

BRIDGE COURSE 5 MATHS

SECTION A

WORK 1

Critical Analysis of an NCERT / State Board Mathematics Textbook

Introduction

Textbooks have a very important role in the field of education, especially in a subject like Mathematics, where clarity of concepts and logical thinking are essential.

In India, Mathematics textbooks published by **NCERT (National Council of Educational Research and Training)** and various State Boards are the main study resources for students.

It is necessary to critically analyse the **quality, presentation, language, illustrations, organization of content, inclusion, stereotypes, and assessment methods** used in these textbooks so that the quality of education can be further improved.

1. Language

- The language of NCERT and State Board Mathematics textbooks is generally kept **simple and clear according to the level of students**.
- However, mathematical terminology such as **rational numbers, ratio, parallel, triangle**, etc., can sometimes be difficult for students, especially those from rural or weaker educational backgrounds.
- In some textbooks, unnecessary mixing of English words creates difficulty for students in understanding the content.
- Despite clarity in language, the presentation of examples sometimes becomes complicated, which makes it difficult for students to understand the topic.
- In translated textbooks, the original meaning or expression is sometimes not properly retained, which creates difficulty in students' understanding.

2. Illustrations

- The use of illustrations is extremely important for explaining mathematical concepts clearly. NCERT textbooks contain **colourful, attractive, and clear illustrations**.
 - These pictures increase children's interest and help them understand complex topics, such as **diagrams, graphs, and shapes in Geometry chapters**.
 - In many State Board textbooks, the quality of illustrations is comparatively lower, or the pictures may be black-and-white and presented in an old-fashioned manner. This may reduce children's interest.
 - Some pictures are used only for decoration and do not have a direct connection with the content. This may distract students.
 - It would be better if all illustrations were connected with the subject matter and designed according to the level of students.
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3. Content Organization

- In NCERT textbooks, the organization of content is generally **logical and systematic**. Chapters usually proceed from easy to difficult, allowing students to gradually understand complex concepts.
 - Each chapter generally begins with objectives, followed by explanation of concepts, examples, activities, and practice questions at the end.
 - In some State Board textbooks, the sequence of chapters may be inconsistent, which can create difficulty for students in understanding the subject.
 - Sometimes repetition of topics or the absence of necessary topics can also be seen, making the curriculum appear incomplete or unbalanced.
 - The variety and level of practice questions are also important because they help develop students' thinking and understanding abilities.
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4. Inclusion

- The purpose of inclusive education is to provide equal opportunities to every type of learner, regardless of their **social, economic, gender, or physical background**.
- In recent years, NCERT has given special attention to inclusion. Examples include characters from different backgrounds, genders, religions, and castes.
- Such diversity is seen less frequently in State Board textbooks. Sometimes examples are limited mainly to urban, male, or particular social groups.

- Special activities or instructions for children with disabilities are often absent from textbooks, which may cause such students to fall behind.
 - For inclusion, it is necessary to prepare examples, activities, and assessment questions while keeping the needs of **all students** in mind.
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5. Stereotypes

- Gender, social, or cultural stereotypes in education can create prejudice in the minds of students.
 - NCERT textbooks generally show both genders participating equally in Mathematics-related activities, which helps develop a sense of equality among students.
 - Some State Board textbooks still contain traditional stereotypes, such as showing only boys participating in Mathematics activities or limiting girls to household activities.
 - Such examples should be avoided, and textbooks should promote **diversity, equality, and inclusiveness**.
 - Examples should also include people from **rural and urban areas and different religious, caste, and economic groups**.
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6. Assessment

- Assessment is a means of examining students' **understanding, analytical ability, and application skills**.
 - NCERT textbooks include different types of questions, such as:
 - Multiple-choice questions
 - Short-answer questions
 - Long-answer questions
 - Project work
 - Activity-based questions
 - This helps in assessing the overall abilities of students.
 - In State Board textbooks, assessment questions are sometimes limited in type and are often based mainly on memorization. This does not adequately promote higher-order thinking.
 - Variety in assessment is necessary so that different types of learners can demonstrate their abilities.
 - Project work and examples connected with real life help increase students' interest in and understanding of Mathematics.
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7. Innovation and Updation

- NCERT textbooks are updated and show innovation from time to time, such as:
 - New teaching approaches
 - Modern examples
 - Information about digital resources
 - The pace of updating State Board textbooks is sometimes slower, and old information or methods may continue to be repeated.
 - With changing times, textbooks should also include **technological, digital, and practical examples**.
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Conclusion

After critically analysing NCERT and State Board Mathematics textbooks, it becomes clear that NCERT textbooks are comparatively better in areas such as **language, content, illustrations, inclusion, and assessment**.

State Board textbooks require improvement, especially in the areas of **inclusion, updation, freedom from stereotypes, and diversity in assessment**.

To improve the quality of education, it is necessary that textbooks have:

- Simple language
- Clear illustrations
- Logical organization of content
- An inclusive approach
- Freedom from stereotypes
- Variety and innovation in assessment methods

In this way, students can receive **quality, inclusive, and interesting Mathematics education**, which will contribute to their overall development.

TASK 2

Critical Analysis of a Foundational-Level Video on the DIKSHA Portal

Example: “Development of Counting Skills”

Introduction

The role of digital resources in the field of education is continuously increasing. Digital learning resources provide children with opportunities to learn through audio, video, pictures, activities, demonstrations, and interactive experiences.

DIKSHA is a major digital platform developed by the Government of India. It provides quality educational videos and other learning resources for different classes and subjects.

These resources are particularly useful for strengthening learning at the **Foundational and Preparatory stages**.

The present report provides a critical analysis of the DIKSHA video “**Development of Counting Skills**.” The analysis considers different aspects of the video, including its language, presentation style, organization of content, illustrations and visual materials, inclusion, stereotypes, assessment, innovation, updation, and suggestions for improvement.

1. Brief Information about the Video

The basic information about the selected video is as follows:

Title of the Video

Development of Counting Skills

Level

Foundational / Preparatory Level – Classes 1–3

Duration

Approximately **12 minutes**

Presenter

A Primary Teacher

Main Objective

The main objective of the video is to develop children's basic abilities related to counting and early number operations.

The video focuses on:

- Counting
- Addition
- Subtraction
- Basic numerical abilities

These are important foundational mathematical skills that children need before moving towards more complex mathematical concepts.

2. Language and Communication

Language plays an important role in helping young children understand mathematical concepts. The language used in the video has several positive features.

Simple and Clear Language

The language used in the video is **very simple, clear, and appropriate for the level of children**.

Since the target learners are children at the Foundational/Preparatory level, the use of simple language helps them understand instructions and mathematical concepts without unnecessary difficulty.

Dialogue-Based Communication

The teacher has adopted a **dialogue-based style** of communication.

Instead of simply explaining the content continuously, the teacher communicates with the children. This helps children feel directly connected with the learning process.

Use of Local and Conversational Language

The video uses local words and conversational language in a balanced manner.

This is useful because children may come from different social, cultural, and linguistic backgrounds. Familiar language can make mathematical concepts easier to understand.

Use of English Words

Sometimes English words are also used in the video.

However, their meanings are also explained. Therefore, the use of English does not remain completely unexplained and children can understand the intended meaning.

3. Presentation Style

The presentation style of an educational video is particularly important for young children because their attention needs to be actively maintained.

Beginning with Questions and Activities

The video begins with questions and activities designed to attract children's attention.

This makes the beginning of the lesson interesting and encourages children to think about the mathematical concept.

Use of Colourful Materials

The teacher uses:

- Colourful objects
- Pictures
- Examples from daily life

These materials make the mathematical concepts more concrete and understandable.

Active Participation

Children are encouraged to participate in counting activities.

As a result, children are not treated merely as **passive listeners**. They are encouraged to become **active participants** in the learning process.

Encouraging and Motivating Tone

The tone of the video is **encouraging and motivating**.

Such a tone can help children feel comfortable while attempting mathematical activities and answering questions.

4. Content Organization

The organization of content is another important aspect of the video.

The subject matter is divided into small and manageable parts.

Sequence of Content

The concepts are presented in the following sequence:

1. **Counting**
2. **Addition**
3. **Subtraction**

This sequence gives children an opportunity to move gradually from basic counting towards simple operations.

Examples and Practice

After each concept, an example and a practice activity are provided.

This allows children to see the concept and then attempt an activity related to it.

Explanation of Difficult Concepts

Difficult concepts are explained using:

- Simple language
- Pictures
- Practical examples

This makes abstract mathematical ideas more concrete for young learners.

Recap and Practice Questions

At the end of the video, a short **recap** is provided.

Practice questions are also included so that children can revisit the concepts they have learned.

Thus, the video follows a sequence of:

Concept → Example → Activity → Recap → Practice.

5. Illustration and Visual Content

Visual materials are very important in foundational mathematics education.

Use of Visual Materials

The video uses:

- Colourful pictures
- Objects
- Cards
- Blackboard/board

These materials help children understand mathematical concepts visually.

Graphics and Animation

Graphics and animation are used to a limited extent.

Although their use is limited, the graphics and animation that are included are **clear and attractive**.

Maintaining Attention

Visual materials help children maintain their attention during the learning process.

Young children often understand concepts better when they can see and manipulate objects rather than only listening to verbal explanations.

Limitation

Sometimes the speed of the visual presentation becomes fast.

Because of this, some children may experience difficulty in understanding the content at the same pace.

Therefore, the speed of visual presentation should be carefully adjusted according to the learning level of young children.

6. Inclusion

Inclusive education means providing learning opportunities to children with different backgrounds and needs.

The video shows several features related to inclusion.

Different Groups of Children

The video keeps different types of children in mind, including:

- Boys
- Girls
- Children from different social backgrounds

Rural and Urban Contexts

The examples include both:

- Rural life contexts
- Urban life contexts

This provides children with examples that can be connected with different living environments.

Children with Special Needs

However, the video does not appear to provide specific instructions or special indications for children with special needs.

This can be considered a limitation because children with special needs may require additional support, alternative activities, or adapted materials.

Diversity

There is diversity in the language and examples used in the video.

Therefore, the video gives an overall impression of an **inclusive educational approach**, although further improvement is possible for children requiring specific support.

7. Stereotypes

Educational resources should avoid stereotypes related to gender, social background, caste, religion, or economic status.

Gender Equality

The video attempts to avoid gender stereotypes.

Both **boys and girls** are shown participating equally in counting activities.

This communicates the idea that Mathematics is not restricted to any particular gender.

Social and Cultural Stereotypes

No obvious stereotypes related to:

- Caste
- Religion
- Economic status

are shown in the video.

Positive Feature

This is a positive feature because it can provide equal encouragement to different groups of children.

It helps create an environment where children can participate in Mathematics without feeling that a particular mathematical activity belongs only to a particular group.

8. Assessment

Assessment is necessary to understand whether children have understood the concepts presented in the video.

Practice Questions

At the end of the video, some practice questions are asked.

These questions provide an opportunity to check children's understanding.

Encouraging Children to Respond

The teacher encourages children to:

- Think about their answers
- Speak their answers
- Participate in the learning process

This makes assessment more interactive.

Variety of Assessment Questions

The assessment questions cover different types of activities, including:

- Counting
- Addition
- Subtraction
- Identification of objects

This provides some variety in assessment.

Limitation of Assessment

However, there is no separate arrangement for identifying the **individual difficulties of each child**.

For example, the video does not provide a separate mechanism to determine whether a particular child is having difficulty with counting, addition, subtraction, or object identification.

Therefore, individualized assessment can be further developed.

9. Innovation and Updation

Digital resources can make Mathematics more connected with children's everyday experiences.

Use of Daily-Life Examples

The use of examples from daily life is an innovative feature of the video.

It allows children to connect counting with situations that they may experience in their own lives.

Use of Digital Resources

The use of digital resources can increase children's interest in learning.

Children get an opportunity to learn Mathematics through a digital medium rather than only through a textbook or blackboard.

QR Code and Digital Links

An attempt has also been made to provide additional resources through:

- QR codes
- Other digital links

This can allow learners to access additional learning materials.

Need for Further Updation

However, the inclusion of updated material is limited.

With the passage of time, new activities and learning experiences can be added to make the resource more useful and contemporary.

10. Suggestions for Improvement

The video can be further improved through the following measures.

1. Support for Children with Special Needs

For children with special needs, the video can include:

- Visual cues
- Sign language
- Alternative activities

This would make the resource more accessible.

2. Improvement in Illustrations

The diversity and speed of illustrations should be balanced according to the learning level of children.

Visual information should not move so quickly that children are unable to understand it.

3. Improvement in Assessment

A facility can be provided for:

- Recording children's answers
- Sharing children's answers

This can help teachers and parents understand children's learning progress.

4. Additional Worksheets

A worksheet can be provided along with the video.

Worksheets can give children opportunities to practise the concepts after watching the video.

5. Instructions for Parents

Instructions for parents can also be provided.

This would help parents support children's learning at home and connect digital learning with home-based activities.

Conclusion

The DIKSHA video “**Development of Counting Skills**” is a useful and effective digital learning resource for children at the foundational level.

The major positive features of the video include:

- Simple and clear language
- Child-friendly communication
- Attractive presentation
- Organized content
- Use of colourful visual materials
- Active participation of children
- Inclusion of different social contexts
- Efforts to avoid stereotypes
- Practice and assessment activities
- Use of daily-life examples
- Use of digital resources

The language, presentation, organization of content, illustrations, and efforts towards inclusion are appreciable.

The participation of children, variety of examples, and attempts to assess learning are also positive features.

At the same time, some areas require further improvement. In particular, **children with special needs require more specific support**, and assessment can be made more innovative and individualized.

Overall, such digital videos represent an important step in digital education. They can support children in developing their **basic mathematical abilities** and can make Mathematics more engaging, understandable, and connected with children's everyday lives.

TASK 3

Report on the Curricular and Pedagogic Recommendations of NCF-SE 2023 and NCF-FS 2022 for Mathematics Education at the Foundational and Preparatory Stages

Introduction

Under the **National Education Policy (NEP) 2020**, the Government of India introduced two important curriculum framework documents:

- **NCF-FS 2022 – National Curriculum Framework for Foundational Stage**
- **NCF-SE 2023 – National Curriculum Framework for School Education**

The purpose of these frameworks is to make the Indian education system **contemporary, inclusive, meaningful, and aligned with global standards**.

Both frameworks provide important recommendations for Mathematics education, particularly for the **Foundational and Preparatory stages**.

The focus is not merely on memorising mathematical facts and procedures. Mathematics education is expected to help children develop **logical thinking, problem-solving ability,**

curiosity, creativity, understanding, and the ability to connect Mathematics with everyday life.

This report discusses the major **curricular and pedagogic recommendations** of NCF-FS 2022 and NCF-SE 2023 for Mathematics education at the Foundational and Preparatory stages.

1. Curricular Recommendations

A. Recommendations of NCF-FS 2022

1. Development of Mathematical Thinking

NCF-FS 2022 recommends that Mathematics should not be restricted only to arithmetic and calculation.

Children should be provided opportunities to develop:

- Logical reasoning
- Problem-solving skills
- Pattern recognition
- Spatial understanding
- Understanding of measurement
- Understanding of time
- Early concepts related to data

Thus, Mathematics at the Foundational Stage should help children develop ways of **thinking mathematically**, rather than simply teaching them to perform calculations.

Children should also be encouraged to develop:

- Curiosity
- An attitude of exploration
- An experimental approach

They should be given opportunities to ask questions, explore situations, try different methods, and discover mathematical relationships.

2. Local and Cultural Context

Mathematical concepts should be connected with the child's **local environment, games, folk stories, and everyday life**.

Instead of presenting Mathematics only through abstract symbols and textbook exercises, teachers should connect mathematical ideas with situations that children already understand.

For example, mathematical learning can be connected with:

- Local games
- Objects available around children
- Daily household activities
- Stories
- Familiar situations
- Local surroundings

The use of **local languages and familiar examples** is also recommended so that children can understand mathematical ideas more naturally.

3. Active and Experiential Learning

The curriculum should provide children with opportunities to learn Mathematics through:

- Activities
- Games
- Group work
- Hands-on experiences
- Exploration

Children should not learn Mathematics only by listening to the teacher or copying answers from the board.

They should have opportunities to **count objects, perform simple operations, measure things, identify shapes, compare quantities, and explore mathematical relationships** through actual experiences.

Such learning makes Mathematics more meaningful and understandable.

4. Inclusion

NCF-FS 2022 emphasizes that Mathematics education should provide opportunities to **all children**.

This includes:

- Children with special needs
- Children from different social and economic backgrounds
- Children from different linguistic backgrounds
- Children from different cultural backgrounds

Equal opportunities should be provided to every learner.

Gender, social, and cultural diversity should also be respected in the Mathematics classroom.

B. Recommendations of NCF-SE 2023

1. Understanding-Based Mathematics Education

NCF-SE 2023 emphasizes that Mathematics should not be taught mainly through **rote memorization**.

Instead, learning should focus on:

- Understanding
- Reasoning
- Application
- Development of deeper conceptual understanding

Children should understand **why** a mathematical procedure works rather than simply memorising a rule or formula.

For example, instead of only memorising an operation, children should understand the meaning of the operation and be able to apply it in appropriate situations.

2. Sequential and Integrated Curriculum

Mathematical concepts should be presented in a systematic progression from **simple to complex**.

Children should gradually move from familiar and concrete experiences towards more complex mathematical ideas.

The Mathematics curriculum should also be connected with other subjects, such as:

- Science
- Art
- Language

This integrated approach helps children understand that Mathematics is not an isolated subject but is connected with many areas of life and learning.

3. Development of 21st-Century Skills

Mathematics education should contribute to the development of important skills required in the contemporary world.

These include:

- Logical thinking
- Problem solving
- Analysis
- Creativity
- Digital literacy

Mathematics should therefore be presented as a **life skill**, rather than only as a school subject.

Children should be encouraged to use mathematical thinking in real-life situations and problems.

4. Diversity in Assessment

Assessment should not depend only on formal examinations.

The framework recommends different forms of assessment, including:

- Continuous and Comprehensive Evaluation (CCE)
- Activity-based assessment
- Project work
- Peer assessment

This provides opportunities for children to demonstrate their understanding in different ways.

2. Pedagogic Recommendations

A. Recommendations of NCF-FS 2022

1. Inquiry-Based Learning

Children should be encouraged to:

- Ask questions
- Explore
- Investigate
- Experiment

The teacher should not always provide the answer immediately.

Instead, the teacher should act as a **facilitator and guide**, helping children discover mathematical ideas through exploration.

For example, rather than simply telling children which group contains more objects, the teacher can ask them to compare the groups and explain how they found the answer.

2. Play- and Activity-Based Education

Mathematics should be taught through:

- Games
- Stories
- Songs
- Hands-on activities
- Manipulatives

Materials such as:

- Blocks
- Cards
- Counting rods
- Other teaching-learning materials

can be used to make mathematical concepts concrete and understandable.

Children can learn mathematical concepts through activities involving counting, addition, subtraction, measurement, and shape recognition.

3. Group and Collaborative Learning

Children should be provided opportunities to work in groups.

They can:

- Discuss mathematical questions
- Share ideas
- Solve problems together
- Learn from their peers

Collaborative learning helps children develop both mathematical understanding and social skills.

Working together also gives children opportunities to explain their thinking to others and listen to different approaches.

4. Multi-Sensory Approach

Mathematical learning should involve different senses and forms of experience.

Children should get opportunities to learn through:

- Seeing
- Listening
- Touching
- Doing

This is especially useful at the Foundational Stage because young children understand many concepts more effectively through concrete experiences.

For example, counting rods, blocks, cards, and real objects can be touched and manipulated while learning number concepts.

B. Recommendations of NCF-SE 2023

1. Joy of Learning

Mathematics should not be presented as a difficult, frightening, or burdensome subject.

Instead, it should become:

- Enjoyable

- Interesting
- Motivating
- Meaningful

Children should be encouraged to enjoy mathematical activities.

Importantly, **mistakes should be treated as opportunities for learning**, rather than simply as failures.

This creates a classroom environment in which children feel comfortable trying different solutions.

2. Question-Oriented and Problem-Solving-Based Education

Children should be encouraged to use Mathematics to solve **real-life problems**.

They should be given opportunities to:

- Think independently
- Develop strategies
- Try different methods
- Find solutions
- Explain their reasoning

Mathematical learning should therefore go beyond finding an answer and should also focus on understanding the process through which the answer is obtained.

3. Inclusion of Technology

NCF-SE 2023 also recommends the inclusion of technology in the learning process.

Teachers can use:

- Digital tools
- Mathematical software
- Mobile applications
- Other ICT-based resources

Technology can make mathematical concepts more interactive and can provide children with additional opportunities for exploration and practice.

3. Assessment

Assessment is an important component of Mathematics education.

Both NCF-FS 2022 and NCF-SE 2023 move away from an approach in which assessment is based only on formal examinations.

NCF-FS 2022

NCF-FS 2022 emphasizes **Continuous and Comprehensive Evaluation (CCE)**.

Children's understanding can be assessed through:

- Games
- Activities
- Stories
- Group work
- Classroom participation

Formal examinations are not considered compulsory at this stage.

The teacher can observe children's participation and performance during everyday learning activities and use this information to understand their progress.

NCF-SE 2023

NCF-SE 2023 recommends **multi-dimensional assessment**.

This can include:

- Written assessment
- Oral assessment
- Projects
- Presentations
- Peer assessment

Assessment should become a part of the **learning process**, rather than being treated only as a way of measuring the final result.

In this approach, assessment also helps teachers understand children's learning needs and difficulties.

4. Inclusion and Diversity

Both frameworks emphasize **Inclusive Education** in Mathematics.

Children come from different:

- Languages
- Cultures
- Social backgrounds
- Economic backgrounds

Therefore, examples and teaching methods should be appropriate for different groups of learners.

Appropriate Examples

Teachers should select examples that children from different backgrounds can relate to.

Different Teaching Methods

A variety of teaching approaches should be used so that children with different learning needs can participate.

Support for Children with Special Needs

For children with special needs, the frameworks recommend the use of:

- Supportive teaching-learning materials
- Appropriate strategies
- Additional learning support

The objective is to provide meaningful opportunities for every child to participate in Mathematics learning.

Conclusion

NCF-FS 2022 and NCF-SE 2023 provide an approach to Mathematics education that focuses on making Mathematics **meaningful, enjoyable, inclusive, and connected with children's lives**.

The recommendations are not limited to teaching numbers and calculations. They also emphasize the development of:

- Logical thinking
- Problem-solving ability
- Creativity
- Reasoning
- Collaboration
- Curiosity
- Application of Mathematics in everyday life

NCF-FS 2022 particularly emphasizes **foundational mathematical understanding, activity-based learning, play, exploration, local contexts, multi-sensory experiences, and continuous assessment**.

NCF-SE 2023 emphasizes **conceptual understanding, reasoning, application, integration with other subjects, 21st-century skills, technology, problem solving, and diverse forms of assessment**.

Both frameworks also emphasize inclusion and respect for linguistic, cultural, social, and economic diversity.

Therefore, teachers should adopt teaching methods that are consistent with these recommendations so that Mathematics education can contribute not only to mathematical knowledge but also to the **overall development of children**.

SECTION B

– TASK 1

Unit Plan Using Four-Block Approach in Mathematics

Topic: Numbers and Number Concepts

Class: 2

Stage: Preparatory Stage

Duration: 8 Days

Introduction

A unit plan helps the teacher organize mathematical concepts and activities in a systematic manner. This unit is designed for Class 2 students to develop basic understanding of numbers, comparison, ordering, place value, addition and subtraction. The **Four-Block Approach** includes Modeling, Shared Activity, Guided Practice and Independent Practice.

Objectives of the Unit

By the end of the unit, students will be able to:

- Identify and write numbers from 1 to 100.
- Compare numbers as greater, smaller or equal.
- Arrange numbers in ascending and descending order.
- Understand tens and ones.
- Develop basic concepts of addition and subtraction.
- Understand the use of numbers in daily life.

Four-Block Approach

1. Modeling: The teacher demonstrates the concept using examples, pictures, objects and the board.

2. Shared Activity: Teacher and students perform activities together through discussion, games and group work.

3. Guided Practice: Students practise with worksheets, cards and objects under the teacher's guidance.

4. Independent Practice: Students practise independently through classwork, homework or individual activities.

Day 1 – Identification of Numbers (1–20)

Modeling: The teacher writes numbers 1–20 on the board and uses colourful cards and pictures.

Shared Activity: Students count together with the teacher and sing number songs.

Guided Practice: Students arrange number cards from 1 to 20.

Independent Practice: Students write numbers 1–20 at home.

Day 2 – Identification of Numbers (21–50)

Modeling: The teacher writes and reads numbers 21–50 and demonstrates counting with pebbles and sticks.

Shared Activity: Students participate in a group counting game.

Guided Practice: Students fill missing numbers in a worksheet.

Independent Practice: Students practise writing numbers 21–50 using pictures.

Day 3 – Comparison of Numbers

Modeling: The teacher explains which of two numbers is greater or smaller.

Shared Activity: Students compare number cards and use $>$, $<$ and $=$ signs.

Guided Practice: Students complete a comparison worksheet.

Independent Practice: Students compare the number of fruits or toys available at home.

Day 4 – Ascending and Descending Order

Modeling: The teacher writes numbers in an incorrect order and demonstrates how to arrange them correctly.

Shared Activity: Students arrange number cards from smaller to larger and larger to smaller.

Guided Practice: Students solve ordering questions on a worksheet.

Independent Practice: Students make a number staircase from 1–10 and 10–1.

Day 5 – Place Value

Modeling: The teacher explains $23 = 2 \text{ Tens} + 3 \text{ Ones}$ using sticks and bundles.

Shared Activity: Students place objects into tens-and-ones boxes.

Guided Practice: Students write the place value of numbers in a worksheet.

Independent Practice: Students divide their toys into groups of tens and ones.

Day 6 – Addition

Modeling: The teacher explains addition using pictures and objects, for example, $5 + 3 = 8$.

Shared Activity: Students play an addition game in groups using objects.

Guided Practice: Students solve addition questions on a worksheet.

Independent Practice: Students practise addition using toys or other objects at home.

Day 7 – Subtraction

Modeling: The teacher explains subtraction using objects, for example, $9 - 4 = 5$.

Shared Activity: Students play a subtraction game by removing toys or pebbles.

Guided Practice: Students solve subtraction questions on a worksheet.

Independent Practice: Students practise subtraction using fruits or other objects at home.

Day 8 – Revision and Assessment

Modeling: The teacher conducts a short revision of all concepts.

Shared Activity: Students participate in a quiz or game covering number identification, comparison, addition and subtraction.

Guided Practice: Students complete an assessment worksheet.

Independent Practice: Students revise the concepts learned during the unit.

Assessment

Assessment will be continuous and based on students' participation in daily activities, worksheets, group work and quizzes. The teacher will identify children's difficulties and provide individual guidance wherever necessary.

Conclusion

This unit plan based on the **Four-Block Approach** makes Mathematics interesting, experiential and easy to understand. Modeling, shared activities, guided practice and independent practice help children develop basic mathematical abilities. It also supports logical thinking, cooperation and confidence among learners.

TASK 2

Prepare Any Two Teaching-Learning Resources in Mathematics Along with Instructional Manual

Introduction

Teaching-Learning Resources (TLRs) play an important role in making Mathematics teaching interesting, experiential and effective. Young children understand mathematical concepts more easily when they can see, touch, arrange and use objects themselves. Such resources help children understand concepts, practise them and develop problem-solving abilities. For this task, two useful Mathematics resources have been selected: **Counting Rods** and **Number Cards**.

Resource 1: Counting Rods

1. Objectives

The main objectives of using counting rods are:

- To develop children's ability to identify and count numbers.
- To develop basic understanding of addition and subtraction.

- To introduce the concept of place value.
- To provide children with an experiential way of learning Mathematics.
- To develop logical thinking and problem-solving skills.
- To encourage active participation in mathematical activities.

Counting rods help children learn mathematical concepts by actually handling and arranging objects rather than only memorising numbers.

2. Scope of the Resource

Counting rods can be used mainly with children of **Classes 1–3**. They can be used for different mathematical concepts such as:

- Counting numbers
- Addition
- Subtraction
- Comparison of quantities
- Understanding tens and ones
- Basic place value activities
- Individual and group activities

Thus, the same resource can be used for several mathematical concepts according to the learning level of children.

3. Construction of Counting Rods

Counting rods can be prepared using simple wooden or plastic sticks. The rods can be made approximately **10–15 cm long** and can be prepared in different colours to make them attractive to children.

The teacher can also make bundles of ten rods. These bundles can be used to explain the difference between **tens and ones**. For example, one bundle of ten rods represents one ten, while separate rods represent ones.

4. Instructional Manual

The teacher first distributes the rods among the children. Before asking children to work independently, the teacher demonstrates the activity.

For example, the teacher may give five rods and ask children to count them. Later, three more rods can be added and children can be asked to find the total. In this way, the teacher can demonstrate:

$$5 + 3 = 8$$

Similarly, subtraction can be explained by removing rods.

For place value, the teacher can make bundles of ten rods and combine them with individual rods. For example:

$$23 = 2 \text{ tens} + 3 \text{ ones}$$

This allows children to understand place value through concrete objects.

5. Steps to Use

1. Distribute counting rods among the children.
 2. Demonstrate the activity clearly.
 3. Ask children to count and arrange the rods.
 4. Conduct guided practice under the teacher's supervision.
 5. Organise group or individual activities.
 6. Give children opportunities for independent practice.
 7. Ask children to share what they have learned.
-

Resource 2: Number Cards

1. Objectives

Number Cards are another useful Mathematics resource. Their main objectives are:

- To develop number identification.
- To understand the sequence of numbers.
- To develop the concept of comparison.
- To practise addition and subtraction.
- To understand place value.
- To make Mathematics learning enjoyable through games and activities.
- To develop children's confidence and participation.

2. Scope of the Resource

Number Cards can be used with children of **Classes 1–4**. They can be used for:

- Number identification
- Ordering numbers
- Comparing numbers
- Addition and subtraction
- Understanding tens and ones

- Individual activities
- Pair activities
- Group activities

Therefore, Number Cards can be used for several topics without requiring expensive teaching materials.

3. Construction of Number Cards

Number Cards can be prepared using thick paper or cardboard. Numbers from **1 to 100** can be written on the cards, with one number on each card.

The cards should be colourful and attractive so that children become interested in using them. They can also be covered with a plastic sheet to make them durable and suitable for repeated classroom use.

4. Instructional Manual

(a) Number Identification

The teacher gives a card to a child and asks:

“Tell the number on your card.”

The child identifies and reads the number aloud.

(b) Ordering of Numbers

Different cards are distributed among children. The teacher asks them to arrange the cards in order.

For example:

1, 2, 3, 4, 5, 6, 7, 8, 9, 10

This activity helps children understand number sequence.

(c) Comparison of Numbers

Two children can be given two different number cards. The teacher asks:

“Which number is bigger?”

Children compare the numbers and identify the greater and smaller number.

(d) Addition and Subtraction

Two or three number cards can be used for simple operations.

For example:

$$7 + 5 = 12$$

Children can use the cards to identify the numbers and perform the operation.

(e) Place Value

Number Cards can also be used to explain tens and ones.

For example:

$$34 = 3 \text{ Tens} + 4 \text{ Ones}$$

This makes the place-value concept easier to understand.

5. Steps to Use

1. Distribute Number Cards among children.
2. Demonstrate the activity before starting.
3. Organise children into pairs or groups.
4. Allow them to identify, arrange and compare numbers.
5. Provide guided practice.
6. Give independent practice.
7. Discuss the answers and correct mistakes.

Conclusion

Counting Rods and Number Cards are simple but useful Teaching-Learning Resources for Mathematics. They make learning more **active, practical and understandable**. Counting rods provide children with hands-on experience in counting, addition, subtraction and place value, while Number Cards help them practise number identification, ordering, comparison, operations and place value. These resources can also be used in individual, pair and group activities. Therefore, their proper use can make Mathematics learning more enjoyable and support children's participation and understanding.

TASK 3

Prepare a Worksheet Folder (At Least 5 Worksheets) to Develop Foundational Numeracy

Introduction

Foundational numeracy means the basic ability to identify numbers, count objects, perform simple addition and subtraction, compare quantities and understand place value. These basic mathematical abilities are essential for children's further learning of Mathematics. Regular practice through worksheets can help children strengthen these skills. The following worksheet folder contains five worksheets suitable for children of Classes 1–3.

Worksheet 1: Number Identification and Counting

Objective

To develop children's ability to identify and count numbers from **1 to 20**.

Activities

1. Count the pictures and tick the correct number.

- Apples – 7
- Balls – 5
- Flowers – 12
- Stars – 9

Children count the objects carefully and select the corresponding number.

2. Fill in the missing numbers.

1, 2, ____, 4, 5

6, ____, 8, 9, 10

11, 12, ____, 14, 15

This activity develops number recognition and sequencing skills.

Worksheet 2: Addition

Objective

To develop the basic understanding of addition through simple numerical and picture-based activities.

Activities

1. Add the following numbers:

1. $3 + 2 =$ _____
2. $4 + 3 =$ _____
3. $5 + 2 =$ _____
4. $6 + 3 =$ _____

2. Picture-based addition

Children count objects shown in two groups and find the total number.

For example:

$$\bullet \bullet \bullet + \bullet \bullet = 5$$

This helps children understand that addition means combining two groups.

Worksheet 3: Subtraction

Objective

To develop children's understanding of subtraction through objects and simple number sentences.

Activities

1. Solve the following:

1. $8 - 3 =$ _____
2. $7 - 2 =$ _____
3. $9 - 4 =$ _____
4. $10 - 5 =$ _____

2. Picture-based subtraction

Show a group of objects and ask children to cross out some objects and count how many remain.

For example:

$$\bullet \bullet \bullet \bullet \bullet - \bullet \bullet = 3$$

Such activities make subtraction easier and more meaningful for young children.

Worksheet 4: Comparison of Numbers

Objective

To develop an understanding of **greater than, smaller than and equal to**.

Activities

1. Fill in the correct sign (> , < or =):

1. 5 ____ 8
2. 12 ____ 10
3. 9 ____ 9

2. Compare groups

One group contains **6 balls** and another group contains **4 balls**.

Question: **Which group has more balls?**

3. Arrange numbers in ascending order

7, 2, 9, 5

Correct order: _____

These activities help children compare quantities and numbers.

Worksheet 5: Place Value

Objective

To develop an understanding of **Tens and Ones**.

Activities

1. Divide the number 23 into tens and ones.

- Tens: _____
- Ones: _____

2. Write the tens and ones for the following numbers:

- 15 → Tens: ____, Ones: ____
- 38 → Tens: ____, Ones: ____
- 46 → Tens: ____, Ones: ____

3. Make numbers from pictures

- 2 bundles of sticks and 4 single sticks = _____
- 3 bundles of sticks and 7 single sticks = _____

This activity connects the concrete representation of sticks with the written form of numbers.

Instructions for Using the Worksheet Folder

1. Give the worksheets to children at suitable intervals.
2. First solve the activities together with the teacher.
3. Then allow children to complete similar questions independently.
4. Use pictures and concrete objects wherever necessary.
5. Check the answers after completion.
6. Give positive feedback to encourage children.
7. Provide additional practice to children who need more support.

The worksheets should not be used only for written practice. Teachers should combine them with pictures, objects, games and classroom activities so that children understand the mathematical concepts clearly.

Conclusion

This worksheet folder provides regular practice in important areas of foundational numeracy, including **number identification, counting, addition, subtraction, comparison and place value**. The activities are simple and suitable for young learners. Regular use of these worksheets can help children improve their numerical understanding and confidence in Mathematics.

SECTION B – TASK 4

Analysis of Children's Written Work: Notebook and Worksheets

Introduction

Written work is an important part of Mathematics learning. By analysing children's notebooks and worksheets, a teacher can identify their common mistakes, understand the possible reasons behind those mistakes and plan suitable remedial activities. For this task, the written work of **Class 2 children** was observed, with special attention to number concepts, addition, subtraction, comparison and place value.

1. Purpose of the Analysis

The main purposes of analysing children's written work were:

- To identify common patterns of mathematical errors.
- To understand the possible causes of these errors.
- To identify areas where children need additional support.
- To plan suitable activities for improving their mathematical understanding.
- To provide individual guidance to children who face greater difficulty.

The analysis showed that children's errors were not always due to lack of mathematical knowledge. Attention, experience, language and confidence could also affect their performance.

2. Types of Errors Observed

(a) Number Identification Errors

Some children made mistakes while reading or writing numbers. They sometimes confused numbers or wrote them incorrectly.

Possible reason: insufficient practice in number identification and sequencing.

Remedial activity: Use number cards, number games and regular number-writing practice.

(b) Place Value Errors

Some children experienced difficulty understanding **Tens and Ones**. For example, they could write a two-digit number but were unable to correctly identify its tens and ones.

Possible reason: the concept was not sufficiently clear to them.

Remedial activity: Use bundles of sticks, beans and coloured cards to demonstrate tens and ones.

(c) Addition and Subtraction Errors

Some children made mistakes while adding or subtracting numbers. They could sometimes understand the operation using objects but faced difficulty when solving written questions.

Possible reason: insufficient activity-based practice.

Remedial activity: Use concrete objects, pictures and games before moving to written calculations. The teacher can demonstrate addition and subtraction step by step.

(d) Comparison Errors

Some children had difficulty deciding which number was greater, smaller or equal.

Possible reason: lack of sufficient practice with quantities and number symbols.

Remedial activity: Use number cards and real objects and ask children to compare two groups. Gradually introduce $>$, $<$ and $=$ signs.

(e) Errors Due to Inattention

Some children appeared to make mistakes because they completed questions very quickly without reading them carefully.

Possible reason: lack of attention or the habit of writing answers in a hurry.

Remedial activity: Encourage children to read each question carefully and check their answer before submitting their work.

(f) Language-Related Errors

Some children experienced difficulty understanding mathematical instructions or word problems.

Possible reason: difficulty understanding the language used in the question.

Remedial activity: Explain mathematical vocabulary in simple language and use pictures or objects to explain word problems.

(g) Errors Due to Anxiety

Some children may make mistakes because of nervousness or examination-related stress.

Remedial activity: Provide a supportive classroom environment and appreciate children's efforts instead of focusing only on incorrect answers.

3. Remedial Activities and Approaches

Activity-Based Learning

Teachers should increase hands-on activities. Bundled sticks, beans and coloured cards can be used to teach place value. A group game such as “**Who will make the correct number quickly?**” can also be organised.

Worksheets

Different worksheets should be provided for:

- Number identification
- Addition and subtraction
- Place value
- Comparison
- Word problems

The teacher should also redesign worksheets according to the errors commonly made by children.

Games and Quizzes

Number games, puzzles, card games and quizzes can be used to practise mathematical concepts. These activities can make learning more interesting and encourage children to participate actively.

Peer Learning

Children can work in pairs or groups. A child who understands a concept can help another child. This promotes cooperation and peer learning.

Individual Guidance

Children who experience greater difficulty should receive individual attention. The teacher should explain the concept again using simple examples and appreciate the child's efforts.

Regular Revision and Assessment

Concepts should be revised regularly. Small assessments can be used to identify children's progress and provide additional practice whenever required.

Conclusion

The analysis of Class 2 notebooks and worksheets shows that mathematical errors are common and can have different causes. Errors may arise from conceptual confusion, lack of practice, inattention, language difficulties or anxiety. Therefore, teachers should not consider mistakes only as weaknesses. They should use them to understand children's learning needs and plan appropriate remedial activities. Activity-based learning, games, worksheets, peer learning and individual guidance can help children develop greater confidence and improve their mathematical abilities.

TASK 5

Teaching a Mathematics Concept through JaaduiPitara / e-JaaduiPitara / ICT Resource

Introduction

ICT resources can make Mathematics learning more interesting, experiential and effective. Resources such as **JaaduiPitara** and **e-JaaduiPitara** provide opportunities for children to learn through games and activities. In this activity, the concept of **Comparison of Numbers** was taught to Class 2 children using an interactive digital resource.

1. Selected Concept

Concept: Comparison of Numbers – $>$, $<$ and $=$

Class: 2

Stage: Preparatory Stage

The main purpose was to help children understand which number is **greater, smaller or equal**.

2. Selection of ICT Resource

An interactive digital game related to **Comparison of Numbers** available through e-JaaduiPitara was selected. Examples include a number comparison game such as “**Which number's elephant is bigger?**”

The resource contains colourful pictures, animation and an attractive interface. Two numbers appear on the screen, and the child has to select the correct sign:

> , < or =

The game provides positive feedback for a correct answer and a hint or corrective message when the answer is incorrect.

3. Teaching Process

(a) Preparation

A smart TV, projector or tablet was arranged in the classroom. The children were divided into two groups. The e-JaaduiPitara portal was opened and the number-comparison game was selected.

(b) Introduction of the Concept

Before using the digital game, numbers from **1 to 50** were revised on the board.

The teacher then connected the concept with daily life by asking:

“If I have 8 mangoes and you have 5 mangoes, who has more?”

Children gave their answers. This helped them understand that comparison is useful in everyday situations.

(c) Active Use of ICT Resource

The game displayed two numbers on the screen, for example:

12 and 19

Children were called one by one and asked to select the appropriate symbol:

12 < 19

When a child selected the correct answer, the digital resource provided animation and applause. If the answer was incorrect, a corrective message was displayed.

The children also played the game together in groups, which encouraged participation and team learning. After each round, the teacher discussed the answer and asked questions such as:

“Why is 19 greater than 12?”

4. Learning Outcomes

After the activity, children were able to:

- Identify numbers correctly.
- Compare two numbers.
- Understand the meaning of **greater than, less than and equal to**.
- Use the symbols **>**, **<** and **=**.
- Explain their answers through simple reasoning.
- Participate actively in Mathematics activities.
- Develop confidence while solving mathematical questions.

The activity therefore connected the use of ICT with the intended mathematical learning outcomes.

5. Children's Response

The digital game created interest among the children because it combined Mathematics with colourful visuals, animation and interactive activities. Children were eager to take their turns and participate in the game.

The immediate feedback also helped children understand their mistakes and try again. Group participation encouraged discussion and cooperation among learners.

6. Assessment

Assessment was carried out through observation and questioning during the activity. The teacher observed whether children could correctly compare numbers and select the appropriate symbol.

Additional questions were also given on the board and through written practice to check whether children could apply the concept without the digital game.

7. Suggestions for Improvement

ICT should be combined with written practice and real objects such as **toys and fruits** so that children can connect digital learning with their surroundings.

For children with special needs, **audio instructions, larger fonts and additional time** can be provided. Children can also be encouraged to use e-JaaduiPitara at home with appropriate support.

Conclusion

The use of JaaduiPitara/e-JaaduiPitara and ICT for teaching **Comparison of Numbers** provided a positive learning experience. Children learned number identification and comparison while also developing confidence, participation and logical thinking. ICT resources can make Mathematics less difficult and more enjoyable by connecting learning with games and activities. Similar resources can also be used in future for concepts such as **addition, subtraction and place value**.

TASK 6

Unit Test on Place Value: Administration, Analysis and Detailed Report

Introduction

Place Value is an important concept in primary Mathematics. It helps children understand the structure of numbers and the meaning of **tens and ones**. A clear understanding of place value also supports children in reading, writing and working with numbers. Therefore, a unit test on **Place Value** was prepared and administered for Class 2 students.

1. Details of the Unit Test

- **Subject:** Mathematics
- **Topic:** Place Value
- **Class:** 2
- **Total Marks:** 20
- **Time:** 40 Minutes

The test was designed to assess children's understanding of tens and ones through objective, short-answer, picture-based and descriptive questions.

2. Unit Test

Section A – Objective Questions

5 Questions × 1 Mark = 5 Marks

Q1. Which is the tens digit in 23?

- (a) 2
- (b) 3
- (c) 5
- (d) 1

Q2. Which is the ones digit in 58?

- (a) 8
- (b) 5
- (c) 6
- (d) 0

Q3. 46 = ____ tens + ____ ones.

- (a) 4, 6
- (b) 6, 4
- (c) 4, 4
- (d) 6, 6

Q4. How many tens are there in 70?

- (a) 7
- (b) 0
- (c) 1
- (d) 10

Q5. Which is the ones digit in 19?

- (a) 1
 - (b) 9
 - (c) 2
 - (d) 0
-

Section B – Short Answer Questions

3 Questions × 2 Marks = 6 Marks

1. Write **35** in tens and ones.
 2. Write the tens digit and ones digit of **52**.
 3. Complete: **64 = ____ tens + ____ ones.**
-

Section C – Picture-Based Questions

2 Questions × 3 Marks = 6 Marks

1. There are **3 bundles of 10 sticks and 7 single sticks**.
 - Write the number.
 - Write its tens and ones.
 2. There are **5 bundles of 10 sticks and 2 single sticks**.
 - Write the number.
 - Write its tens and ones.
-

Section D – Long Answer Question

3 Marks

1. Write the tens and ones for the following numbers:
48, 27 and 90.
-

3. Administration of the Test

The test was conducted in the Class 2 classroom. Before starting the test, the teacher explained the instructions clearly to all children. Students were given **40 minutes** to complete the paper.

The teacher ensured that every child attempted the questions independently. Children were encouraged to read each question carefully before answering. During the test, the teacher observed children's working methods, especially while solving questions related to tens and ones.

The test included different types of questions so that children could demonstrate their understanding in more than one way.

4. Analysis of Students' Performance

After collecting the answer sheets, the responses were checked question by question. The analysis focused not only on the marks obtained but also on the **types of mistakes made by children**.

Some children were able to identify tens and ones correctly in two-digit numbers. However, a few children confused the tens digit with the ones digit. For example, some children identified **3 as the tens digit in 23** instead of 2.

Picture-based questions helped in identifying whether children actually understood the concept or were only memorising rules. Children who could correctly understand bundles of ten and individual sticks generally performed better in place-value questions.

Some mistakes were also related to hurried writing or misunderstanding the instructions. Such errors indicate that children need more practice and opportunities to work with concrete objects.

5. Remedial Activities

Based on the analysis, the following activities can be used:

(a) Bundle-and-Stick Activity

Children can use bundles of ten sticks and individual sticks to construct numbers such as 24, 35 and 47.

(b) Place Value Chart

A simple chart containing **Tens | Ones** can be used regularly.

(c) Number Cards

Children can select number cards and identify their tens and ones.

(d) Games and Quizzes

Games, puzzles and card activities based on place value can make practice interesting.

(e) Individual Guidance

Children who experience greater difficulty should receive individual explanation and additional practice. Their efforts should be appreciated through positive feedback.

6. Conclusion

The unit test helped assess children's understanding of **Place Value** in a systematic manner. It provided information about children's strengths as well as areas where additional support was required.

The analysis showed that activity-based learning, concrete materials, worksheets, games and regular revision can help children develop a clearer understanding of tens and ones. Assessment should therefore not be used only for giving marks; it should also help the teacher identify learning difficulties and plan appropriate remedial activities.

Thus, the unit test became an important tool for understanding children's learning and improving the teaching-learning process.

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