-solving on the board.

Day 10: Introduction to Division

Control Group

The teacher introduced division using textbook definitions. Students took notes but showed difficulty grasping the concept.

Experimental Group

A video was shown illustrating division as equal sharing, with real-world examples. Students discussed how they could apply division in everyday life.

Day 11: Hands-on Activity for Division

Control Group

Students practiced long division using worksheets but struggled without interactive guidance.

Experimental Group

Students worked in pairs using counters to physically divide objects, making it easier for them to understand.

Day 12: Teacher-Led Lesson on Division with Remainders

Control Group

The teacher solved division problems on the board while students copied the steps. Some students still had difficulties.

Experimental Group

The teacher used real-life problems (e.g., distributing candies) to explain remainders interactively. Students engaged in discussions, leading to better comprehension.

Day 13: Mixed Operations Introduction (Video Lesson)

Control Group

The teacher introduced mixed operations using textbook rules and examples.Students took notes.

Experimental Group

A video demonstrated mixed operations using animations and real-life scenarios, which made it easier for students to grasp.

Day 14: Group Activity on Mixed Operations

Control Group

Students solved mixed operation problems individually with little discussion.

Experimental Group

Students worked in groups to solve real-world math problems involving mixed operations, leading to peer learning and better understanding.

Day 15: Teacher-Led Lesson on Word Problems

Control Group

The teacher explained word problems using a step-by-step method on the board.

Students copied the notes.

Experimental Group

The teacher engaged students by asking them to create their own word problems and solve them in class discussions.

Day 16: Video on Real-Life Math Applications

Control Group

Students read about real-life math applications in their textbooks.

Experimental Group

A video showcased real-life uses of number operations in shopping, cooking, and sports. Students found it more relatable and engaging.

Day 17: Group Work – Creating and Solving Word Problems

Control Group

Students solved word problems alone from their textbooks.

Experimental Group

Students collaborated in groups, creating their own math word problems and solving them together, enhancing critical thinking.

Day 18: Teacher-Led Lesson on Multi-Step Word Problems

Control Group

The teacher explained multi-step word problems using textbook examples.

Experimental Group

The teacher guided students through multi-step problems interactively, allowing them to ask questions and apply different strategies.

Day 19: Introduction to Fractions

Control Group

The teacher introduced fractions using a chalk-and-board method. Students were explained the basic concept of fractions using written examples. They copied notes and solved a few problems from the textbook.

Experimental Group

Students watched an **instructional video** demonstrating fractions with real-life examples like pizza slices and chocolate bars. The teacher paused the video at key moments to ask questions and discuss concept

Day 20: Understanding Numerators and Denominators

Control Group

The teacher wrote definitions of numerators and denominators on the board and solved examples. Students took notes and solved a few exercises.

Experimental Group

Students engaged in a **collaborative activity** using fraction cards. They worked in pairs to match fraction representations with written fractions, explaining their reasoning to their partners.

Day 21: Identifying Fractions in Daily Life

Control Group

The teacher explained examples from daily life, such as half a glass of water or a quarter of an apple, but without visuals or hands-on activities. Students wrote these examples in their notebooks.

Experimental Group

A **teacher-led instruction** was conducted using fraction models. The teacher used colored fraction strips to show halves, thirds, and fourths, encouraging students to compare them.

Day 22: Proper and Improper Fractions

Control Group

The teacher explained proper and improper fractions by drawing examples on the board. Students practiced by solving book exercises.

Experimental Group

Students watched a **video lesson** explaining the difference between proper and improper fractions, with animations and real-world examples. They then discussed what they learned.

Day 23: Conversion Between Mixed Numbers and Improper Fractions

Control Group

The teacher gave formulas and solved problems on the board, asking students to copy and memorize the steps.

Experimental Group

A **collaborative activity** was conducted where students used fraction bars to convert mixed numbers into improper fractions and vice versa

Day 24: Comparing Fractions

Control Group

The teacher explained greater than and less than signs and asked students

to solve exercises from the textbook.

Experimental Group

A **teacher-led instruction** used fraction strips and a number line to compare fractions visually, allowing students to develop a deeper understanding.

Day 25: Equivalent Fractions

Control Group

The teacher gave notes on equivalent fractions and assigned written exercises.

Experimental Group

Students watched a **video lesson** with animations demonstrating how to generate equivalent fractions by multiplying or dividing numerators and denominators.

Day 26: Simplifying Fractions

Control Group

The teacher solved simplification problems on the board and asked students to do the same in their notebooks.

Experimental Group

A **collaborative activity** was conducted where students worked in small groups to simplify fractions using fraction tiles and discussed their strategies.

Day 27: Adding Like Fractions

Control Group

The teacher explained addition of fractions with the same denominators using textbook examples.

Experimental Group

A **teacher-led instruction** involved solving problems using colored fraction circles and real-world applications like adding parts of a pizza.

Day 28: Subtracting Like Fractions

Control Group

The teacher gave written steps on how to subtract fractions with the same denominators and asked students to follow the same method.

Experimental Group

Students watched a **video** demonstrating subtraction of fractions in real-life scenarios, such as sharing food among friends.

Day 29: Adding Unlike Fractions

Control Group

The teacher introduced LCM (Least Common Multiple) to make denominators equal before adding fractions, explaining it on the board.

Experimental Group

Students engaged in a **collaborative activity** where they used fraction bars to physically adjust denominators and add fractions

Day 30: Subtracting Unlike Fractions

Control Group

The teacher continued with board work, explaining step-by-step subtraction of fractions with different denominators.

Experimental Group

A **teacher-led instruction** was given using a fraction wall to show how fractions can be broken into smaller parts to perform subtraction.

Day 31: Multiplication of Fractions

Control Group

The teacher introduced the formula for multiplying fractions and gave examples for students to copy and practice.

Experimental Group

Students watched an **instructional video** explaining multiplication of

fractions using real-life scenarios and interactive visuals.

Day 32: Division of Fractions

Control Group

The teacher explained "Keep, Change, Flip" (KCF) for fraction division and assigned written practice.

Experimental Group

A **collaborative activity** was conducted where students worked in pairs to divide fractions using pictorial representations.

Day 33: Word Problems on Fractions

Control Group

The teacher solved a few fraction word problems on the board and assigned similar questions from the textbook.

Experimental Group

A **teacher-led instruction** involved breaking down real-world fraction problems step by step with student participation.

Day 34: Real-Life Applications of Fractions

Control Group

The teacher asked students to write examples of fractions in daily life but did not provide hands-on experience.

Experimental Group

Students watched a **video lesson** showing fractions in daily scenarios like cooking and measurements.

Day 35: Fraction Games and Activities

Control Group

Students practiced fraction exercises from the textbook.

Experimental Group

A **collaborative activity** was conducted where students played fraction bingo and fraction puzzles to reinforce learning.

Day 36: Fractions on a Number Line

Control Group

The teacher explained fractions on a number line using a diagram on the board.

Experimental Group

A **teacher-led instruction** was conducted where students physically placed fraction cards on a large number line drawn on the floor.

Day 37: Review

Control

The teacher reviewed the number operator concepts by giving oral questions and assigning revision worksheets.

Experimental Group

Students watched a **recap video** summarizing all number operator concepts learned over the past weeks.

Day 38: Review and Revision

Control Group

The teacher reviewed the fraction concepts by giving oral questions and assigning revision worksheets.

Experimental Group

Students watched a **recap video** summarizing all fraction concepts learned over the past weeks.

Day 39:

Control Group

Teacher provided a time for the complete preparation of posttest. Whole period they prepared for posttest.

Experimental Group

Teacher provided a time for the complete preparation of posttest. Whole

period they prepared for posttest.

Day 40:

Control Group

All the students appeared in posttest.

Experimental Group

All the students appeared in posttest.

3.11. Ethical Considerations

Students' and their school principals' informed consent was sought before to participating in the study in order to address ethical concerns regarding participants' psychological, emotional, and physical security. All participant data was kept private, and any personally identifiable information was not be shared. Students was informed that participation in the study is entirely optional and that they can leave at any moment without facing any repercussions. Lastly, ethical standards established by relevant institutional review boards and regulatory organizations followed throughout the study methods.

CHAPTER 4

DATA ANALYSIS AND INTERPRETATIONS

This chapter presents the analysis and interpretation of collected data from pretest and posttest. The data were analyzed according to the hypothesis of the study in order to accept and reject the hypothesis.

4.1 Data Analysis

The purpose of this study was to determine the effects of rotational model on academic achievement of students. For this purpose, three objectives were made.

4.1.1. Objective 1

The first research objective of the study was to find out the achievement of the of students in mathematics of experiment group taught through rotation model. Different in mean pretest and post test scores of experiment group was calculated by using descriptive statistics.

Table 4.1

Pretest and posttest score of experimental groups

	N	Mean
Pretest	26	2.27
Posttest	26	8.27

Table 4.1 shows that the mean scores of pretest of experiment group was 2.27 and standard deviation was .827. And the mean scores on posttest was 8.27. It means the mean scores on posttest was high as compared to mean score on pretest of the students from experiment group.

4.1.2. Objective 2

The second research objective of the study was to find out the

achievement of the of students in mathematics of control group taught through traditional method. Different in mean pretest and post test scores of experiment group was calculated by using descriptive statistics.

Table 4.2

Pretest and Posttest scores of control group

	N	Mean
Pre-test	26	2.23
Post-test	26	4.58

Table 4.2 shows the mean scores of pretest of control group was 2.23. Mean scores on posttest was 4.58. Its means that the performance of the control groups was based on traditional method.

4.1.3. Objective 3

The third research objective of the study was to compare the mean scores of students taught through the rotation model and traditional method. Different in mean pretest and post test scores of experiment group was calculated by using independent sample t-test.

Table 4.3

Comparison of mean scores of both groups

Groups	N	Mean	Df	P	T
Experiment group	26	8.27			
				0.00	8.338
Control group	26	4.58	50		

Table 4.3 shows the analysis of third objectives were drawn on the basis of objectives 1 and 2. Mean scores on pretest for both groups were same as per their previous performance. Mean scores on posttest for both groups were different. Mean scores on posttest of experiment group was higher than scores of control group. It means treatment was effective for the academic achievement of students. Since the p-value is less than 0.05, the result is statistically significant, meaning there is a significant difference between the two groups' post-test scores. Therefore, the null hypothesis is rejected, and it is concluded that: There is a significant difference in the effect of mathematics learning between the Rotation Model and traditional instruction at the primary level.

CHAPTER 5

SUMMARY, FINDINGS, DISCUSSION, CONCLUSIONS AND RECOMMENDATIONS

5.1 Summary

Teaching methodology act as a backbone in carrying out any successful education system. Teaching learning process is becoming advanced in all over the world. Many countries have possessed educational technologies which help the students a lot. These technologies allow students and teachers to communicate with each other not only through face to face but online as well. Rotational classroom model is one of the advanced teaching methodologies initiated by Jonathan Bergmann and Aaron Sams in 2007.This model is used in many countries but teachers in Pakistan does not use this model because of many reasons like lake of educational technologies access of course content in definite time period and many more. Blended learning using the rotation model as implemented by selected school allows students to personalize their learning through activities face-to face instruction. Throughout the mathematics instruction, students participate in self-paced lessons that provide instructional videos, interactive practice, and assessment. Traditional teaching method is considered is the most suitable teaching method to cover a lot of course in definite time. Rotational teaching model is a teaching model in which lecture deliver through instructional videos, collaborative activities and teacher-led activities. These activities delivered to students to watch them inside and outside the class and get prepared for next class. Students discussed their problems related to lesson in which they learned through different types of activities in class session. But in lecture and demonstration method, lecture delivered by teacher in class and crucial part of content done by students inside the class. Students needs teacher's guidance and help in their problems but they do not have guide for their help. So many concepts remain ambiguous. This study was conducted to explore the effect of rotation model on academic achievement of students at primary level. The objective of the study were to find out the achievement of students in mathematics of experiment group taught through rotation model, to find the achievement of the students in mathematics of

control group taught through the traditional method and to compare the mean scores of students taught through the rotation model and traditional method. Quasi-experimental research design was used to compare the difference in performance of students in both groups. Instrument used for this study was pretest and posttest made by the researcher in consultation with subject teachers and experts. Sample of the study included 3rd class of Government higher secondary school Thatha Khalil. For the analysis of data, mean and t-test was applied.

5.2 Findings

The findings of the study discussed in line with research objectives.

Research Objective 1: The first research objective of the study was to find out the achievement of the of students in mathematics of experiment group taught through rotation model.

The mean scores of pretest of experiment group was 2.27 and standard deviation is

.827. And the posttest scores of mean is 8.27 and standard deviation is 1. 402.Its mean that there is a significant difference in mean in pretest and posttest achievement scores of experiment group. Students' performance was better in experiment group. Students of experiment group got better marks in posttest as compared to the pretest.

Research Objective 2: The second research objective of the study was to find out the achievement of the students in mathematics of control group taught through traditional method.

The mean scores of pretest of control group of mean is 2.23 and standard deviation is. 765.And the posttest scores of mean is 4.58 and the standard deviation is 1. 770.Its means that the performance of the control groups was based on traditional method. Videos and collaborative activities were missing in lecture-based teaching model due to which performance of students was ordinary.

Research Objective 3: The third research objective of the study was to compare the mean scores of students taught through the rotation model and

traditional method. Different in mean pretest and post test scores of experiment group was calculated by using independent sample t-test.

Findings of third objectives were drawn on the basis of objectives 1 and 2. Mean pretest scores of both groups were same due to traditional teaching method. Mean scores on posttest of experiment group was 8.27, value of p was 0.00 and the value of t was 8.338. Mean scores on posttest of experiment group were higher than scores of control group. It means experiment was effective for the academic achievement of students. The findings indicate that students in the experimental group, who received instruction through the Rotation Model, achieved significantly higher scores compared to those in the control group. This supports the effectiveness of the Rotation Model in enhancing mathematical achievement among primary-level students.

5.3 Discussion

This study aimed to explore the effect of the Rotation Model classroom on the academic achievement of primary-level students in the context of Pakistan. The findings revealed that the Rotation Model significantly enhanced students' performance in mathematics compared to traditional teaching methods. These results align with the broader literature that supports innovative, student-centered approaches in mathematics education.

One of the major outcomes of this study was the promotion of active engagement and collaborative learning through the Rotation Model. Unlike the traditional lecture-based system, the Rotation Model provided opportunities for students to engage in hands-on activities, peer collaboration, and individualized instruction during face-to-face sessions. Mathematics, a subject that often demands conceptual understanding and problem-solving skills, particularly benefited from such an active learning approach.

The results are consistent with the findings of Akinoso (2020), who found that students had a more positive attitude toward mathematics when taught through the station rotation model compared to traditional methods. This suggests that student motivation and interest are critical factors contributing to the improved academic performance observed in this study. Engaging students through varied instructional strategies (videos, collaborative work, teacher-led

sessions) seems to create a more dynamic and responsive classroom environment, leading to better learning outcomes.

Similarly, the study by Mondragon (n.d.) showed that the rotation model positively impacted students' academic performance and attitudes towards mathematics. These findings parallel the present study, reinforcing the idea that structured variability moving between instructional videos, teacher guidance, and collaborative activities sustains student attention and supports different learning styles.However, not all studies fully support these conclusions. For instance, the research by Zuvic-Butorac et al. (2011) on blended e-learning in higher education found no significant difference in performance compared to traditional methods. One possible explanation is the difference in context and age group. University students may already possess higher levels of self-regulation and motivation, making the teaching method less influential on their outcomes. In contrast, primary school students, like those in the present study, benefit more visibly from structured and interactive instructional models that guide their learning process actively.

The study by Al-Sayyab (2023) on blended learning during the COVID-19 pandemic also reported positive effects on student performance, similar to the present findings. However, it should be noted that the pandemic context created a necessity for flexible learning models, possibly intensifying the positive perception of blended or rotational models. In the current non-pandemic context of Pakistan, the Rotation Model still shows strong effectiveness, indicating its value beyond emergency teaching needs. Overall, this study contributes to the existing literature by providing empirical evidence that the Rotation Model can significantly improve mathematics achievement at the primary level in a Pakistani educational context. It highlights the importance of interactive, flexible, and student-centered learning approaches in early mathematics education.

The discussion suggest that adopting Rotation Models integrating instructional videos, collaborative learning, and teacher-led instruction offers a promising pathway for enhancing mathematical achievement among primary school students. It shifts the classroom dynamic from passive reception to active participation, which is crucial for building strong foundational skills in

mathematics.

5.4 Conclusions

After analyzing the findings of the study following conclusion were drawn:

1. Rotation model becomes an effective way of enhancing students' achievement because posttest scores of treatment group were higher than posttest scores of control group. Students were more interested for learning in treatment group due to educational videos, activities and especially teacher-led instruction in which they are free to ask questions. Students' problems were discussed and solved in face-to-face session by teacher.
2. Conventional method is not that much effective as compared to station rotation model due to which performance of students was not that much effective. They were hesitant to ask questions, therefore, their thinking is just limited within a textbooks and classroom and not goes beyond it. So, they are not competent to attempt questions in which some comprehension is required.
3. Rotation Model becomes more effective compared to the conventional method, primarily due to its emphasis on experiential and student-centered learning. This model allowed students to engage actively with the content, fostering deeper conceptual understanding. As a result, students in the experimental group were able to solve complex mathematical problems more effectively than those in the control group.

5.5 Recommendations

The recommendations were made on the bases of findings and results of the study.

1. The rotation model was found to be successful in achievement in mathematics among students. Researcher recommended that teacher may implemented this model at primary levels because it makes the students active learners as well as allows the teachers to update their knowledge and teachers practices according to the teaching standards of modern world.
2. Although many schools in Punjab have integrated digital tools such as tablets and some activity-based learning strategies, the conventional

teaching method still tends to emphasize teacher-centered instruction and limited student autonomy. Therefore, it is recommended that instructional videos, interactive simulations, and structured collaborative activities be gradually incorporated into daily lesson plans to enhance the effectiveness of conventional instruction. This will help bridge the gap between traditional and modern pedagogical approaches. School principals and administrators should support teachers in applying innovative teaching models such as the Station Rotation Model in a phased manner. This integration would not replace the conventional method entirely but rather enrich it with blended learning techniques that promote active engagement, independent thinking and problem-solving skills in students.

5.6 Limitation of the Study

Only two chapters of mathematics were taken for experiment because researcher was allowed for 8 weeks and these two units were allotted to researcher by subject teachers.

5.7 Recommendations for Future Researches

Recommendations for future studies are

1. A same type of study may be conducted to compare gender wise difference in the performance of students in rotation model and traditional classroom.
2. A study may be executed by taking other subjects (Science, History, Geography etc.) with large sample in any other district or province.
3. An experimental study may be carried out in private sector by taking any grade level and region.

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APPENDICES

Appendix # A

PRE-TEST:

NAME:_____ DATE: _____

CLASS:_____ SECTION: _____

TIME: 45 MINUTES MARKS: 10

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1. **What is the fraction form of one-half?**
   a. 1/3
   b. 1/4
   c. 1/2
   d. 2/3
2. **What is the sum of 1/3 and 1/6?**
   a. 2/9
   b. 1/2
   c. 5/6
   d. 1/3
3. **Which of the following is a proper fraction?**
   a. 3/2
   b. 5/4
   c. 4/3
   d. 2/5
4. **If a pizza is divided into 8 equal slices and 5 slices are eaten, what fraction of the pizza remains?**
   a. 3/8
   b. 5/8

c. 2/8

d. 3/5

5. **If a rectangle is divided into 6 equal parts and 4 parts are shaded, what fraction of the rectangle is shaded?**
   a. 1/4

   b. 2/3

   c. 4/6

6. **If you have 7 blocks and you lose 2, how many blocks do you have left?**

   a. 5

   b. 4

   c. 6

   d. 3

7. **Which number is greater: 12 or 15?**

   a. 12

   b. 15

   c. Both are equal

   d. None of the above

8. **If you have 7 candies and give away 2, how many candies do you have left?**

   a. 3

   b. 4

   c. 5

   d. 6

9. **What is 10 - 6?**

   a. 2

   b. 3

   c. 4

d. 5

10. Which number is smaller: 12 or 9?

a. 12

b. 9

c. They are the same

d. None of these

Appendix # B

POST-TEST:

.

NAME:_____ DATE:_____

CLASS:_____ SECTION:_____

TIME:45 MINUTES MARKS:_____

1. **What is the definition of unit fractions?**

A. Fractions with a numerator of 1

B. Fractions with a numerator greater than 1

C. Fractions with a denominator of 1

D. Fractions with a denominator greater than 1

2. **How are unit fractions represented?**

A. With a numerator of 1 and a variable denominator

B. With a variable numerator and a denominator of 1

C. With a numerator greater than 1 and a variable denominator

D. With a numerator of 1 and a fixed denominator

3. **Arrange the following unit fractions in ascending order: 1/3, 1/6, 1/4.**

A.1/6, 1/4, 1/3

B. 1/4, 1/6, 1/3

C. 1/3, 1/4, 1/6

D. 1/6, 1/3, 1/4

4. **What is the result of adding 1/4 and 1/3?**

A. 2/7

B. 5/12

C. 7/12

D. 1/2

5. **What is the result of adding 5 and 3?**

A. 8

B. 15

C. 3

D. 53

6. **How is division defined in terms of sharing?**

A. Distributing a quantity equally among a given number of groups

B. Multiplying two numbers to find the product

C. Subtracting one number from another

D. Adding two numbers together

7. **Solve the equation: 3 x _____ = 9.**

A. 3

B. 6

C. 12

D. 27

8. **What is the result of solving the equation: 18 ÷ 3 = _____?**

A. 6

B. 12

C. 9

D. 3

9. **If a pie is divided into 10 equal slices and 7 slices are eaten, what fraction of the pie remains?**

A. 3/10

B. 7/10

C. 3/7

D. 7/8

10. **What is the difference between 3/4 and 1/2?**

A. 1/4

B. 1/2

C. 1/8

D. 1/3

LESSON PLANS

Appendix # C

Lesson 1: Identifying Fractions in Real Life (Collaborative Activity)

Grade Level: 3rd.

Duration: 35 min

LessonDuration:2 day

Objectives:

1. Recognize fractions in everyday situations.
2. Understand the meaning of halves, thirds, and fourths.

Materials:

- Picture cards with real-life fraction examples
- Fraction strips
- Whiteboard and markers

Introduction (10 minutes):

1. Start with a discussion on where students see fractions in daily life (e.g., pizza slices, money, measuring cups).
2. Show pictures of real-life fractions and ask students to identify them.

Direct Instruction (10 minutes):

1. Use fraction strips to illustrate halves, thirds, and fourths.
2. Explain how fractions represent parts of a whole.

Guided Practice (15 minutes):

1. Divide students into small groups.
2. Give each group picture cards and ask them to match fractions with real-life objects.
3. Each group presents their matches and explains their reasoning.

Independent Practice (10 minutes):

1. Students complete a worksheet where they identify and color fractions in real-life images.

Assessment (5 minutes):

1. A quick oral quiz where students identify fractions in teacher-presented images.

Closure (5 minutes):

1. Discuss the importance of fractions in daily life.
2. Assign a homework task where students find and draw fractions in their surroundings

Lesson 2: Equivalent Fractions (Instructional Video)

Grade Level: 3rd.
Duration: 35 minutes
Lesson Duration: 2 Days
Date: 22nd to 23rd Aug,2024

Objectives:

1. Understand that different fractions can represent the same value.
2. Learn how to generate equivalent fractions by multiplying numerator and denominator.

Materials:

- Projector
- Fraction tiles
- Worksheets

Introduction (10 minutes):

1. Recap previous knowledge on fractions.
2. Ask students if they think 1/2 and 2/4 are the same and why.

Direct Instruction (10 minutes):

1. Play a **video on equivalent fractions**, showing visual representations and explanations.
2. Pause to discuss key points and answer student questions.

Guided Practice (15 minutes):

1. Use fraction tiles to demonstrate equivalence practically.
2. Solve examples as a class, showing step-by-step multiplication of numerator and denominator.

Independent Practice (10 minutes):

1. Students complete a worksheet on identifying equivalent fractions.

Assessment (5 minutes):

A short quiz with three equivalent fraction problems.

Closure (5 minutes):

1. Review the main ideas from the lesson.
2. Assign a practice worksheet for homework.

Lesson 3: Comparing and Ordering Fractions (Teacher-Led Instruction

Grade Level: 3rd.
Duration: 35 minutes **Lesson**
Duration: 2 Days
Date: 26th to 27th Aug,2024

Objectives:

1. Compare fractions with the same and different denominators.
2. Arrange fractions in ascending and descending order.

Materials:

- Number lines
- Fraction bars
- Whiteboard and markers

Introduction (10 minutes):

1. Ask students to compare 1/2 and 1/4.
2. Discuss how denominators affect the size of fractions.

Direct Instruction (10 minutes):

1. Demonstrate comparing fractions using **a number line**.
2. Explain the concept of finding a common denominator.

Guided Practice (15 minutes):

1. Work through examples on the board with student participation.
2. Students place fraction bars on a number line to visualize differences.

Independent Practice (10 minutes):

1. Students complete an ordering fractions worksheet.

Assessment (5 minutes):

1. Quick check-in quiz with 3 fraction comparison problem

Closure (5 minutes):

1. Recap lesson and ask students to share their findings.
2. Assign practice problems for homework.

Lesson 4: Addition of Like Fractions (Collaborative Activity)

Grade Level: 3rd.
Duration:35 min
Duration: 2 Days
Date:28th to 29th Aug,2024

Objectives:

1. Learn to add fractions with the same denominators.
2. Apply the concept to real-life scenarios.

Materials:

- Fraction circles
- Flashcards with fraction problems
- Worksheets

Introduction (10 minutes):

1. Ask students how we add whole numbers and if the same rule applies to fractions.
2. Give simple examples of adding fractions with the same denominator.

Direct Instruction (10 minutes):

1. Demonstrate addition using fraction circles.
2. Explain that only the numerators are added while the denominator stays the same.

Guided Practice (15 minutes):

1. Students work in pairs with flashcards to solve fraction addition problems.
2. Each pair presents a solved example on the board.

Independent Practice (10 minutes):

1. Students complete a worksheet on adding fractions with like denominators.

Assessment (5 minutes):

1. A few oral fraction addition problems.

Closure (5 minutes):

1. Review the key points of the lesson.
2. Assign homework with fraction addition problems.

Lesson Plan# 05

Topic: Fraction
Grade Level: 3rd.
Time : 35 minutes
Duration: 2 Days
Date:30th Aug,2024

Objectives:

1. Understand the definition and representation of unit fractions.
2. Compare and arrange unit fractions in ascending order.
3. Add and subtract unit fractions.

Materials:

- Whiteboard and markers
- Fraction cards
- Number lines
- Visual aids (fraction circles, bars)
- Worksheets
- Projector (for instructional videos)

Introduction (10 minutes):

1. Begin with a brief discussion about fractions, highlighting their importance in everyday life.
2. Define unit fractions: Fractions with a numerator of 1.
3. Provide examples and non-examples of unit fractions on the board.

Direct Instruction (10 minutes):

1. Use fraction circles/bars to visually demonstrate unit fractions.
2. Show an instructional video that explains unit fractions and their representations (numerator is 1, variable denominator).
3. Illustrate how to compare unit fractions using a number line.

Guided Practice (15 minutes):

1. Distribute fraction cards to students and ask them to arrange a set of unit fractions in ascending order (e.g., 1/6, 1/4, 1/3).
2. Work through examples on the board with student participation.

Solve addition problems involving unit fractions together as a class (e.g., ¼ 1/3).

Independent Practice (10 minutes):

1. Students complete a worksheet with problems on unit fractions: defining, representing, comparing, and adding unit fractions.

Assessment (5 minutes):

1. Quick quiz with questions from the post-test (e.g., arranging fractions, addition of fractions).
2. Review answers as a class and provide immediate feedback.

Closure (5 minutes):

1. Recap the key points about unit fractions.
2. Encourage students to share any questions or thoughts about the lesson.
3. Assign homework for further practice on unit fractions.

Lesson Plan#06

Rotational Model Classroom Lesson Plan for Fraction

Grade:3rd
Topic: Unit Fraction
Duration: 35 minutes
Lesson Duration: 2 Days
Date:2nd to 3rd Sep,2024

Objective:

- Students will understand the concept of unit fractions (fractions with a numerator of 1).
- Students will identify and represent unit fractions using visual models and real-world examples.

Materials Needed:

- Fraction circles or bars
- Paper and markers
- Interactive fraction app or online tool (if available)
- Worksheets with problems involving unit fractions
- Whiteboards and markers

1. Introduction (10 minutes)

- Define a unit fraction as a fraction where the numerator is 1 (e.g., 12,13,14\frac {1}{2}, \frac {1}{3}, \frac {1}{4}21,31,41).
- Use fraction bars to visually demonstrate unit fractions.
- Real-world example: "If a pizza is cut into 4 equal parts, each part is 14\frac {1}{4}41."
- Ask students to identify unit fractions in everyday scenarios.

2. Stations (20 minutes)

Station 1: Visual Representation (10 minutes)

- Students use fraction circles or bars to represent unit fractions.
- Activity:"Color12,13,14,15\frac{1}{2},\frac{1}{3},\frac{1}{4},\frac{1}{5}21,31,41,51 using fraction bars. Write the fraction that matches the shaded part."
- Students work in pairs to compare their work and discuss their reasoning.

Station 2: Collaborative Problem-Solving (10 minutes)

- Provide word problems involving unit fractions.
  - Example: "Lila shares 1 chocolate bar equally with her 3 friends. What fraction of the chocolate does each friend get?"

- Students work in small groups to solve and explain their answers.

Station 3: Interactive Practice (10 minutes)

- Use tablets or laptops to explore an interactive fraction app.
- Activity: Students drag and drop visual pieces to form unit fractions and receive immediate feedback.
- If no devices are available, provide a "fraction puzzle" where students match fractions to their corresponding models.

3. Wrap-Up and Reflection (5 minutes)

- Bring the class together to discuss what they learned.
- Ask questions such as, "How is 13\frac {1}{3}31 different from 14\frac{1}{4}41?"
- Encourage students to share their favorite activity and any challenges they faced.

Lesson Plan#07
Traditional Classroom

Grade:3rd
Topic: Unit Fraction
Duration: 35 minutes
Lesson Duration: 2 Days
Date: 4th to 5th Sep,2024

Objective:

- Students will understand and identify unit fractions.
- Students will represent unit fractions using visual aids and solve related problems.

Materials Needed:

- Fraction circles or bars
- Chart paper and markers
- Worksheets with unit fraction problems
- Whiteboard and markers

Lesson Breakdown

1. **Introduction (10 minutes)**

- Define a unit fraction with examples.
  - Example: "If you divide a cake into 5 equal pieces, each piece is 15\frac{1}{5}51."
- Use the whiteboard to demonstrate how to represent 12,13,14\frac{1}{2}, \frac{1}{3}, \frac{1}{4}21,31,41, and 15\frac{1}{5}51.
- Ask students to describe what they see in their own words.

2. **Guided Practice (15 minutes)**

- Draw shapes (circles, rectangles) on the board and divide them into equal parts.
- Shade one part and ask:
  - "What fraction is this?"
  - "Why is it a unit fraction?"
- In pairs, students use fraction circles or bars to create unit fractions and explain their models to each other.

3. Collaborative Activity (15 minutes)

- Group students into small teams. Provide each team with chart paper and markers.
- Activity:
  - Each team creates a "Fraction Poster" showing at least 5 unit fractions.
  - They draw shapes, divide them into equal parts, and shade 1 part for each fraction.
  - Example: 14,15,16\frac{1}{4}, \frac{1}{5}, \frac{1}{6}41,51,61.
- Teams present their posters to the class.

4. Independent Practice (5 minutes)

- Distribute worksheets with problems like:
  - Identify the unit fraction from a given picture.
  - Draw shapes to represent 13,14,16\frac{1}{3},\frac{1}{4},

    \frac {1}{6}31,41,61.
- Students complete the worksheet individually.

5. Wrap-Up and Reflection (5 minutes)

- Recap the lesson by asking:
  - "What is a unit fraction?"
  - "Can anyone give an example of a unit fraction in real life?"
- Encourage students to share what they enjoyed or found challenging

Lesson Plan#08
Rotational Classroom

Topic: Fractions on a Number Line
Duration:35 minutes

Lesson Duration: 2 Days

Objective:

- Students will learn to identify and plot fractions on a number line.
- Students will collaborate to represent fractions using visual aids and solve problems interactively.

Materials Needed:

- Number line strips (printed or drawn on paper)
- Fraction cards (e.g., 12,13,34\frac{1}{2}, \frac{1}{3}, \frac{3}{4}21,31,43)
- Colored markers or crayons
- Fraction manipulatives (e.g., fraction bars or strips)
- Worksheets with number lines and fraction.
  Lesson Flow

1. **Introduction (10 minutes)**

- Begin with a quick discussion about fractions as parts of a whole.
- Introduce the number line and explain how it can represent fractions between 0 and 1.
- Demonstrate plotting fractions like 12\frac{1}{2}21 14\frac{1}{4}41,and 34\frac{3}{4}43 on the board.
  Example: Draw a number line from 0 to 1, divide it into 4 equal parts, and label each point.

2. **Stations (10 minutes)**

Station 1: Fraction Sorting and Placement (15 minutes)

- **Activity:**
  - Students pick fraction cards and match them with points on a pre-drawn number line.
  - Example: Match 24\frac{2}{4}42 with the second mark on a number line divided into

- **Collaboration:**
  - Work in pairs to discuss where the fraction belongs and why.

Station 2: Create Your Own Number Line (15 minutes)

- **Activity:**
  - Students are given blank number lines and asked to divide them into equal parts based on a given fraction (e.g., thirds, fifths).
  - They plot fractions such as 13,23\frac{1}{3}, \frac{2}{3}31,32, etc.
- **Collaboration:**
  - Groups of 3 discuss how to divide the line evenly and verify each other's work.

Station 3: Word Problem Exploration (10 minutes)

- **Activity:**
  - Solve word problems involving fractions on a number line.
  - Example: "If a number line is divided into 8 parts, where would 58\frac{5}{8}85 be?"
- **Collaboration:**
  - Pairs explain their reasoning to each other before solving the problem.

3. Wrap-Up and Reflection (5 minutes)

- Gather the class to review the activity.
- Discuss what they found challenging and share strategies they used.
- Reinforce the importance of equal spacing for fractions on a number line.

Lesson Plan# 09

Traditional Classroom

Topic: Fractions on a Number Line

Duration: 35 minutes

Lesson Duration: 2 Days

Objective:

- Students will learn to identify and plot fractions on a number line.

Materials Needed:

- Whiteboard and markers
- Fraction cards
- Worksheets with number lines and fraction problems

Lesson Flow

1. **Introduction (10 minutes)**

- Begin by explaining fractions and how they are represented on a number line.
- Draw a number line from 0 to 1 on the board.
- Show how dividing the line into equal parts represents fractions, plotting 12,14,\frac{1}{2}, \frac{1}{4},21,41, and 34\frac{3}{4}43 as examples.

2. **Guided Practice (10 minutes)**

- Solve examples on the board with the class:
  - Divide a number line into thirds and plot 13\frac{1}{3}31, 23\frac{2}{3}32, and 111.
  - Divide another number line into eighths and plot 38\frac{3}{8}83.
- Ask questions to involve the class:
  - "Where would 24\frac{2}{4}42 be?"
  - "If the line is divided into 5 parts, what fraction is at the third mark?"

3. **Collaborative Activity (10 minutes)**

- **Activity:**
  - Students work in groups of 3. Each group receives a blank number line and a set of fraction cards.

- They divide the number line into equal parts and plot the fractions.
- Groups present their completed number lines to the class.

4. Independent Practice (10 minutes)

- Distribute worksheets with number lines and questions like:
- Plot 23\frac{2}{3}32 on a number line divided into thirds.
- Identify which fraction is at the fourth mark on a line divided into eighths.

5. Wrap-Up and Reflection (5 minutes)

- Recap key points from the lesson.
- Ask students to share what they learned about plotting fractions on a number line.
- Provide a simple exit question: "Where is 34\frac{3}{4}43 on a number line divided into 4 equal parts?"

Lesson Plan #10

Rotation Model Classroom Lesson Plan

Grade:3rd

Topic: Equivalent Fraction

Time Duration: 35 minutes

Lesson Duration: 2 Days

Objective:

Students will understand the concept of equivalent fractions and practice identifying, creating, and comparing them through hands-on activities and collaborative tasks.

Materials Needed:

- Fraction strips or bars
- Worksheets with fraction problems
- Visual aids (charts showing equivalent fractions)
- Dice
- Mini whiteboards and markers

Lesson Structure

1. **Introduction (5 minutes)**

- Use a visual aid (e.g., fraction strips) to show how 12\frac{1}{2}21 is the same as 24\frac{2}{4}42.
- Explain that equivalent fractions represent the same amount, even if the numbers look different.
- Example: Cut a rectangle into two equal parts and shade one part. Then cut the same rectangle into four parts and shade two parts.

2. **Station Rotations (25 minutes)**

Students rotate through **three stations**, spending 8 minutes at each.

- **Station 1: Visual Representation**

Students use fraction strips to find equivalent fractions. For example, they can match 12\frac{1}{2}21 with 24\frac{2}{4}42 by overlaying strips.

- Task: Complete a worksheet where they draw fraction bars to represent equivalent

fractions.

- **Station 2: Fraction Dice Game** In pairs, students roll two dice to create a fraction (e.g., if they roll a 3 and a 6, their fraction is 36\frac{3}{6}63). They then simplify or find an equivalent fraction using their whiteboards.
- Collaborative element: Work together to confirm each other's answers.

Lesson Plan #11

Traditional Classroom Model Lesson Plan

Grade:3rd
Topic: Equivalent Fraction
Time Duration: 35 minutes
Lesson Duration: 2 Days

Objective:

Students will learn to identify and create equivalent fractions using visual aids and collaborative group work.
Materials Needed:

- Fraction strips or bars
- Worksheets with fraction problems
- Visual aids (charts showing equivalent fractions)
- Mini whiteboards and markers

Lesson Structure

1. **Introduction (10 minutes)**

   - Show a visual example of equivalent fractions, such as 12\frac{1}{2}21 and 24\frac{2}{4}42, using fraction strips.
   - Write examples on the board, explaining how to multiply or divide the numerator and denominator by the same number to find equivalent fractions.
     - Example: 13=26\frac{1}{3} = \frac{2}{6}31=62 (Multiply both numerator and denominator by 2).
   - Engage students by asking questions: "What do you think 34\frac{3}{4}43 is equivalent to if we multiply both by 2?"
2. **Guided Practice (10 minutes)**

   - Solve problems as a class on the board.

     Example: Simplify 48\frac{4}{8}84, and find two equivalent fractions for 23\frac{2}{3}32.
   - Use fraction strips for a hands-on demonstration of why the fractions are equivalent.
3. **Collaborative Activity (10 minutes)**

   - Divide students into small groups. Provide each group with fraction strips and a worksheet.
   - Task: Find equivalent fractions for a list of given fractions using fraction strips, and verify their answers with a partner.
     Example: "Find two fractions equivalent to 14\frac{1}{4}41 using the strips."

4. **Wrap-Up and Reflection (5 minutes)**

- Review the key concept: Equivalent fractions represent the same value, even if they look different.
- Have a quick "fraction match" game where students stand and hold fraction cards, then find their equivalent partner.

Lesson Plan #12

Rotational Model Classroom Lesson Plan

Grade:3rd

Topic: Comparing Fractions

Time: 35 minutes

Lesson Duration: 2 Days

Objective:

Students will learn to compare fractions by using visual models, number lines, and reasoning strategies such as finding common denominators or comparing to benchmark fractions (e.g., 12\frac{1}{2}21).

Materials Needed:

- Fraction strips or bars
- Fraction number line charts
- Whiteboards and markers
- Worksheets with fraction comparison problems

Structure and Activities:

1. **Introduction (5 minutes)**
   - Explain that fractions can be compared by looking at their sizes.
   - Use fraction strips or bars to demonstrate simple comparisons, such as 14<12\frac{1}{4} < \frac{1}{2}41<21.
2. **Station 1: Visual Models (10 minutes)**
   - **Activity:** Students work in pairs with fraction strips. They place fractions side by side to determine which is larger or smaller.
   - Example Task: "Compare 34\frac{3}{4}43 and 23\frac{2}{3}32 using fraction strips. Explain your reasoning to your partner."
3. **Station 2: Number Lines (10 minutes)**
   - **Activity:** Students place given fractions on a number line. They compare the positions of two fractions to decide which is larger.

- Example Task: "Place 35\frac{3}{5}53 and 46\frac{4}{6}64 on the number line. Which is larger?"

4. **Station 3: Collaborative Problem-Solving (10 minutes)**

- **Activity:** In small groups, students solve fraction comparison problems on whiteboards. The group discusses their reasoning and agrees on the answer.
- Example Task: "Compare 58\frac{5}{8}85 and 34\frac{3}{4}43. Write down how you reached your answer."

5. **Wrap-Up (5 minutes)**

- Regroup as a class to review the key strategies used in the stations.
- Ask a few students to share their solutions and explain their reasoning.

Lesson Plan #13

Traditional Classroom

Grade:3rd

Topic: Comparing Fractions

Time: 35 minutes

Duration: 2 Days

Objective:

- Students will learn to compare fractions using visual models, reasoning strategies, and number lines.

Materials Needed:

- Fraction strips or bars
- Fraction number line chart (projected or printed)
- Whiteboard and markers
- Worksheets

Structure and Activities:

1. **Introduction (5 minutes)**
   - Begin by asking: “Which is greater, 13\frac{1}{3}31 or 12\frac{1}{2}21? Why?”
   - Demonstrate the comparison using fraction strips and number lines.
   - Highlight strategies, such as comparing numerators/denominators and using benchmarks like 12\frac{1}{2}21.
2. **Guided Practice (10 minutes)**

   Solve examples together as a class. Examples:
   - Compare 25\frac{2}{5}52 and 37\frac{3}{7}73 using fraction strips.
   - Place 46\frac{4}{6}64 and 23\frac{2}{3}32 on a number line.
3. **Collaborative Activity (10 minutes)**
   - Divide students into small groups.
   - Each group gets fraction cards and sorts them into "greater than," "less than," or "equal

to" pairs.

- Example Task: Compare pairs like 38\frac{3}{8}83 and 14\frac{1}{4}41, 510\frac{5}{10}105 and 12\frac{1}{2}21.

4. **Independent Practice (5 minutes)**

- Students solve 3-4 comparison problems individually on a worksheet.

- Example Problems: Compare 710\frac{7}{10}107 and69\frac{6}{9}96, 23\frac{2}{3}32 and 34\frac{3}{4}43.

5. **Wrap-Up (5 minutes)**

- Review answers as a class.

- Recap key strategies for comparing fractions.

- End with a reflective question: “Why is comparing fractions important in real life?”

Lesson Plan #15

Rotation Model Lesson Plan for Proper Fractions and Improper

Fractions Grade: 3rd

Time Period: 35 Minutes

Lesson Duration: 2 Days

Objective

- Students will distinguish between proper and improper fractions.
- Students will represent proper and improper fractions using visual models.
- Students will engage in collaborative activities to strengthen their understanding of proper and improper fractions.

Materials Needed

- Fraction circles or fraction bars
- Chart paper and markers
- Visual fraction cards (showing proper and improper fractions)
- Worksheets with fraction problems
- Small whiteboards and markers

Time Allocation

1. **Introduction:** 5 minutes
2. **Station Rotations:** 25 minutes (3 stations, ~8 minutes each)

   Wrap-Up and Reflection: 5 minutes

Lesson Flow

Introduction (5 Minutes)

- Briefly explain the concept of proper and improper fractions:
  - **Proper Fraction**: The numerator is smaller than the denominator (e.g., 25\frac{2}{5}52).
  - **Improper Fraction**: The numerator is equal to or greater than the denominator (e.g., 74\frac{7}{4}47).
- Use fraction bars or circles to visually demonstrate examples of each.
- State that they will explore these ideas further at the stations.

2. Station Rotations (25 Minutes) Station 1: Visual Representation

- **Activity**:

  - Students use fraction circles or bars to build and compare proper and improper fractions.
  - Example: Show 34\frac{3}{4}43 as a proper fraction using 3 out of 4 parts colored. Show 74\frac{7}{4}47 by coloring 7 parts across two whole circles.

- **Collaborative Task**:

  - In pairs, students create and label their own examples of proper and improper fractions using manipulatives.

Station 2: Sorting Game

- **Activity**:

  - Students work in groups to sort fraction cards into "Proper Fractions" and "Improper Fractions" categories on a chart.

- **Challenge**:

  - Each group explains why they placed specific fractions in a category.

Station 3: Problem-Solving and Whiteboard Practice

Activity:

- Students solve fraction-related word problems (e.g., "If 9 out of 4 pieces of chocolate were eaten, what type of fraction is this?").
- Students write answers and explanations on small whiteboards.

3. Wrap-Up and Reflection (5 Minutes)

- Gather the class and review key differences between proper and improper fractions.
- Ask students to share one example of each type of fraction they learned at the stations.
- Quick quiz: Display fractions on the board and ask students to call out if they are proper or improper.

Lesson Plan # 16
Traditional Classroom

Grade:3rd

Time Period: 35 Minutes

Lesson Duration: 2 Days

Objective

- Students will distinguish between proper and improper fractions.
- Students will represent proper and improper fractions using visual models.
- Students will engage in collaborative activities to strengthen their understanding of proper and improper fractions.

Materials Needed

- Fraction bars or circles
- Whiteboard and markers
- Worksheets with fraction problems

Time Allocation

1. **Introduction:** 5 minutes
2. **Guided Practice:** 10 minutes
3. **Collaborative Activity:** 15 minutes
4. **Wrap-Up and Reflection:** 5 minutes

Lesson Flow

1. Introduction (5 Minutes)

- Explain proper and improper fractions as in the rotational model.

Use fraction bars to visually demonstrate examples, emphasizing the numerator and denominator roles.

2. Guided Practice (10 Minutes)

- Solve examples together as a class:
  - Example 1: 38\frac{3}{8}83 (proper fraction).
  - Example 2: 118\frac{11}{8}811 (improper fraction).
- Use fraction bars to visually explain how improper fractions exceed a whole.

- Ask guiding questions:
  - "What do you notice about the numerator and denominator in improper fractions?"

3. Collaborative Activity (15 Minutes)

- **Group Activity:** Sorting Fractions
  - Divide the class into small groups. Each group receives fraction cards.
  - Groups sort the cards into "Proper" and "Improper" categories on a chart.
- **Challenge Task:**
  - Ask each group to create a short story or word problem involving one proper and one improper fraction. For example:
    - "We ate 54\frac{5}{4}45 slices of pizza. Is this a proper or improper fraction?"
- Groups present their solutions and stories to the class.

4. Wrap-Up and Reflection (5 Minutes)

- Recap the lesson by asking students:
  - "What is the difference between proper and improper fractions?"
- Provide a quick exit ticket: Write one proper fraction and one improper fraction.

Lesson Plan # 17

Topic: Number Operations

Grade:3rd

Subject: Mathematics

Duration:35 min

Duration: 2 Days

Objectives:

1. Understand and perform basic operations: addition, subtraction, multiplication, and division.
2. Solve word problems involving these operations.
3. Demonstrate an understanding of division as sharing.

Materials:

- Whiteboard and markers
- Number cards
- Manipulatives (counters, blocks)
- Worksheets
- Projector (for instructional videos)

Introduction (10 minutes):

1. Discuss the four basic operations: addition, subtraction, multiplication, and division.
2. Define each operation and provide simple examples.

Direct Instruction (15 minutes):

1. Use manipulatives to demonstrate each operation:
   - Addition: Combine groups of objects.
   - Subtraction: Remove objects from a group.
   - Multiplication: Create equal groups.
   - Division: Share objects equally among groups.
2. Show an instructional video that explains these operations with visual aids and real-life examples.

Guided Practice (10 minutes):

1. Work through sample problems for each operation on the board with student participation.
2. Solve a variety of problems involving these operations, ensuring to explain each step clearly.

Independent Practice (10 minutes):

1. Students complete a worksheet with problems on addition, subtraction, multiplication, and division.
2. Include word problems to test understanding of division as sharing.

Assessment (5 minutes):

1. Quick quiz with questions from the post-test (e.g., 3 x _____ = 9, 18 ÷ 3 =

   _____, simple addition).
2. Review answers as a class and provide immediate feedback.

Closure (5 minutes):

1. Recap the key points about number operations.
2. Encourage students to share any questions or thoughts about the lesson.
3. Assign homework for further practice on number operations.

Lesson Plan# 18

Introduction to Addition and Subtraction for Traditional Classroom

Time Period: 35 minutes

Lesson Duration: 2 Days

Objective: By the end of the lesson, students will be able to:

- Understand and apply the concept of addition and subtraction.
- Solve addition and subtraction problems within 100.

Materials:

- Whiteboard and marker.
- Solve addition and subtraction problems within 100 using strategies based on place value, properties of operations, and/or the relationship between addition and subtraction.

Lesson Structure:

1. **Introduction (10 minutes):**

   - Begin by discussing real-life situations where addition and subtraction are used (e.g., buying items at a store or counting apples).
   - Write two simple addition and subtraction problems on the board (e.g., 34 + 25 and 57 - 23).
   - Ask students to share their thoughts on how they would solve them.

2. **Direct Instruction (05 minutes):**

   - Demonstrate how to solve addition and subtraction problems on the board step-by- step.
     - Addition example: 34 + 25. Add the tens first, then the ones.
     - Subtraction example: 57 - 23. Subtract the tens first, then the ones.
   - Model how to check answers using a number line or by estimating.

3. **Guided Practice (10 minutes):**

   - Give students a few problems (e.g., 45 + 32, 78 - 26).
   - Solve them as a class, asking students for input on how to proceed at each step.

- Use counters if necessary for visual reinforcement.

4. **Independent Practice (10 minutes):**

- Provide a worksheet with 5-10 addition and subtraction problems for students to complete individually.
- Walk around to provide support as needed.

5. **Closing (5 minutes):**

- Review the key steps for solving addition and subtraction problems.
- Have a few students share their answers with the class.

Lesson Plan# 19
Introduction to Multiplication

Time Period:35 min
Duration: 2 Days
Date: 15th to 16th Oct,2024

Objective:
By the end of the lesson, students will be able to:

- Understand the concept of multiplication as repeated addition.
- Solve simple multiplication problems (e.g., 2 × 3, 4 × 5).

Materials:

- Whiteboard and markers
- Counters or objects for grouping

Standards:

- Interpret and solve multiplication problems using the concept of repeated addition.
- Solve multiplication problems within 100.

Lesson Structure:

1. **Introduction (10 minutes):**
   - Begin with a brief review of addition, reminding students of repeated addition.
   - Ask students, "If I have 3 groups of 2 apples, how many apples do I have in total?"
   - Introduce the multiplication symbol and show how 3 × 2 equals 6.
2. **Direct Instruction (15 minutes):**
   - Demonstrate multiplication as repeated addition. For example, show that 4 × 3 means adding 4 three times (4 + 4 + 4).
   - Write multiplication problems on the board (e.g., 2 × 5, 3 × 6), and solve them with the class, emphasizing the connection to repeated addition.
3. **Guided Practice (10 minutes):**
   - Use counters or objects to model multiplication problems. For example, group 4 sets of 3 counters to visually show 4 × 3.
   - Work through a few problems with the class, asking students to share how they would solve them.

4. **Independent Practice (10 minutes):**

   Provide a worksheet with simple multiplication problems (e.g., 2 × 4, 5 × 3, 6 × 2).

   - Allow students to solve the problems independently. Offer help to those who need it.

5. **Closing (5 minutes):**

   - Review the key idea of multiplication as repeated addition.
   - Have a few students share how they solved the multiplication problems.

Lesson Plan #20
Introduction to Division

Time Period: 35 min
Duration: 2 Days
Date: 17th to 18th Oct,2024

Objective:
By the end of the lesson, students will be able to:

- Understand the concept of division as sharing equally or grouping.
- Solve simple division problems (e.g., 6 ÷ 2, 12 ÷ 3).

Materials:

- Whiteboard and markers
- Counters or objects for grouping

Standards:

- Interpret and solve division problems as sharing or grouping equally.
- Solve division problems within 100.

Lesson Structure:

1. **Introduction (10 minutes):**
   - Begin with a real-life example of division (e.g., "If we have 12 cookies and 4 friends, how can we divide the cookies equally?").
   - Explain that division is about splitting into equal groups.
2. **Direct Instruction (15 minutes):**
   - Demonstrate division on the board using objects (e.g., divide 12 objects into 3 equal groups).
   - Introduce division vocabulary: dividend (the number to be divided), divisor (the number we divide by), and quotient (the result).
   - Solve a few problems on the board, such as 12 ÷ 3 and 8 ÷ 4.
3. **Guided Practice (10 minutes):**
   - Use counters to model division. For example, for 6 ÷ 2, divide 6 counters into 2 equal groups.
   - Ask students to help solve a few division problems using counters or objects to reinforce the concept of equal grouping.

4. **Independent Practice (10 minutes):**

- Provide a worksheet with simple division problems (e.g., 10 ÷ 2, 15 ÷ 3, 9 ÷ 3).
- Allow students to complete the problems on their own while you provide support as needed.

5. **Closing (5 minutes):**

- Review the steps of division: dividing into equal groups, finding the quotient.
- Have a few students share their solutions and explain how they solved the division problems.

Experiment Activities

Appendix# D

Topic	Activity	Description	Purpose
Unit Fractions	Problem solving	Solve real-life problems involving unit fractions, like dividing a pizza into equal parts	Connects learning to real-world scenarios and develops critical thinking.
Fraction on number line	Plotting fraction	Students mark proper fractions on a number line drawn on paper or whiteboards.	Builds spatial understanding of fractions.
Equivalent fraction	Manipulating exploration	Use fraction bars or circles to explore equivalent fractions(e.g.,12=24\frac{1}{2} =\frac{2}{4}21=42).	Develops understanding of equivalence through hands-on activities.
Comparing Fraction	Fraction circles comparison	Use fraction circles to compare two fractions visually	Provides a concrete way to understand fraction comparison.
Proper and improper fraction	Sorting fraction game	Students sort fraction cards into "Proper" and "Improper" categories.	Encourages collaboration and strengthens fraction identification skills.

Addition	Whiteboard practice	Pairs solve addition problems on whiteboards, taking turns writing and solving.	Promotes collaborative learning and peer teaching.
Subtraction	Flashcard race	Students race to solve subtraction problems using flashcards.	Builds fluency in subtraction through repetition and competition.
Multiplication	Dice roll multiplication	Roll two dice and multiply the numbers; write the product and corresponding equation.	Develops multiplication fluency and introduces randomness for engagement.