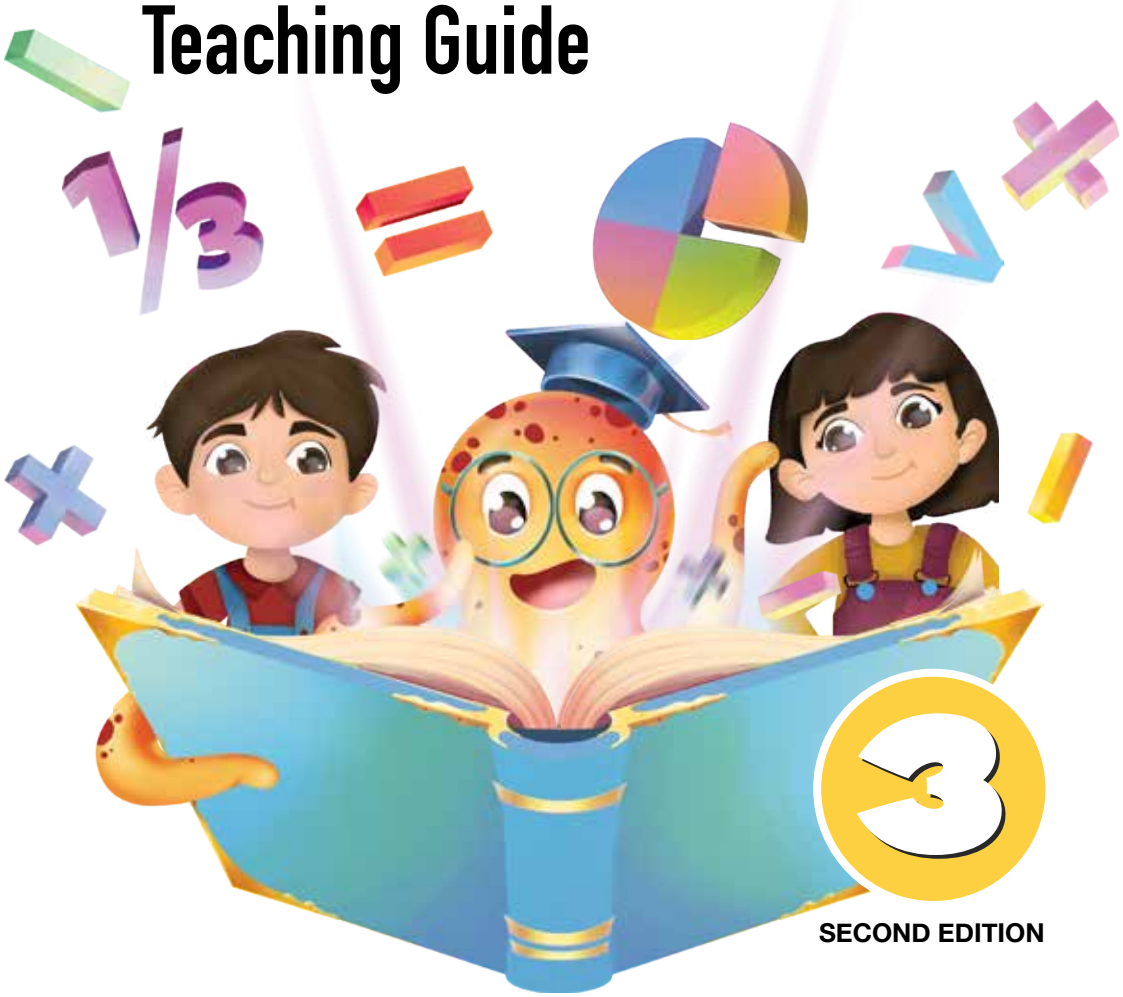
MATHS WISE

Teaching Guide



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SECOND EDITION

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Plan Your Work and Work Your Plan

Before creating a lesson plan, it's essential to understand the art of teaching. Effective teaching involves connecting with students' daily lives and revisiting previously learned material. A well-structured lesson plan is crucial to engaging every student in the classroom. There are three key components to lesson planning:

A. Curriculum:

A curriculum should be tailored to meet students' needs and school objectives, avoiding overambition and haphazard planning, particularly in math education.

B. Instruction:

Teachers can use various methods, such as verbal explanations, visual aids, and inquiry-based learning, to deliver instruction. The best teachers adapt their approach to suit their students' needs, continuously updating their skills and methodology.

C. Evaluation:

Evaluation is a tool to assess not only students' understanding but also the effectiveness of the teacher's instruction. It helps teachers refine their approach and ensure students achieve their full potential.

By considering these three facets, teachers can create comprehensive lesson plans that promote meaningful learning and student engagement.

D. Long-term Lesson Plan

A long-term lesson plan covers the entire term and typically involves school coordinators outlining the core syllabus and unit studies. When planning, two crucial factors to consider are:

- **Time frame:** Allocating sufficient time for each topic to ensure comprehensive coverage.
- **Prior knowledge:** Assessing students' existing knowledge of the topic to inform the planning process.

An experienced coordinator will consider the topic's complexity and the students' ability to grasp it within the given time frame. Assigning the optimal number of lessons for each topic is essential to avoid overspending time on easier topics, which could impact the time needed for more challenging topics later.

E. Suggested Unit Study Format

Weeks	Dates	Month	Number of Days	Remarks

Short-term Lesson Planning

The responsibility of the course teacher. The term "lesson" originates from the Latin word "lectio," meaning the action of reading, but in this context, it refers to the action of teaching a topic in the classroom. To plan a topic effectively, consider the following suggested format, while also being open to adapting and improving your approach based on your school's and colleagues' methods.

When planning a lesson, consider the following steps:

1. **Topic:** Identify the topic title.
2. **Overview:** Assessing students' prior knowledge of a topic is a crucial step in the learning process, involving the evaluation of what students already know, understand, and can do related to the topic before instruction begins.

To assess prior knowledge, teachers can use various methods, including:

- Pre-assessment quizzes or tests to gauge students' understanding of the topic.
- Class discussions to explore students' thoughts, ideas, and experiences related to the topic.

By assessing prior knowledge, teachers can create a more effective and engaging learning environment, ultimately leading to better student outcomes.

3. **Objectives:** Clearly defining the learning objectives for a topic is a crucial step in the lesson planning process. Learning objectives specify what students are expected to know, understand, and be able to do by the end of the lesson or topic.

By clearly defining learning goals, teachers can create a roadmap for instruction, guide assessment, and promote student understanding, ultimately leading to more effective teaching and learning.

4. **Time Frame:** Accurately estimating the time required for each topic is vital to ensure a successful lesson plan. However, class dynamics can be unpredictable, and flexibility is essential to adapt to the unique needs and responses of each class. Note that introductory sessions often require more time, but as the topic progresses, students may learn faster, allowing for potential reductions in the allocated timeframe.

To effectively manage classroom time, teachers should:

- establish a general time frame for each topic,
- be prepared to adjust as needed,
- monitor student progress,
- prioritize essential tasks, and leave buffer time for unexpected events or questions, ensuring a flexible and adaptive lesson plan.

5. **Methodology:** This refers to how you will demonstrate, discuss, and explain the topic to your students. Effective methodology involves using a range of teaching methods to cater to different learning styles, incorporating technology, providing opportunities for questions and feedback, and encouraging active learning through group work and problem-solving activities. By using varied methodologies, teachers can create an engaging, interactive, and student-centred learning environment that promotes deeper understanding and application of the topic.

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6. **Resources Used:** Refers to the materials and tools needed to support teaching and learning.
- **Tangible materials:** Everyday objects that will help students to visualize and understand complex concepts.
- **Printed materials:** Exercise books, worksheets, and test worksheets to provide students with hands-on practice and assessment opportunities.
- **Assignments and projects:** Longer-term tasks that require students to apply their knowledge and skills.
- **Digital resources:** Online tools, software, and multimedia resources, such as educational apps, videos, and interactive simulations, to enhance engagement and understanding.

By identifying and listing the resources needed, teachers can ensure that they have everything required to deliver effective instruction and support student learning.

7. **Continuity:** Continuity refers to reinforcing learning throughout a topic to ensure students retain and build upon previously acquired knowledge. To achieve continuity, teachers can alternate between class work and homework, gradually increase task difficulty, use varied teaching methods and resources, and provide regular feedback and assessment. By planning for continuity, teachers help students develop a strong foundation of knowledge and skills, making connections between lessons and topics, and promoting deeper understanding and application of the subject matter.
8. **Supplementary Work:** To further enhance student learning, teachers can consider additional activities to complement their instruction.
    - **Group projects or individual research:** Encourage students to work collaboratively or independently on projects that delve deeper into the topic, promoting critical thinking, problem-solving, and creativity.
    - **Presentations or assignments:** Provide opportunities for students to demonstrate their understanding through presentations, reports, or other assignments, helping to develop their communication and critical thinking skills.
9. **Evaluation:** Ongoing assessment is essential to monitor student progress, identify areas of improvement, and inform teaching adjustments. Strategies include:
    - **Regular quizzes and self/peer correction:** Administer quizzes to check students' understanding and provide opportunities for self-reflection and peer feedback.
    - **Formal tests at the end of the topic:** Conduct comprehensive tests to assess students' mastery of the topic and identify areas where they may need additional support.
    - **Continuous monitoring of student progress:** Regularly review student work, observe their participation, and engage in one-on-one discussions to inform teaching adjustments and ensure students are on track to meet learning objectives.

By incorporating supplementary work and ongoing evaluation, teachers can create a comprehensive and supportive learning environment that fosters student growth and achievement.

Scheme of Work

Unit: Estimated number of Lessons:

Specific Learning Outcomes (SLOs):

These are the expected changes or improvements in students' knowledge, attitudes, or skills by the end of a lesson. Teachers should list the SLOs in a precise format, ensuring they are SMART (Specific, Measurable, Achievable, Relevant, Time-bound). There can be multiple SLOs for a lesson.

Prior Knowledge Assessment:

Teachers should list clear, concise questions to assess students' awareness before introducing new concepts and skills. These questions can be asked randomly or as a quiz but should be brief. This assessment demonstrates students' readiness to learn and stimulates interest. Teachers should have a clear idea of the expected answers.

Resources:

Plan a short activity or strategy to capture students' attention and transition from the previous lesson. This activity should be interesting and relevant to the students, such as a discussion on scientific exploration, interesting facts, or real-life applications of the topic. Outline the teaching activities and steps in sequence, specifying their impact on student learning.

Class Assignment:

Specify the written work students will complete in their notebooks during the lesson.

Home Assignment:

Specify the work students will do at home. Home assignments should reinforce or extend what was learned in class, not repeat the same work or introduce entirely new topics.

Evaluation:

Evaluation should occur within the lesson through activities or tools that assess students' learning based on the lesson's objectives. Home assignments should not be used for evaluation. Teachers should evaluate students during and after learning to understand their progress and adjust teaching methods accordingly. Assessment is ongoing and can be formative or summative.

Ways to Evaluate Teaching and Student Learning:

- Oral Assessment: Ask concept-check questions.
- Written Assessment: Use quizzes, games, classwork, homework, and tests.
- Teacher's Assessment: Engage students in discussions or observe them during activities.
- Peer Assessment: Students provide feedback on their classmates' work.
- Personal Assessment: Students evaluate their own performance.

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Bringing Innovative Mathematical Pedagogy to the Classroom

Introduction

Effective mathematics instruction is a complex and dynamic process that necessitates a combination of theoretical foundations, practical strategies, and a comprehensive understanding of how students learn.

Creating a Supportive Learning Environment

A supportive learning environment is essential for cultivating a positive and inclusive classroom atmosphere. This involves establishing a space where students feel secure in taking risks, posing questions, and delving into mathematical concepts. Teachers can accomplish this by utilizing strategies such as:

Think-Pair-Share: This method encourages students to collaborate in pairs to solve mathematical problems and exchange their solutions with the class.

Number Talks: This technique entails discussing mathematical concepts and resolving problems collectively as a class, enhancing active engagement and communication among students.

Math Centers: This approach pertains to organizing various stations or centers in the classroom where students can engage in diverse mathematical activities, fostering hands-on learning and exploration.

The Concrete-Representational-Abstract (CRA) Framework

Concrete-Representational-Abstract (CRA) is a core framework for teaching mathematics that consists of introducing concepts using tangible objects, progressing to representational models, and ultimately, abstract symbols. This framework enables students to cultivate a profound understanding of mathematical concepts by linking abstract ideas to concrete experiences.

For instance, when instructing on addition, students can begin with counting blocks, advance to number lines, and finally utilize numerical equations. This gradual transition from concrete to abstract aids students in establishing a solid foundation in mathematics.

Differentiated Instruction

Differentiated instruction is vital for addressing various learning needs and abilities within the classroom. Teachers can implement different strategies, such as:

Choice Boards: This technique entails offering students a board or chart that presents various learning activities or tasks, allowing them to select the activities that best align with their learning style and capability.

Choice boards can be customized to specific learning objectives and may include a wide array of activities, such as:

- Completing a worksheet or practice exercise
- Creating a visual project or presentation
- Conducting an experiment or investigation
- Participating in a group discussion or debate

This strategy empowers students to take ownership of their education, progress at their own rate, and make selections that resonate with their interests and strengths.

Math Journals: This strategy includes having students keep a journal or notebook where they can document their thoughts, ideas, and solutions to mathematical challenges.

Students can utilize their journals to:

- Record their thinking and problem-solving processes
- Draw diagrams or illustrations to assist them in understanding mathematical concepts
- Write reflections on their learning and identify areas requiring further practice
- Create concept maps or vocabulary lists to aid them in organizing their thoughts

Resource-Based Learning: This strategy consists of supplying students with an assortment of resources and materials to improve their learning, such as:

- Manipulatives (e. g., Geo boards, base ten blocks, pattern blocks)
- Games and puzzles
- Real-world objects and materials (e. g., measuring cups, scales, geometry shapes)
- Printed or photocopied worksheets and activity sheets

This approach enables students to interact with mathematical ideas in a practical and engaging manner, even without technology.

Inquiry-Based Learning and Problem-Solving

Inquiry-based learning and problem-solving are essential elements of math education that focus on motivating students to explore, examine, and share their discoveries. Instructors can create open-ended tasks that encourage students to think critically, reason mathematically, and formulate problem-solving techniques.

For instance, while teaching geometry, students can engage in a "shape scavenger hunt," where they identify and describe different shapes found in their surroundings. This kind of inquiry-driven learning aids students in attaining a more profound comprehension of mathematical principles and enhances their critical thinking and problem-solving abilities.

Assessment and Feedback

Assessment and feedback are crucial aspects of successful math instruction that guide teaching and support student development. Educators can apply a variety of methods, including:

- **Formative assessments:** This method involves consistently evaluating student comprehension and development throughout a lesson or unit, offering feedback and modifying instruction as necessary.

- **Self-assessment:** This approach involves encouraging students to ponder their own learning and comprehension, recognizing both strengths and weaknesses.
- **Peer feedback:** This technique involves having students give support and feedback to one another, fostering collaboration and communication.

Technology Integration- Digital

Incorporating technology is another vital element of contemporary math education that can enrich teaching and learning. Instructors can employ digital instruments, such as math software, applications, and online materials, to:

- **Engage students:** Digital resources can offer interactive and immersive learning situations that capture students' attention and enhance motivation.
- **Promote interactive learning:** Digital tools can encourage active learning and investigation, allowing students to discover and experiment with mathematical ideas.
- **Provide real-time feedback:** Digital resources can deliver instant feedback and evaluations, assisting educators in pinpointing areas where students require further assistance.

Cultural Relevance and Responsiveness

Cultural relevance and responsiveness are significant factors in math education that involve recognizing and appreciating the varied backgrounds, experiences, and viewpoints of students. Educators can implement culturally responsive teaching methodologies, such as:

- **Incorporating real-world examples:** Instructors can use practical examples and applications to demonstrate mathematical concepts, making them more meaningful and understandable for students.
- **Using multicultural resources:** Teachers can utilize multicultural materials and resources to expose students to a variety of perspectives and experiences.
- **Promoting student voice and agency:** This is a powerful way to engage students in mathematics education, foster a sense of ownership and motivation, and develop essential skills for lifelong learning. By offering students opportunities to take charge of their learning, educators can help them develop into confident, self-directed, and mathematically literate individuals.

Conclusion

To summarize, effective math instruction necessitates a thorough and diversified approach that encompasses various strategies, techniques, and tools. By establishing a nurturing learning space, applying the CRA framework, customizing instruction, fostering inquiry-based learning, leveraging assessment and feedback, integrating technology, and encouraging cultural relevance and responsiveness, educators can cultivate deep understanding, inspire a passion for mathematics, and equip students for success in a more intricate and interconnected world.

The Features of a Dynamic Classroom: A Comprehensive Approach to Effective Teaching and Learning

Introduction

A dynamic classroom is a learning environment that is characterized by engagement, motivation, and a sense of community. It is a space where students feel valued, supported, and challenged to reach their full potential. In this essay, we will explore the features of a dynamic classroom and discuss how teachers can create such an environment to promote effective teaching and learning.

Student-Centered Learning

- **Personalized Learning:** Students have different learning styles, interests, and abilities. A dynamic classroom accommodates these differences by offering personalized learning experiences.
- **Inquiry-Based Learning:** Students are encouraged to explore, investigate, and discover concepts and ideas through hands-on activities and real-world applications.

Collaborative Learning

- **Teamwork and Communication:** Students work together in groups to complete tasks, projects, or activities, promoting teamwork, communication, and problem-solving skills.
- **Diverse Perspectives:** Collaborative learning allows students to share their ideas, perspectives, and experiences, creating a rich and diverse learning environment.
- **Peer Feedback and Support:** Students provide feedback and support to each other, promoting a sense of community and responsibility.

Technology Integration

- **Digital Tools and Resources:** Technology is used to support teaching and learning, enhance student engagement, and promote collaboration.
- **Online Learning Platforms:** Online platforms provide access to a wide range of resources, including online textbooks, educational apps, and multimedia content.
- **Virtual Field Trips and Guest Speakers:** Technology allows students to participate in virtual field trips and interact with guest speakers from around the world.
- **Case Studies:** Real life case scenarios integrating story sums in mathematics classes.

Flexible Learning Spaces

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- **Learning Zones:** Teachers create different learning zones or areas, each with its own unique characteristics and features, to promote movement, collaboration, and creativity.
- **Outdoor Learning Spaces:** Outdoor learning spaces provide opportunities for hands-on learning, exploration, and discovery in a natural environment.

Real-World Applications

- **Project-Based Learning:** Students work on real-world projects that require them to apply what they have learned to solve problems and create solutions.
- **Industry Partnerships:** Schools partner with industries and organizations to provide students with opportunities to work on real-world projects and gain practical experience.
- **Service Learning:** Students participate in service-learning projects that require them to apply what they have learned to make a positive impact in their community.

Ongoing Assessment and Feedback

- **Formative Assessments:** Teachers use formative assessments to monitor student progress and understanding throughout the learning process.
- **Feedback and Self-Assessment:** Students receive regular feedback and are encouraged to reflect on their own learning, set goals, and identify areas for improvement.
- **Summative Assessments:** Teachers use summative assessments to evaluate student learning at the end of a lesson, unit, or semester.

Teacher Reflection and Professional Development

- **Reflective Practice:** Teachers reflect on their teaching practices, seeking ways to improve and innovate.
- **Professional Learning Communities:** Teachers participate in professional learning communities to share best practices, collaborate with colleagues, and learn from each other.
- **Workshops and Conferences:** Teachers attend workshops and conferences to stay up to date with best practices and new technologies.

Embracing Diversity and Inclusion

- A dynamic classroom values diversity and promotes inclusion.
- Teachers create a welcoming environment using diverse texts, images, and resources that reflect students' backgrounds and experiences.
- This helps students feel seen, heard, and valued, building trust, motivation, and a sense of belonging.

Fostering a Growth Mindset

- A dynamic classroom fosters a growth mindset.
- Teachers encourage students to view challenges as opportunities for growth and learning, rather than threats to their ego.
- Teachers praise effort, persistence, and progress, rather than just talent or ability, to help students develop a growth mindset.

Key Takeaways

- A dynamic classroom empowers students to take ownership of their learning, unleash their creativity, and reach their full potential.
- Educators can create a learning ecosystem that fosters academic excellence, social growth, and emotional well-being by embracing the features of a dynamic classroom.

Creating a Sustainable Learning Environment

- A dynamic classroom is a sustainable learning environment that promotes long-term growth and development.
- Teachers can create a sustainable learning environment by establishing clear routines, providing opportunities for student reflection, and encouraging ongoing feedback and assessment.
- By creating a sustainable learning environment, educators can help students develop the skills and habits necessary to succeed in an ever-changing world.

Review and Assess Exercises

- **Regular Review:** Regular review and assess exercises help students reinforce their understanding of key concepts, identify areas for improvement, and develop problem-solving skills.
- **Adjusting Instruction:** By regularly reviewing and assessing student progress, teachers can adjust their instruction to meet the diverse needs of their students.

A dynamic classroom is a transformative environment that empowers students to take ownership of their learning, unleash their creativity, and reach their full potential. By embracing the features outlined in this essay, educators can create a learning ecosystem that fosters academic excellence, social growth, and emotional well-being.

Table of Content

Unit 1 Whole Numbers

Learning Framework

Pupils will learn to identify, read, and write Roman Numbers from 1–20.

Explain to students that this system of numbers was developed by Roman around 2000 year ago. It is the oldest way of writing numbers which is still existing and used by us. This system was invented before the invention of 'zero'. So, they couldn't write 'ten' as '10'.

Classwork: Complete Exercise 1

Identify even and odd numbers and list them as well in the given range of numbers.

Don't begin the lesson by defining even or odd numbers. Let the pupils do the division of numbers manually to find even and odd numbers. Make seating arrangements in a way that pupils are sitting in pairs. Provide each pair with a bundle of sticks, containing 3, 4, 5, 6, 7, … sticks (depending on number of pairs of students). Instruct each pair to open the bundle and count the total sticks. Write the total number of sticks on a piece of paper. Then distribute the sticks fairly (equally) between themselves. If there are any undistributable sticks, leave them on the table. When students have done the activity, take feedback from each group separately. Ask them about the total number of sticks and the remaining ones and note them on the board in the form of a table as given below:

Total Sticks	Remaining	Type
3	1	odd
4	0	even
5	1	odd
6	0	even
7	1	odd
8	0	even
9	1	odd
10	0	even
11	1	odd

If the remaining sticks are more than one, tell them to complete the distribution. There are only two different remainders, 1 and 0. Ask them what can you say about the numbers which have zero as remainder? These numbers can be divided into two groups equally while others cannot be. Show them clearly that the last digit of an even number is 0, 2, 4, 6, or 8. Now tell them the definition of

even numbers and ask them to identify which are even numbers in the table, and then mark them in the table. Tell them that the non-even numbers are called odd numbers. Mark them on the board as well.

Classwork: Complete Exercise 2

Counting and Representing 4-Digit Numbers

Pupils will develop the ability to count to 9999 and represent 4-digit numbers in numerals. To achieve this, teachers will use base-ten blocks or place value charts to demonstrate the concept of 4-digit numbers. Pupils will practice counting up to 9999 using number lines or hundreds charts. The teacher will observe pupils during counting activities and review worksheets to assess their understanding of 4-digit numbers.

Reading and Writing Large Numbers in Numerals and Words

Pupils will learn to read and write up to 999 and 10,000 in numerals and in words. Teachers will use flashcards or posters with numbers up to 999 and 10,000 to demonstrate the relationship between numerals and words. Pupils will practice reading and writing numbers up to 999 and 10,000 in numerals and words, and will apply their knowledge in real-life contexts, such as reading prices or quantities.

- Identify the place value of digits in the given number up to ten thousand.
- Write the names of the numbers up to the place value ten thousand as well as in expanded form.

Pupils will develop the ability to identify the place value of digits in numbers up to ten thousand. To achieve this, teachers will use place value charts to demonstrate the concept of place value. Pupils will learn that each digit in a number has a specific place value, such as ones, tens, hundreds, thousands, and ten thousands.

Pupils will learn to write numbers up to ten thousand in words and expanded form. Teachers will use flashcards or posters with numbers up to ten thousand to demonstrate the relationship between numerals and words. Pupils will practice writing numbers up to ten thousand in words (e.g., ten thousand) and expanded form (e.g., 10,000 = 10 x 1,000). They will apply their knowledge in real-life contexts, such as reading prices or quantities.

Classwork: Complete Exercise 3 & 4

- Representing Numbers on a Number Line
- Identifying Numbers on a Number Line

To teach pupils to represent a given number on a number line up to 2-digit numbers, teachers can use number lines, hundreds charts, or worksheets with number lines. Pupils can practice representing numbers on a number line using online games or interactive whiteboards. For instance, the teacher can ask pupils to represent the number 45 on a number line.

Pupils will learn to identify the value of a number from a number line up to 2-digit numbers.

Teachers can use number lines, hundreds charts, or worksheets with number lines to help pupils understand the concept of number lines. For example, the teacher can use a number line to demonstrate how to identify the value of a number.

Classwork: Complete Exercise 5

Compare numbers using symbols and arrange numbers up to 9999 (3, 4-digits) using symbols <, >, or =.

Pupils will learn to compare the left-hand side number with the other in the given pair of numbers and decide whether it is smaller, larger, or equal to the other number then insert the suitable notation accordingly.

Pupils are aware of comparison of numbers. Now focus on left-hand side number. Explain to them how to insert equality and inequality marks between the two given numbers.

is equal to	=
smaller / less than	<
bigger / greater than	>

If the left-hand side number is smaller than the other number, then insert the less than mark. For example, 543 < 553.

If the left-hand side number is bigger than the other number, then insert the greater than mark. For example, 553 > 552.

If the left-hand side number is equal to the other number, then insert the less than mark. For example, 541 = 541.

Classwork: Complete Exercise 6

Round numbers to the nearest 10, 100, and 1000 using different concrete and pictorial representations.

Pupils will learn to round off the numbers given to the nearest 10 or 100.

Rounding off a number to nearest ten means finding the number in tens closest to the given number.

The process of rounding off appears very simple when learnt but for the pupils of class 3, it is a multi-skills complicated process. To round off a number to nearest 10, first introduce them with the list of numbers in tens as given below:

10, 20, 30, 40, 50, 60, 70, 80, 90, 100, 110, 120, 130, 140, 150, …

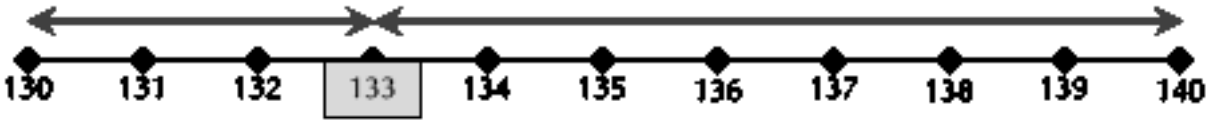
Let you need to round off 110,117, and 133 to the nearest 10.

110 is part of the numbers in tens so, it doesn't require rounding off to the nearest 10.

117 does not belong to the list of numbers in tens so, it has to be rounded off to the nearest 10. In the list of the numbers in tens, 117 exists between 110 and 120.

The distance of 117 from 110 and 120 is shown in the diagram above. Everybody can see that 117 is closer to 120 than 110 so, 117 to the nearest 10 is equal to 120.

133 does not belong to the list of numbers in tens so, it must be rounded off to the nearest 10. In the list of the numbers in tens, 133 exists between 130 and 140.

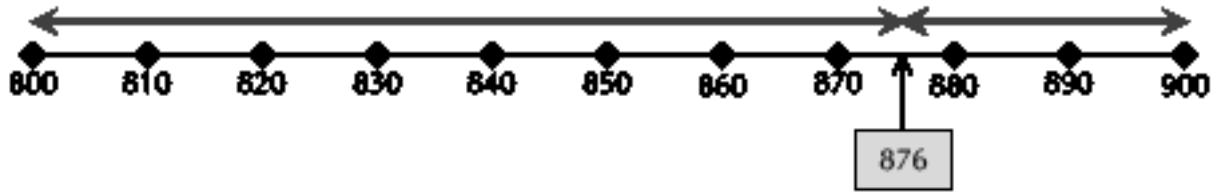


The distance of 133 from 130 and 140 is shown in the diagram above. It can be easily noticed that 133 is closer to 130 than 140 so, 133 to the nearest 10 is equal to 130.

Rounding off a number to nearest hundred means to find the number in hundreds closest to the given number. First introduce them with the list of numbers in hundreds as given below:

100, 200, 300, 400, 500, 600, 700, 800, 900, 1000, 1100, 1200, …

To round off 876 to the nearest 100, notice that 876 exists between 800 and 900. Draw a number line like below and mark the position of 876 on it.



The distance of 876 from 800 and 900 is shown in the diagram above. It can be easily noticed that 876 is closer to 900 than 800 so, 876 to the nearest 100 is equal to 900.

Classwork: Complete Exercise 7

Recognise and extend a given number pattern in increasing and decreasing order.

To teach pupils to recognise and extend number patterns, teachers should start by introducing simple patterns using visual aids such as blocks, counting bears, or number lines. The teacher

should explain that a pattern is a sequence of numbers that follow a specific rule, and that pupils can use this rule to extend the pattern. For example, the teacher might show pupils the pattern 2, 5, 8, 11 and ask them to identify the next number in the sequence. The teacher should encourage pupils to look for relationships between the numbers and to use reasoning to explain their answers. As pupils become more confident, the teacher can introduce more complex patterns, including those that increase and decrease.

Finding Missing Numbers or Operations in Number Sentences

To teach pupils to find missing numbers or operations in number sentences, teachers should start by introducing simple number sentences with missing numbers or operations, such as 2 + _ = 5 or 5 - _ = 2. The teacher should explain that pupils need to use reasoning and problem-solving skills to figure out the missing number or operation. The teacher can use visual aids such as number lines or hundreds charts to help pupils visualise the problem and find the solution. As pupils become more confident, the teacher can introduce more complex number sentences, including those with multiple missing numbers or operations.

Classwork: Complete Exercise 8

Lesson Plan

Suggested Time: 2 periods

Objectives:

To enable students to:

- Read and write Roman numbers up to 20.

Concept Connector:

Learning Roman numerals allows students to connect to ancient Rome and its historical context. To this day, Roman numerals are still in use. In this year, students will be able to extend their focus on how Roman numerals are read and written.

Exploring the Objective:

Introduce the topic by asking the students what they already know about Roman numerals. Use the concept connector on Page 2 to help students recall Roman numerals up to 12. Following recall, introduce how Roman numerals are written by showing how they can be represented by fingers. Furthermore, use the text and examples on page 3 and 4 to explain the rules of writing them. To explain the real-life relevance of using Roman numerals, Math in Action on page 4 can be incorporated within the lesson.

Activity

What you need

- Flashcards with Roman numerals I-XX and their corresponding Arabic numerals
- Markers
- Candies/stickers/or any small reward

How to Play

- Create flashcards with Roman numerals (I-XX) and their corresponding Arabic numerals.
- Shuffle them and place them face down.
- Divide the students into pairs.
- Ask a pair to flip two cards at a time and try and match the Roman numeral to its corresponding Arabic numeral.
- If they find a pair within 5 tries, they keep the pair and get a small reward.

Reflection

- Students develop the skill to recognise, read and write Roman numerals up to 20.

Exercise

To reinforce knowledge of Roman numerals, carry out question 1 of Exercise 1. Use QR activity sheet on Page 2 as a worksheet to reinforce the students' knowledge of Roman numerals.

Extension Activity

The following questions can be given as added practice, worksheet or as reinforcement of the topic.

1. Write the number 44 in Roman numerals.
2. Write the Arabic numeral for LXXXVIII.
3. Write the missing numbers: LXXI, _____, LXXIII, LXXIV, _____.

Activity Sheet

Unit 1 Whole Numbers

Learning Objective:

- Read roman numbers up to 20.
- Write roman numbers up to 20.

Let's Talk Math: Ask pupils if they have ever encountered roman numbers before.

Make Sure You Have: Roman Numeral Cards

Activity: Roman Number Fun

Duration: 1 Lesson **Whole Class Activity**

Let's Try It:

- Write the Roman numerals up to 20 on the board.
- Ask pupils to identify them.
- If anyone knows the right answer, let them explain to the class.
- If not, explain that these are Roman numerals.
- Explain that Roman numerals are like the Arabic numerals they use but written differently.
- Go through the numerals with the class, reading them aloud and pointing to each number.
- To read them, add the values together (e.g., 'XX' is two tens, which equals 20).
- Repeat this process a few times.
- Divide the class into groups of 3 to 5 pupils.
- Give each group a set of twenty cards with a Roman numeral on each card.
- Allow time for each group to arrange the cards in order.

Assessment:

- Give pupils time at their desk to write all the roman numbers in their notebooks in order.
- After they are done, have pupils do a peer review.

Place Values

Learning Objective:

Identify the place values of numbers up to 5 digits.

Let's Talk Math:

Ask pupils if they know place value of 2-, 3-, 4-, and 5-digit numbers from before.

Make Sure You Have:

Place Value Chart

Activity:

Place Value Parade

Duration: 1 Lesson Whole Class Activity

Let's Try It:

- Write 5 zeros on the board.
- Ask pupils how many zeros are on the board.
- Point to the right-most zero and ask for its place value (answer: ones).
- Write "ones" above the zero.
- Repeat for the other zeros, labeling the place values from right to left: ones, tens, hundreds, thousands, ten thousands.
- Go over the place values several times.
- Erase the labels and ask pupils to raise their hands and name the place values.
- Once pupils are confident, write random five-digit numbers on the board.
- Invite pupils to come to the board one by one and circle a specified place value in the number.

Assessment:

- Read out twenty-five-digit numbers, and after each number, say a place value up to ten thousand.
- Ask pupils to write them down in digits and circle the stated place value.
- Once they are done, allow them to peer review.

Number Line

Learning Objective:

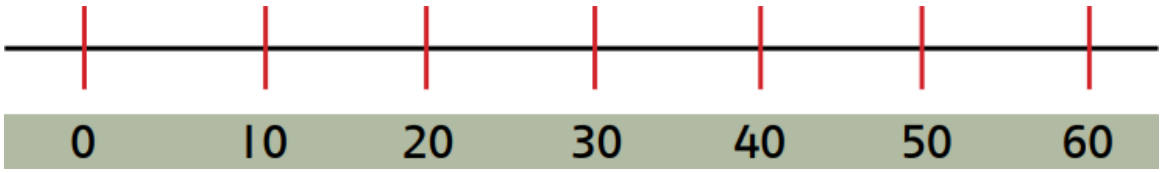
- Represent a given number on number line up to 2-digit numbers.
- Identify the value of a number from number line up to 2-digit numbers.

Let's Talk Math:

- Ask the students if they think that numbers are complicated.
- They have learnt a lot about numbers and should realise that even though there is more to learn, that doesn't mean it has to be complicated.

Make Sure You Have:

- Bowl
- Chits



Activity: Number Line Challenge

Duration: 1 Lesson **Whole Class Activity**

Let's Try It:

- Fill a bowl with chits, each containing two 2-digit numbers with a difference of 10 (e.g., 35 and 45, or 76 and 86).
- Pass the bowl around the class so each student picks one chit.
- Pick a chit yourself after everyone has theirs.
- Draw a line on the board to create a number line, ranging from the smaller number to the larger number on your chit.
- Demonstrate the process clearly so the class understands.
- Ask students to pair up.
- Each pair will make a 10-centimetre line and create a number line from the smaller number on their chit to the larger one.
- Ensure they label the numbers correctly on their number lines.

Assessment: This exercise should be done individually. Ask each pupil to choose three two- digit numbers. Then ask them to make three number lines, one for each, that start from five numbers before and extend to five numbers after.

Even and Odd Numbers

Learning Objective:

- Recognise even and odd numbers till 99 within a given sequence.
- Differentiate between an even and an odd number within a given sequence.

Let's Talk Math: Ask pupils why numbers are important and how they use it in their daily lives.

Make Sure You Have: Even and Odd Numbers

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

Activity: Even-Odd Hunt

Duration: 1 Lesson **Group Activity**

Let's Try It:

- Encourage the class to name random numbers divisible by 2.
- Explain that numbers divisible by 2 are called even numbers and the numbers that cannot be divided by 2 are called odd numbers.
- Ask them to think of odd numbers.
- Divide the class into 5 groups and sssign each group a range of numbers between 1 and 99.
- Ask each group to make cards for their assigned numbers.
- Tape the number cards on the walls around the classroom, creating a number line.
- Provide highlighters and ask pupils to identify and colour even numbers one colour and odd numbers another.
- Decide on and explain the colour code and remind them to highlight only when certain.
- Discuss the easy method of identifying even and odd numbers by looking at the last digit.
- If the last digit is 0, 2, 4, 6, or 8, the number is even.

Assessment:

Write up to 20 random numbers on the board and ask the pupils to identify the even numbers.

Name: _____

Date : _____

Ascending/Descending order

a. 379 878 778 741

b. 608 554 800 545

c. 678 209 579 687

d. 337 540 595 319

Ask the students to pick any two sequence of four number cards. Ask them to arrange one set in ascending order and other set in descending order.	*Comparing and ordering numbers*

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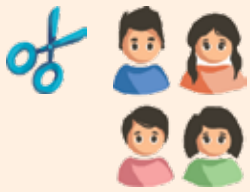
Name: _____

Date : _____

Rounding Off



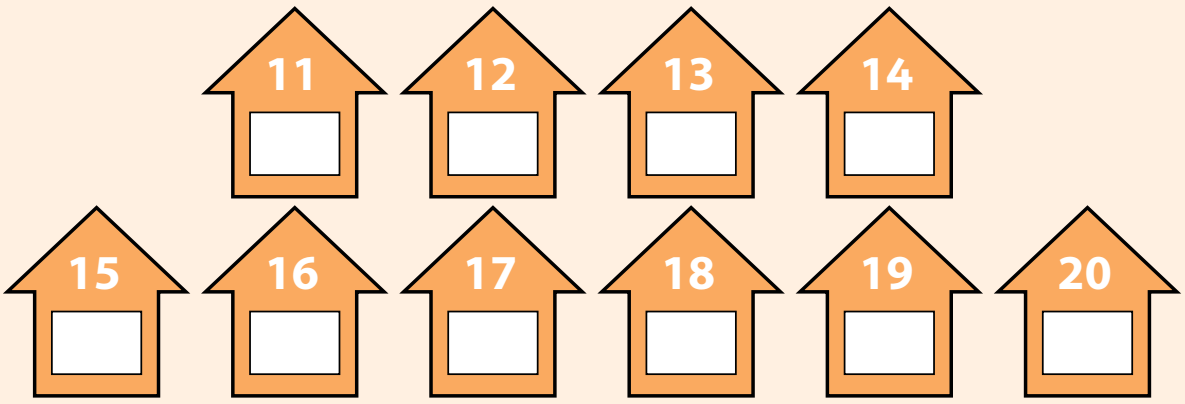
162	276	535
93	308	712
420	851	938

Round off to the nearest tens and hundreds.	*Estimation*

Solutions of Review and Assess

Whole Numbers

1. Write the house numbers in Roman numerals.



2. Write **true** or **false**

a. 24 is an even number. ☐

b. 53 is not an odd number. ☐

c. All numbers ending in 0, 2, 4, 6, or 8 are even numbers. ☐

d. All numbers ending in 1, 3, 5, 7, or 9 are odd numbers. ☐

3. Shade all odd numbers green and even numbers blue in the given grid.

236	237	238	239	240	241	242	243	244
245	246	247	248	249	250	251	252	253
254	255	256	257	258	259	260	261	262
263	264	265	266	267	268	269	270	271

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4. I am greater than 10 but less than 13. I am an even number.
Who am I? ☐

5. Write the place value of the bold digit in each number.

a. 570**3** ☐ b. 94**3**16 ☐

c. 4**1**802 ☐ d. **1**6034 ☐

6. How many tens are there in 500? _____

7. How many tens are there in 9000? _____

8. How many tens are there in 40 000? _____

9. Write these numbers in words.

a. 1234 _____

b. 58,023 _____

c. 40,000 _____

d. 98,765 _____

e. 8006 _____

f. 15,235 _____

g. 99,999 _____

h. 81,654 _____

10. Write the number.

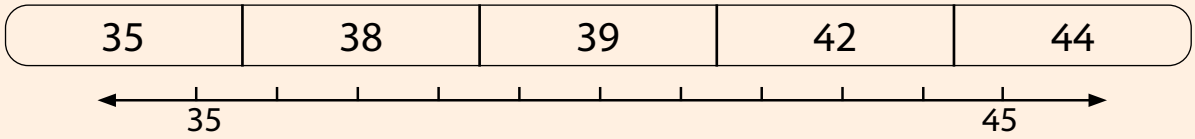
a. Forty-two thousand five hundred and thirty-six ☐

b. Ninety-eight thousand four hundred and seven ☐

c. Fifty thousand five hundred ☐

d. Twenty-two thousand two hundred and twenty-two ☐

11. Represent the following numbers on a number line.



12. Fill in the correct symbol <, > or = in each box.

a. 32 ☐ 23	b. 64 ☐ 64	c. 98 ☐ 100	d. 567 ☐ 565
e. 641 ☐ 641	f. 892 ☐ 879	g. 777 ☐ 887	h. 201 ☐ 300

13. Write the given numbers in ascending order (from smallest to the largest).

	Numbers	Ascending Order				
a.	67, 34, 56, 45, 78					
b.	829, 929, 799, 698, 689					

14. Write the given numbers in descending order (from largest to the smallest).

	Numbers	Descending Order				
a.	92, 62, 72, 82, 52					
b.	537, 646, 603, 573, 703					

15. Round off the following numbers.

	Numbers	Rounded off to the nearest 10
a.	63	
b.	79	
c.	809	
d.	320	
e.	876	
f.	555	

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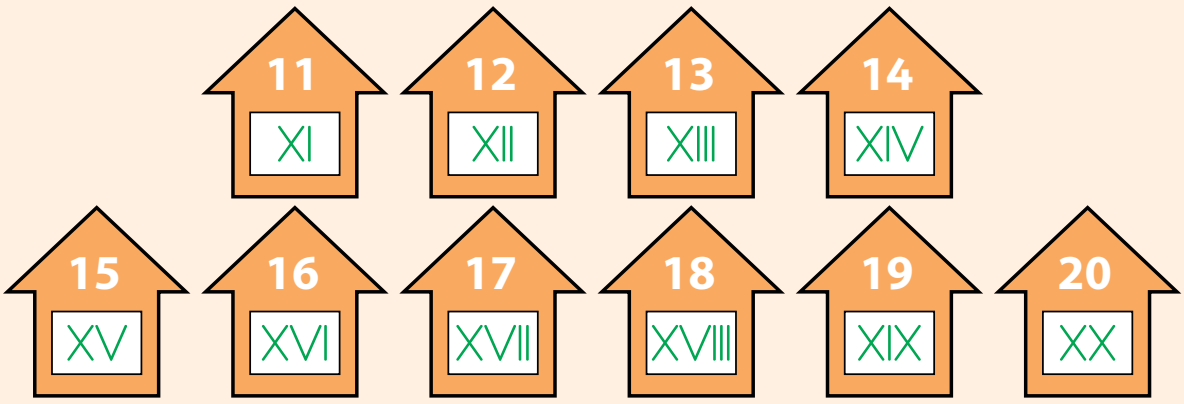
Review and Assess
Whole Numbers

1. Write the house numbers in Roman numerals.



2. Write **true** or **false**

a. 24 is an even number. True

b. 53 is not an odd number. True

c. All numbers ending in 0, 2, 4, 6, or 8 are even numbers. True

d. All numbers ending in 1, 3, 5, 7, or 9 are odd numbers. True

3. Shade all odd numbers green and even numbers blue in the given grid.

236	237	238	239	240	241	242	243	244
245	246	247	248	249	250	251	252	253
254	255	256	257	258	259	260	261	262
263	264	265	266	267	268	269	270	271

4. I am greater than 10 but less than 13. I am an even number.
Who am I? 12

5. Write the place value of the bold digit in each number.

a. 570**3** 3 Ones

b. 94**3**16 3 Hundreds

c. 4**1**802 1 Thousands

d. **1**6034 1 Ten Thousands

6. How many tens are there in 500? 50

7. How many tens are there in 9000? 900

8. How many tens are there in 40 000? 4000

9. Write these numbers in words.

a. 1234 One thousand two hundred and thirty-four

b. 58,023 Fifty-eight thousand and twenty-three

c. 40,000 Forty thousand

d. 98,765 Ninety-eight thousand seven hundred and sixty-five

e. 8006 Eight thousand and six

f. 15,235 Fifteen thousand two hundred and thirty-five

g. 99,999 Ninety-nine thousand nine hundred and ninety-nine

h. 81,654 Eighty-one thousand six hundred and fifty-four

10. Write the number.

a. Forty-two thousand five hundred and thirty-six 42,536

b. Ninety-eight thousand four hundred and seven 98,407

c. Fifty thousand five hundred 50,500

d. Twenty-two thousand two hundred and twenty-two 22,222

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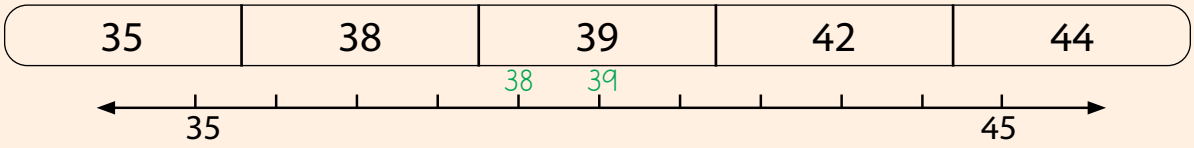
11. Represent the following numbers on a number line.



12. Fill in the correct symbol <, > or = in each box.

a. 32 [>] 23	b. 64 [=] 64	c. 98 [<] 100	d. 567 [>] 565
e. 641 [=] 641	f. 892 [>] 879	g. 777 [<] 887	h. 201 [<] 300

13. Write the given numbers in ascending order (from smallest to the largest).

	Numbers	Ascending Order				
a.	67, 34, 56, 45, 78	34	45	56	67	78
b.	829, 929, 799, 698, 689	689	698	799	829	929

14. Write the given numbers in descending order (from largest to the smallest).

	Numbers	Descending Order				
a.	92, 62, 72, 82, 52	92	82	72	62	52
b.	537, 646, 603, 573, 703	703	646	603	573	537

15. Round off the following numbers.

	Numbers	Rounded off to the nearest 10
a.	63	60
b.	79	80
c.	809	810
d.	320	300
e.	876	880
f.	555	560

Unit

2 Number Operations

Unit 2 Number Operations

Adding and Subtracting Numbers Mentally and in Written Form

To teach pupils to add and subtract numbers mentally and in written form, teachers should start by reviewing the concepts of addition and subtraction, emphasizing the importance of understanding place value and regrouping. For mental calculations, the teacher can use real-life examples, such as calculating change or measuring ingredients, to demonstrate the practical application of mental math. To teach written calculations, the teacher can use base-ten blocks, place value charts, or hundreds charts to help pupils visualize the regrouping process. The teacher should gradually increase the difficulty level, starting with simple calculations involving 1-digit numbers and progressing to more complex calculations involving 2-, 3-, and 4-digit numbers. To reinforce understanding, the teacher can provide opportunities for pupils to practice written calculations with and without regrouping, using a variety of numbers, including 4-digit numbers.

Classwork: Complete Exercise 1 and 3

Solving Real-World Word Problems

To teach pupils to solve real-world word problems involving addition and subtraction, teachers can use everyday scenarios, such as shopping or measuring ingredients, to create word problems. The teacher can use visual aids like diagrams, charts, or pictures to help pupils understand the problem and identify the missing numbers. For example, the teacher can use a scenario like "Tom has £15 to spend on toys. He buys a toy car for £8. How much money does he have left?" to teach pupils to solve real-world word problems involving subtraction.

Classwork: Complete Exercise 2

Estimating Answers to Addition and Subtraction Questions

To teach pupils to estimate answers to addition and subtraction questions, teachers can use number lines, hundreds charts, or mental math strategies like rounding numbers. The teacher can provide pupils with a variety of estimation strategies, such as using benchmarks or making rough calculations, to help them develop their estimation skills. For example, the teacher can ask pupils to estimate the answer to a question like "45 + 27" by rounding the numbers to the nearest ten or hundred.

Classwork: Complete Exercise 4, 5 and 6

Developing Times Tables for 6, 7, 8, and 9

To teach pupils to count and write in multiple steps, teachers can use base-ten blocks, counting

bears, or number lines to help pupils visualize the counting process. The teacher can provide pupils with opportunities to practice counting and writing in multiple steps, using a variety of numbers and scenarios. For example, the teacher can ask pupils to count up or down by tens or hundreds, using a number line or hundreds chart to help them keep track.

To teach pupils to develop times tables for 6, 7, 8, and 9, teachers can use arrays, number lines, or multiplication charts to help pupils visualize the multiplication process. The teacher can provide pupils with opportunities to practice reciting and writing times tables, using a variety of strategies like chanting, clapping, or writing multiplication sentences. For example, the teacher can use an array of 6 rows and 7 columns to help pupils visualize the multiplication sentence "6 x 7 = 42".

To teach pupils that the multiplication of any two numbers can be done in any order, teachers can use concrete and pictorial representations like arrays, number lines, or multiplication charts. The teacher can provide pupils with opportunities to explore the commutative property of multiplication, using a variety of numbers and scenarios. For example, the teacher can use an array of 3 rows and 4 columns to help pupils visualize the multiplication sentence "3 x 4 = 12", and then ask them to find the product of "4 x 3" using the same array.

Classwork: Complete multiplication tables on page 36-39

Multiplying 1-, 2-, and 3-Digit Numbers by 1-Digit Numbers

To teach pupils to multiply 1-, 2-, and 3-digit numbers by 1-digit numbers, teachers can use arrays, number lines, or multiplication charts to help pupils visualize the multiplication process. For mental calculations, the teacher can use real-life examples, such as calculating the cost of multiple items or measuring ingredients. For written calculations, the teacher can use arrays to help pupils understand the concept of regrouping. For example, the teacher can use an array of 4 rows and 6 columns to help pupils visualize the multiplication sentence "4 x 6 = 24".

To teach pupils to solve real-world word problems involving multiplication, teachers can use everyday scenarios, such as planning a party or measuring ingredients for a recipe. The teacher can provide pupils with opportunities to practice solving word problems, using a variety of numbers and scenarios. For example, the teacher can ask pupils to solve a word problem like "If Sara has 3 groups of 4 pencils, how many pencils does she have in total?"

Classwork: Complete Exercise 8 and 9

- **Understanding the Non-Commutative Property of Division**
- **Dividing 1-, 2-, and 3-Digit Numbers by 1-Digit Numbers**

To teach pupils that the division of any two numbers cannot be done in any order, teachers can use concrete and pictorial representations like base-ten blocks, number lines, or division charts. The teacher can provide pupils with opportunities to explore the non-commutative property of division, using a variety of numbers and scenarios. For example, the teacher can use a set of 12 blocks to demonstrate the difference between 12 ÷ 4 and 4 ÷ 12.

To teach pupils to divide 1-, 2-, and 3-digit numbers by 1-digit numbers, teachers can use base-ten blocks, number lines, or division charts to help pupils visualize the division process. For mental calculations, the teacher can use real-life examples, such as sharing a certain number of items among a group of people. For written calculations, the teacher can use long division or partial quotients to help pupils understand the concept of remainders. For example, the teacher can use a division chart to help pupils visualize the division sentence "12 ÷ 4 = 3".

To teach pupils to divide a number by 1 and itself, teachers can use concrete and pictorial representations like base-ten blocks or number lines. The teacher can provide pupils with opportunities to explore the concept of dividing a number by 1 and itself, using a variety of numbers and scenarios. For example, the teacher can use a set of 5 blocks to demonstrate that 5 ÷ 1 = 5 and 5 ÷ 5 = 1.

Classwork: Complete Exercise 10,11 and 12

Solving Real-World Word Problems Involving Division

To teach pupils to solve real-world word problems involving division, teachers can use everyday scenarios, such as sharing a certain number of items among a group of people or measuring ingredients for a recipe. The teacher can provide pupils with opportunities to practice solving word problems, using a variety of numbers and scenarios. For example, the teacher can ask pupils to solve a word problem like "If Maria has 18 pencils and wants to put them in bags of 3 pencils each, how many bags can she make?"

Classwork: Complete Exercise 12 and 13

Solving Real-World Word Problems Involving Multiple Operations

To teach pupils to solve real-world word problems involving multiple operations, teachers can use everyday scenarios, such as planning a party or measuring ingredients for a recipe. The teacher can provide pupils with opportunities to practice solving word problems, using a variety of numbers and scenarios. For example, the teacher can ask pupils to solve a word problem like "If Tom has 15 friends coming to his party and wants to give each friend 2 bags of chips, and each bag of chips costs £1.50, how much will Tom spend on chips in total?"

Classwork: Complete exercise 15

Lessons Plan

Suggested Time: 2-3 periods.

Objectives:

Students will be able to:

- Add mentally and in written form (with and without regrouping) including 4-digit numbers with 1-, 2-, 3-, and 4-digit numbers.
- Solve real-world word problems (including missing numbers and money) involving addition.

Concept Connector:

Students are now familiar with the concept of addition and subtraction. They have also previously learnt how to add and subtract with carrying and borrowing. Using the concept connector on page 26, review how addition with carrying of tens and hundreds is done with 3-digit numbers.

Exploring the Objective:

The lesson starts with the addition of 4-digit numbers without carrying. Use examples on Page 26 to reinforce how addition of 4-digit numbers with 1-, 2-, 3-, and 4-digit numbers is done. Emphasis on the importance of arranging numbers according to place value. Once, the students are comfortable with the concept, move on towards explaining them how addition of 4-digit numbers is done with carrying over. Mention that once the sum of hundreds is equal to or greater than 10, 1 thousand is carried to the thousands column. Use example 2 on page 27 and example 4 on Page 28 as support. Furthermore, use example 3 and 5 as the real-life application of the concept.

Once the students are familiar with the addition of 4-digit numbers with and without carrying, move on to the strategies of mental calculation. Review number bonds with the students before starting this concept. Use example 6 and 7 on pages 29 and 30 of the textbook to support teaching.

Activity:

What you need:

- White or black board
- Dice

How to Play:

- Make two columns on the board. The first column would have a list of 2-, 3-, and 4-digit numbers while the second column would have a list of 4-digit numbers.
- Pair students in groups of twos.
- Ask each pair to roll the two dice.
- The number on the dice 1 determines the number from Column A and the number of dice 2 determines the number from column B.
- The students will then be asked to add the two numbers together and determine whether carrying is required or not.

- The pair that solves the problem the quickest wins.

Refection:

- Students develop problem-solving skills.
- Students are able to add different number of digits together.

Exercise:

Start with Exercise 1, Question 2 (Page 27) to help students practice adding 4-digit numbers without carrying. This will also reinforce their skills in writing numbers in words. Assign medium-hard question 3 of Exercise 1 for individual classwork to further strengthen their understanding. As homework, assign Exercise 1, Question 1 as easy-level homework to ensure students are comfortable with the basics.Use medium-hard question 1 of Exercise 2 for guided classwork. This will teach students how to add multiple numbers using the carrying method.

Assign Question 2 of Exercise 2 as homework for individual practice to reinforce the carrying method. Question 3 of Exercise 2 serves as hard-level question which should be tackled together by students and teachers, promoting collaborative problem-solving. This structured approach ensures a balanced mix of guided learning, individual practice, and homework to reinforce the concepts of adding 4-digit numbers with and without carrying.

Assign Question 2 of Exercise 3 in classwork that requires guided practice as it is a hard-level question. Using mental strategies, the teacher may assign Question 1 as individual classwork and homework as well. The teacher may also pair this exercise with the Math Quest to make the lesson more fun.

Extension Activity:

The following questions can be given as added practice, worksheet or as reinforcement of the topic.

1. Add the following numbers vertically. Carry over wherever required.
   a. 4444 + 333
   b. 1254 + 5359
   c. 7562 + 865
2. Use different mental strategies to solve the following questions:
   a. 26 + 23
   b. 34 + 28
   c. 126 + 14 + 4

Number Operations

Addition

Learning Objective:

- Add numbers up to 4-digits with and without carrying vertically and horizontally.
- Add numbers up to 100 using mental calculation strategies.
- Solve real-life number stories up to 4-digits with and without carrying involving addition.

Let's Talk Math: Ask pupils the real-life situations where they use addition.

Make Sure You Have:

- Chalk
- Blackboard/Whiteboard

Activity: Step by Step

Duration: 1 Lesson **Individual Activity**

Let's Try It:

- Explain vertical calculation is much easier because it does not require mental math.
- Mental math means solving sums in your head.
- Calculating sums mentally helps when there are smaller numbers, however, with larger numbers it is always wise to use pen and paper and show every step of your working.
- Write up to five more equations on the board and allow pupils to volunteer to write them vertically.
- These do not necessarily involve carrying.
- Start with easier sums with only 2-digits numbers so that struggling pupils feel more comfortable with addition.

Assessment:

- Have pupils attempt real-life number stories that have up to 4-digits, with, and without carrying, making sure they show their working.
- Here is an example:
- Jehanzeb is on a road trip. He stops to make coffee and sees that he still has to drive 628 kilometres. He has already driven 599 km. How many kilometres is his entire road trip?

Subtraction

Learning Objective:

- Subtract numbers up to 4-digits with and without borrowing.
- Subtract numbers up to 100 using mental calculation strategies.
- Solve real-life number stories up to 4-digits with and without borrowing involving subtraction

Let's Talk Math:

- Pupils are familiar with all the concepts introduced in this Unit, i.e. subtraction with and without borrowing so this should serve as a revision and a refinement of their skills.

Make Sure You Have:

- Bowl
- Chits

Activity: Step by Step

Duration: 1 Lesson **Group Activity**

Let's Try It:

- Write the following on the board: 8392 – 6397.
- Ask for volunteers to write the problem vertically on the board.
- Solve it step by step, with the help of the class.
- Go over these enough times so that the class understands exactly how you got the answer.
- Then divide the class into two, group A and group B.
- Have one bowl of chits with random 4-digit numbers under 5000, and another with 4-digit numbers over 5000.
- Have group A choose chits from one bowl, and the group B from the other bowl.
- Then ask all members of group A to pair up with members of group B, so that each pair will have a number over 5000, and a number under 5000.
- Ask the pairs to come to the front of the class and carry out the subtraction of the bigger number from the smaller number.
- They should try to solve it as a pair, but if they are stuck, then the class should help them.

Assessment: Have pupils attempt real-life number stories up to 4-digits, with, and without borrowing, making sure they show their working.

Multiplication and Division

Learning Objective:

- Apply mental mathematical strategies to multiply 1-digit numbers to 1-digit numbers
- Divide 2-digit numbers by a 1-digit number (with zero remainder).
- Apply mental mathematical strategies to divide 1-digit numbers by a 1-digit number.
- Solve real-life situations involving division of 2-digit number by a 1-digit number

Let's Talk Math:

- Explain to pupils that multiplication is a form of repeated addition, and division is a form of repeated subtraction, are used in everyday life.
- Ask pupils for examples where they use multiplication and division in real-life, or where do they see others use it.

Let's Try it:

- Explain that the activity focuses on solving questions using mental math without writing.
- Write a number sentence on the board and give pupils time to solve it mentally.
- Reveal the correct answer on the board and have pupils compare it with their own.
- Encourage pupils to discuss any challenges they faced in mental math.
- Remind pupils that division is like multiplication in reverse, or repeated subtraction.
- Review with a simple division example, like 4 ÷ 2, ensuring everyone understands.
- For the main activity:
- Call out numbers, and pupils mentally calculate what the number divided by 2 is.
- Begin with 1-digit numbers and move to easy 2-digit numbers as they gain confidence.
- Gradually increase the difficulty but keep numbers under 100.

Assessment: Assign some division questions so that pupils can practice. Make sure to keep to 1-digit numbers, with no remainder.

Name: _____

Date : _____

Mental Math

Using mental math, calculate which sums will have an even answer, and colour them in.

74 – 18	13 + 45
38 + 37	48 – 24
23 + 23	39 + 40
50 – 32	15 + 17
19 – 12	78 – 38

In pairs, choose one addition and one subtraction question, and write one real-life story sum for each.	*Addition* *Subtraction*

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Name: _____

Date : _____

Real-life Story Sums

1. Alizay has saved Rs 4250. Her grand mother gives her Rs 1985. How much money does she have now?

2. Hassan buys a light bulb that will fuse after 2590 minutes of being on. His friend borrows and uses it for 1995 minutes, how many minutes will Hassan still be able to use it for?

3. Yousuf is making omelettes for his friends. He wants to use 3 eggs per person, so if 12 people are coming, how many eggs will be needed?

4. Fatima's aunt buys candy for all of her nieces and nephews, and tells Fatima to divide it equally amongst them. If there are 48 candies, and 6 nephews and nieces, how many candy should each get?

Solve the above questions.	*Number operations*

Name: _____

Date : _____

Multiplication Cards

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

Use a big box of beads to visualise each **multiplication table**. For example, when discussing the multiples of 6, group the beads in sets of six. One set will have 6 beads, 2 will have 12, and so on. Ask the students to find all the multiples of each number 6, 7, 8, and 9 using sets of beads.	*Multiplication*

Note: Try to apply mental math strategies.

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Name: _____

Date : _____

Multiplication Cards

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

	Multiplication

Name: _____

Date : _____

Multiplication Cards

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

	Multiplication

Note: Arrays can be used to find the products.

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Name: _____

Date : _____

Multiplication Cards

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

	Multiplication

Name: _____

Date : _____

Multiplication with 0 and 1

1+1+1=3 3*1=3	0+0+0=0 3*0=0
1+1+1+1= 4*1=__	0+0+0+0=__ 4*0=0
1+1+1+1+1=__ __*__=	

Tell the students that any number multiplied by 1 remains same and any number multiplied by 0 becomes zero. Ask them to fill the empty cards making multiplication statements with 0 and 1.	*Multiplication*

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Name: _____

Date : _____

Division Cards

6 ÷ 6	12 ÷ 6
18 ÷ 6	24 ÷ 6
30 ÷ 6	36 ÷ 6
42 ÷ 6	48 ÷ 6
54 ÷ 6	60 ÷ 6

This time, reverse the bead exercise. Use the beads to represent the number being **divided**. For example, tell a student to take 18 beads and make groups of 6, then count how many groups were formed.	*Division*

Note: Try to apply mental math strategies.

Name: _____

Date : _____

Division Cards

7 ÷ 7	14 ÷ 7
21 ÷ 7	28 ÷ 7
35 ÷ 7	42 ÷ 7
49 ÷ 7	56 ÷ 7
63 ÷ 7	70 ÷ 7

	Division

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Name: _____

Date : _____

Division Cards

$8 \div 8$	$16 \div 8$
$24 \div 8$	$32 \div 8$
$40 \div 8$	$48 \div 8$
$56 \div 8$	$64 \div 8$
$72 \div 8$	$80 \div 8$

	Division

Name: _____

Date : _____

Division Cards

9 ÷ 9	18 ÷ 9
27 ÷ 9	36 ÷ 9
45 ÷ 9	54 ÷ 9
63 ÷ 9	72 ÷ 9
81 ÷ 9	90 ÷ 9

	Division

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Number Operations

1. Solve the following.

a. 5678 + 2300	b. 9000 + 5604	c. 3059 + 1536
d. 6677 – 2345	e. 3688 – 2710	f. 9008 – 8989
g. 55 × 5	h. 72 × 7	i. 39 × 7
j. 450 ÷ 9	k. 400 ÷ 8	l. 246 ÷ 6

2. Solve the following real-life problems.

Problems	Working
a. Mariam had 1365 buttons in one jar and 4522 in another. How many buttons did she have altogether?	
Answer: ☐ buttons	
b. Aslam has Rs 5425 and his sister has Rs 3579. How much money do they have in total?	
Answer: ☐	
c. A train covered the distance of 7052 km in the first half of the journey and 1968 km more to reach the destination. What was the total distance covered?	
Answer: ☐ km	
d. There are 2367 fish in a large tank and 245 less in a small tank. How many fish are there altogether?	
Answer: ☐ fish	

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	Problems	Working
e.	Ahmed had 2456 marbles in one jar and 9133 in another. How many marbles did he have altogether?	
	Answer: ☐ marbles	
f.	A milkman bought 40 litres of milk to sell in 8-litre bottles. How many bottles of milk was he able to make?	
	Answer: ☐ bottles	
g.	A factory wants to pack 672 packets of toys in a pack of seven each. How many packets will be made?	
	Answer: ☐ packets	
h.	In a market there are 6745 shops. On a Sunday 4998 were closed. How many shops remained open?	
	Answer: ☐ shops	

Problems	Working
i. A farmer planted 85 trees in each row in his farm. If he planted six rows, how many trees did he plant altogether?	
Answer: ☐ trees	
j. In a school there are 30 students in each class. If there are nine classes, how many students are there in the school?	
Answer: ☐ students	
k. A teacher gave 8 counters to each student for an activity. If there are 35 students in the class, how many counters did the teacher distribute?	
Answer: ☐ counters	
l. Sara bought 96 balloons to distribute equally among her six friends. How many balloons did she give to each friend?	
Answer: ☐ balloons	

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Number Operations

1. Solve the following.

a. 5678 + 2300 5 6 7 8 + 2 3 0 0 7 9 7 8	b. 9000 + 5604 9 0 0 0 + 5 6 0 4 1 4 6 0 4	c. 3059 + 1536 3 0 5 9 + 1 5 3 6 4 5 9 5
d. 6677 – 2345 6 6 7 7 - 2 3 4 5 4 3 3 2	e. 3688 – 2710 3 6 8 8 - 2 7 1 0 9 7 8	f. 9008 – 8989 9 0 0 8 + 8 9 8 9 1 9
g. 55 × 5 5 5 × 5 2 7 5	h. 72 × 7 7 2 + 7 5 0 9	i. 39 × 7 3 9 + 7 2 7 3
j. 450 ÷ 9 50	k. 400 ÷ 8 50	l. 246 ÷ 6 41

2. Solve the following real-life problems.

Problems	Working
a. Mariam had 1365 buttons in one jar and 4522 in another. How many buttons did she have altogether?	a. Total buttons = Buttons in jar 1 + Buttons in jar 2 = 1365 + 4522 = 5887
Answer: 5887 buttons	
b. Aslam has Rs 5425 and his sister has Rs 3579. How much money do they have in total?	b. Total money = Aslam's money + Sister's money = Rs 5425 + Rs 3579 = Rs 9004
Answer: 9004	
c. A train covered the distance of 7052 km in the first half of the journey and 1968 km more to reach the destination. What was the total distance covered?	Total distance = Distance in first half + Additional distance = 7052 km + 1968 km = 9020 km
Answer: 9020 km km	
d. There are 2367 fish in a large tank and 245 less in a small tank. How many fish are there altogether?	d. Number of fish in small tank = 2367 - 245 = 2122 Total fish = Fish in large tank + Fish in small tank = 2367 + 2122 = 4489
Answer: 4489 fish	

	Problems	Working
e.	Ahmed had 2456 marbles in one jar and 9133 in another. How many marbles did he have altogether?	e. Total marbles = Marbles in jar 1 + Marbles in jar 2 = 2456 + 9133 = 11589
	Answer: 11589 marbles	
f.	A milkman bought 40 litres of milk to sell in 8-litre bottles. How many bottles of milk was he able to make?	f. Number of bottles = Total litres of milk ÷ Litres per bottle = 40 litres ÷ 8 litres/bottle = 5 bottles
	Answer: 5 bottles bottles	
g.	A factory wants to pack 672 packets of toys in a pack of seven each. How many packets will be made?	g. Number of packets = Total packets of toys ÷ Packets per pack = 672 packets ÷ 7 packets/pack = 96 packs
	Answer: 96 packs packets	
h.	In a market there are 6745 shops. On a Sunday 4998 were closed. How many shops remained open?	h. Number of shops open = Total shops – Shops closed = 6745 shops – 4998 shops = 1747 shops
	Answer: 1747 shops	

Problems	Working
i. A farmer planted 85 trees in each row in his farm. If he planted six rows, how many trees did he plant altogether?	i. Total trees = Trees per row × Number of rows = 85 trees/row × 6 rows = 510 trees
Answer: 510 Trees trees	
j. In a school there are 30 students in each class. If there are nine classes, how many students are there in the school?	j. Total students = Students per class × Number of classes = 30 students/class × 9 classes = 270 students
Answer: 270 Students students	
k. A teacher gave 8 counters to each student for an activity. If there are 35 students in the class, how many counters did the teacher distribute?	k. Total counters = Counters per student × Number of students = 8 counters/student × 35 students = 280 counters
Answer: 280 Counter counters	
l. Sara bought 96 balloons to distribute equally among her six friends. How many balloons did she give to each friend?	l. Balloons per friend = Total balloons ÷ Number of friends = 96 balloons ÷ 6 friends = 16 balloons per friend
Answer: 16 Ballons balloons	

Unit

3 Fractions and Decimals

Learning Framework

Unit 3 Fractions and Decimal

Recognising and Differentiating Among Proper Fractions, Improper Fractions, and Mixed Numbers

Pupils will learn to recognise and differentiate among proper fractions, improper fractions, and mixed numbers using real-life examples, such as measuring ingredients for a recipe or dividing a pizza among friends. Teachers can use visual aids like fraction strips, circles, or rectangles to help pupils understand the concept of fractions. For example, the teacher can use a paper plate divided into 8 equal parts to demonstrate the difference between proper fractions (e.g., 3/8), improper fractions (e.g., 8/8), and mixed numbers (e.g., 1 3/8).

Classwork: Complete Exercise 2

Identifying Equivalent Fractions

To teach pupils to identify equivalent fractions, teachers can use number lines, fraction charts, or equivalent fraction walls to help pupils visualise the concept of equivalent fractions. For example, the teacher can use a number line to show that 1/2, 2/4, and 3/6 are equivalent fractions. Pupils can also use fraction tiles or blocks to build and identify equivalent fractions.

Pupils will learn to simplify fractions to their lowest term using factor trees, prime factorisation charts, or simplification diagrams. Teachers can provide pupils with opportunities to practice simplifying fractions, using a variety of numbers and scenarios. For example, the teacher can ask pupils to simplify the fraction 6/8 using a factor tree.

Classwork: Complete Exercise 4

Comparing and Ordering Like Fractions

To teach pupils to compare and order like fractions, teachers can use fraction strips, number lines, or comparison charts to help pupils visualise the concept of comparing and ordering fractions. For example, the teacher can use fraction strips to compare the fractions 3/8 and 5/8, and ask pupils to order them from least to greatest.

Classwork: Complete Exercise 3

Adding and Subtracting Like and Unlike Fractions

Pupils will learn to add and subtract like and unlike fractions using number lines, fraction charts, or addition and subtraction diagrams. Teachers can provide pupils with opportunities to practice

adding and subtracting fractions, using a variety of numbers and scenarios. For example, the teacher can ask pupils to add the fractions 1/4 and 1/4 using a number line.

To teach pupils to represent addition and subtraction of fractions, teachers can use visual aids like diagrams, drawings, or fraction strips to help pupils visualise the concept of adding and subtracting fractions. For example, the teacher can use a diagram to represent the addition of 1/4 and 1/4.

Classwork: Complete Exercise 5 and 6

Understanding Hundredths and Tenths

Pupils will learn that hundredths arise by dividing an object, single-digit numbers, and quantities into 100 equal parts. Teachers can use visual aids like grids, charts, or base-ten blocks to help pupils understand the concept of hundredths. For example, the teacher can use a grid divided into 100 equal parts to demonstrate the concept of hundredths.

To teach pupils that tenths arise by dividing an object, single-digit numbers, and quantities into 10 equal parts, teachers can use visual aids like number lines, fraction charts, or diagrams to help pupils understand the concept of tenths. For example, the teacher can use a number line to show that 1/10 is equal to 0.1.

Classwork: Complete Exercise 7

Lesson Plan

Suggested Time: 2-3 periods

Objectives:

The students will be able to:

- Identify equivalent fractions and show families of equivalent fractions.
- Simplify fractions to the lowest term.

Concept Connector:

Students are already familiar with the concept of fractions as equal parts of a whole and have an understanding of like fractions. To reinforce these concepts, use Math Lab Pages 26 and 27 for a quick revision. On Page 27, the Fraction Bars can be particularly useful. These bars visually demonstrate that two bars with the same shaded amount can represent two equal fractions, laying the foundation of equivalent fractions. This visual and hands-on approach will help solidify their grasp of how different fractions can be equivalent.

Exploring the Objectives:

Using Fraction Bars from Math Lab 3, explain to the students what equivalent fractions are. Use Example 3 on Page 55 of the textbook to explain that there are families of equivalent fractions that represent the same fractions. Explain that bigger equivalents fractions can be obtained by multiplying the numerator and the denominator with the same number, while smaller equivalent fractions can be obtained by dividing the numerator and the denominator with the same number. Math Lab 3 Page 29 can be paired up with the explanation to reinforce the concept as an activity. Math Quest on Page 55 can be used as a fun activity to do in the classroom.

Once the students are familiar with what equivalent fractions are, move onto simplifying fractions. This required reducing fractions to their lowest form by dividing the numerator and the denominator by a common divisor. Examples 4, 5 and 6 on Pages 56 and 57 can be used as support of this concept.

Math in Action on Page 56 features fun fact that emphasis on the real-life application of fractions and decimals.

Activity:

- What you need:
- Fraction circles or bars
- Paper and markers
- Scissors

How to Play:

- Give students paper and markers to draw their own fraction circles or bars.
- Have them cut out the pieces and find equivalent fractions by comparing different pieces.

Reflection:

- Students develop the understanding that two different fractions can represent equal parts.
- Students understand that fraction can be simplified and reduced to their lowest terms.

Exercise:

Assign Question 2 of Exercise 4 as classwork to reinforce how equivalent fractions are made. This allows students to practice how multiplying and dividing help in making converting fractions to their equivalent. Question 3 and 4 serve as medium-hard practice that can be done in the classroom under the guidance of the teacher. Question 1 can be given as homework once the students develop the understanding of how equivalent fractions are made.

Question 5 deals with simplifying fractions. Parts a-e can be done in the classroom while parts f-k can be given as homework.

The QR code activity on Page 58 can also be used as a support worksheet to reinforce the concept and make it more concrete.

Extension Activity:

The following questions can be given as added practice, worksheet or as reinforcement of the topic.

1. Write three equivalent fractions of the following:
   a. 5/10 b. 3/9 c. 63/70 d. 18/25
2. Reduce the following fractions to their lowest form.
   a. 50/75 b. 66/120 c. 42/45 d. 40/160

Unit 3 Fractions and Decimals

Common, Proper and Improper Fractions

Learning Objective:

- Express the fractions in figure and vice versa.
- Match the fractions with related figures.
- Recognise proper and improper fractions.
- Differentiate between proper and improper fractions.

Let's Talk Math: Discuss with pupils how a fraction is a number that represents a part of a whole.

Make Sure You Have:

- Bowl
- Chits

Activity: Fraction Sorting Challenge

Duration: 1 Lesson **Whole Class/Group Activity**

Let's Try It:

- Divide the class into pairs.
- Provide each pair with 4-5 blank paper chits.
- Each pair writes proper and improper fractions on the chits and exchanges them with another pair.
- The receiving pair sorts the fractions into tagged boxes (proper or improper fractions).
- Ensure each pair has fractions to sort.
- Check the boxes at the end for any incorrect placements.
- Review the fractions with the class and discuss their categorisation.

Assessment:

- Ask students to find something at home they can describe using a fraction (e.g., number of socks of a certain color over total socks, or males in the family over total family members).

Equivalent and Comparing Fractions

Learning Objective:

- Identify equivalent fractions from the given figures.
- Write three equivalent fractions for a given fraction.
- Compare fractions with same denominators using symbols “, or, “=”.

Let’s talk math:

- Fractions can also help with portion size.
- Also point out that when we tell time in hours and minutes, or work with most units, we are constantly using fractions without even realising it, because a minute is 1/60th of an hour.

Make Sure You Have:

- Strips of paper
- Coloured circles
- A pack of coloured pencils.

Activity: Fractions in Shapes

Duration: 1 Lesson **Whole Class Activity**

Let’s Try It:

- Introduce fractions using strips of paper, colored circles, or colored pencils.
- Use one shape at a time to demonstrate the same fraction with different objects or shapes.
- Show that a fraction can represent any shape or set of objects.
- Teach students to associate fractions with their names:
- 2 equal parts: 2 halves in a whole.
- 3 equal parts: 3 thirds in a whole.
- 4 equal parts: 4 quarters in a whole. 10 equal parts: 10 tenths in a whole.
- 100 equal parts: 100 hundredths in a whole.
- Explain equivalent fractions, e.g., two quarters equal one half, showing why 2/4 = 1/2.

Assessment:

- Ask students to provide other examples of equivalent fractions.

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Addition and Subtraction of Fractions

Learning Objective:

- Add two fractions with same denominators.
- Represent addition of fractions through figures.
- Subtract fractions with same denominators.
- Represent subtraction of fractions through figures.

Let's Talk Math:

- Discuss with pupils that to add like fractions, add only the numerators.
- The denominator remains the same.
- To subtract a fraction from another like fraction, subtract the smaller numerator from the larger one.
- The denominator remains the same.

Activity: Learning Fractions Through Shapes

Duration: 1 Lesson Whole Class Activity

Let's Try It:

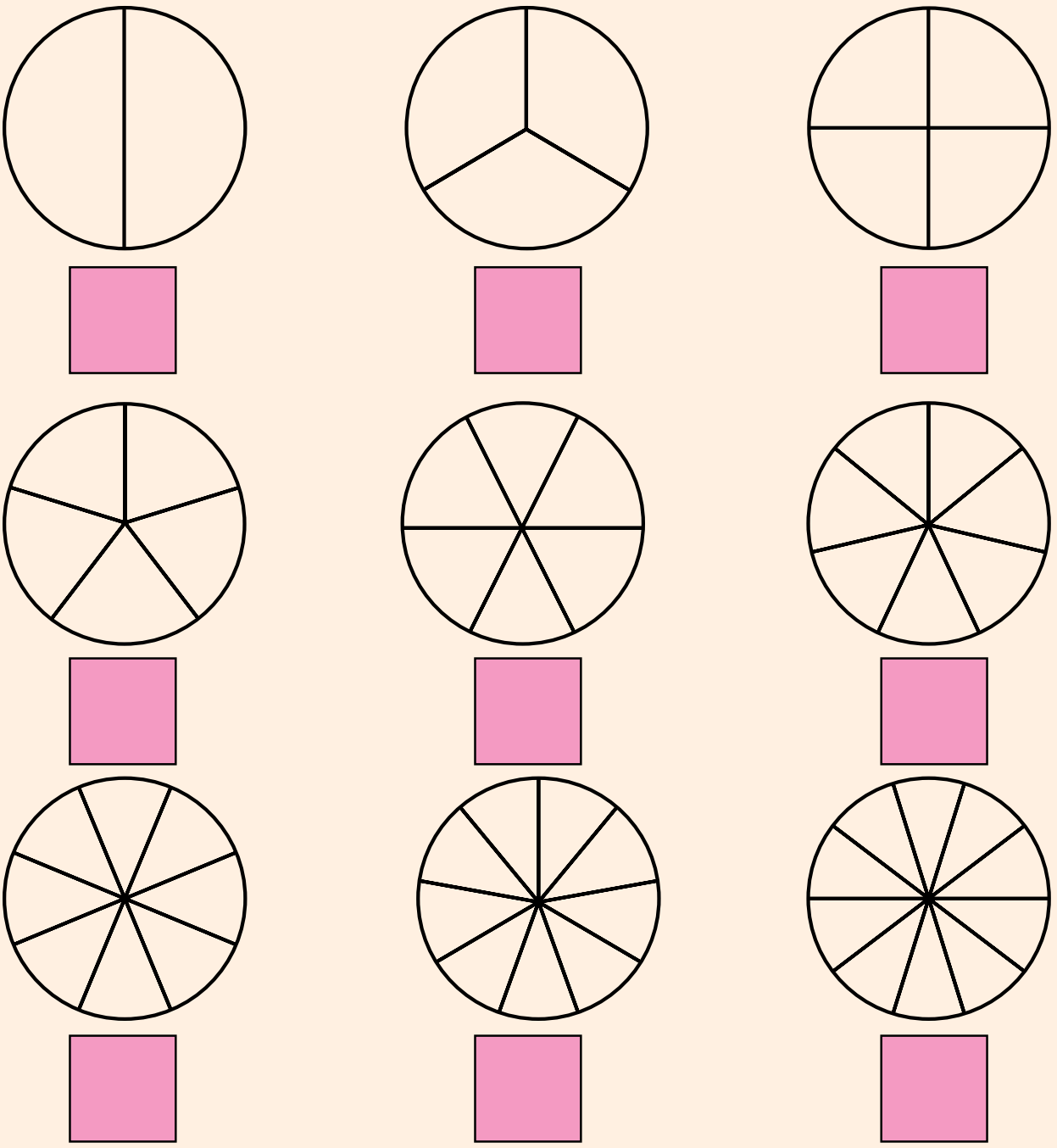
- Since pupils have not added or subtracted fractions before.
- To help them, ask a volunteer to come to the front of the class and help them draw, fraction discs or fractions bars to represent each fraction.
- Use diagrams to explain how the addition and subtraction works.
- Explain that when fractions have the same denominator, only the numerators are added.
- Explain that when fractions have the same denominator only the numerators are subtracted.

Assessment: Solve up to five more addition and subtraction questions using fractions of the same denominator on the board.

Name: _____

Date : _____

Fraction Discs



Tell students to colour one part in each disc with one colour, and the remaining parts with another colour. Then ask them what fraction would **represent** the larger part.	*Fractions*

Note: Fraction circles can be used to explore fractions.

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Name: _____

Date : _____

Fraction Bars

Fill in the below fraction bars with fractions.

1							
$\frac{1}{2}$				$\frac{1}{2}$			
$\frac{1}{4}$		$\frac{1}{4}$		$\frac{1}{4}$		$\frac{1}{4}$	
$\frac{1}{6}$		$\frac{1}{6}$		$\frac{1}{6}$		$\frac{1}{6}$	
$\frac{1}{8}$	$\frac{1}{8}$	$\frac{1}{8}$	$\frac{1}{8}$	$\frac{1}{8}$	$\frac{1}{8}$	$\frac{1}{8}$	$\frac{1}{8}$

Use the example of a pizza with 8 slices. You may also use a pictorial representation, with each part representing a slice. Represent each **fraction** using slices and let the students decide which fraction represent the most slices vs the least slices.	*Equivalent fractions*

Note: Fraction blocks or fraction tower cubes can be used for better understanding of the concept of fractions.

Name: _____

Date : _____

Fraction Figures

$\frac{1}{3} + \frac{1}{3} = \frac{2}{3}$

$\frac{1}{6} + \frac{1}{6} =$

$\frac{1}{5} + \frac{1}{5} =$

Draw figures to find the answers.	*Fractions*

Note: Cuisenaire rods can be used for addition of fractions.

Name: _____

Date : _____

Fraction Cards

$\frac{4}{18}$	$\frac{52}{8}$	$\frac{6}{9}$	$\frac{7}{8}$
$\frac{13}{9}$	$\frac{12}{9}$	$\frac{3}{19}$	$\frac{4}{11}$
$\frac{5}{4}$	$\frac{6}{3}$	$\frac{7}{2}$	$\frac{8}{5}$

These fraction cards are to be cut out for the activities given on pages 31 and 33.

Fractions

Name: _____

Date : _____

Note: Page is left blank for cutting purposes

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Name: _____

Date : _____

Fraction Cards

$\frac{17}{10}$	$\frac{2}{10}$	$\frac{3}{10}$	$\frac{41}{10}$
$\frac{5}{10}$	$\frac{26}{10}$	$\frac{7}{10}$	$\frac{8}{10}$
$\frac{9}{10}$	$\frac{13}{11}$	$\frac{42}{11}$	$\frac{35}{11}$

These fraction cards are to be cut out for the activities given on pages 31 and 33.

Fractions

Name: _____

Date : _____

Note: Page is left blank for cutting purposes

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Name: _____

Date : _____

Fraction Cards

$\frac{4}{3}$	$\frac{5}{11}$	$\frac{6}{2}$	$\frac{8}{10}$
$\frac{8}{7}$	$\frac{9}{1}$	$\frac{1}{11}$	$\frac{19}{12}$
$\frac{2}{20}$	$\frac{3}{2}$	$\frac{4}{2}$	$\frac{5}{1}$

These fraction cards are to be cut out for the activities given on pages 31 and 33.

Fractions

Name: _____

Date : _____

Note: Page is left blank for cutting purposes

OXFORD UNIVERSITY PRESS

Name: _____

Date : _____

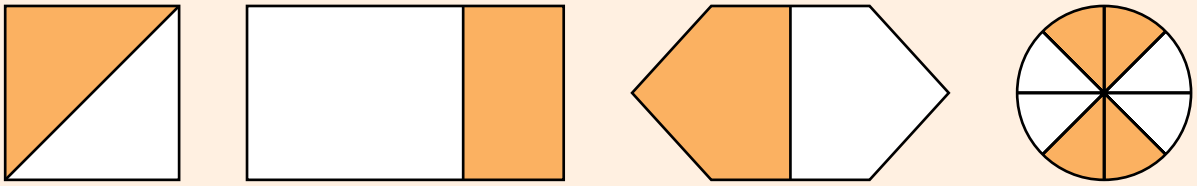
Fraction Cards

$\frac{6}{12}$	$\frac{7}{12}$	$\frac{8}{12}$	$\frac{9}{12}$
$\frac{10}{12}$	$\frac{11}{12}$		

Fill in the blank cards with improper fractions	*Fractions*

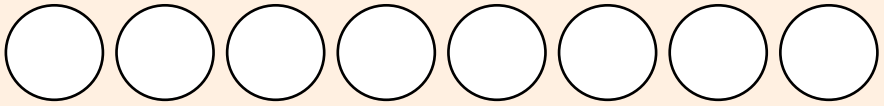
Fractions and Decimals

1. Tick (✔) the shapes that are divided in half.

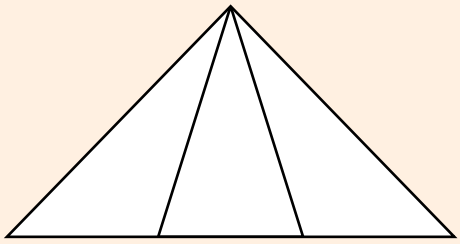


2.

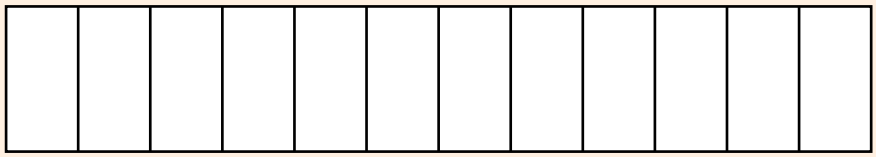
a. Colour $\frac{1}{2}$ of the shapes.



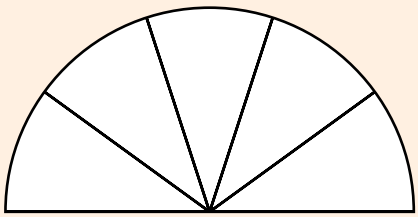
b. Colour $\frac{1}{3}$ of the shape.



c. Colour $\frac{1}{4}$ of the shape.



d. Colour $\frac{3}{5}$ of the shape.



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3. Identify proper and improper fractions from the given set of fractions. Write them in the correct column.

$\frac{3}{5}$	$\frac{7}{6}$	$\frac{9}{8}$	$\frac{1}{3}$	$\frac{2}{7}$	$\frac{5}{3}$	$\frac{4}{9}$	$\frac{2}{3}$	$\frac{8}{7}$	$\frac{3}{4}$	$\frac{7}{5}$	$\frac{11}{9}$

Proper fractions	Improper fractions

4. Fill in the boxes with <, >, or =.

a. $\frac{3}{4} \square \frac{4}{5}$ b. $\frac{2}{3} \square \frac{3}{5}$ c. $\frac{7}{10} \square \frac{6}{10}$

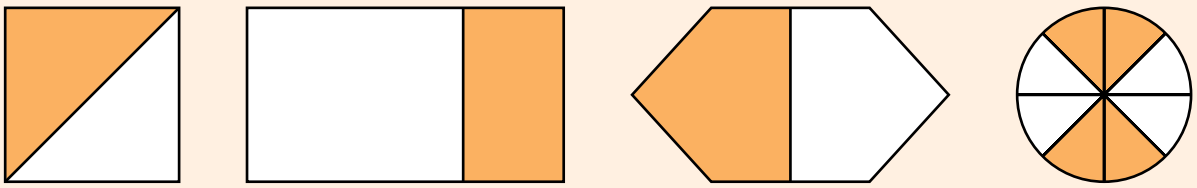
d. $\frac{2}{9} \square \frac{8}{36}$ e. $\frac{5}{6} \square \frac{6}{7}$ f. $\frac{3}{8} \square \frac{6}{16}$

5. Solve the following.

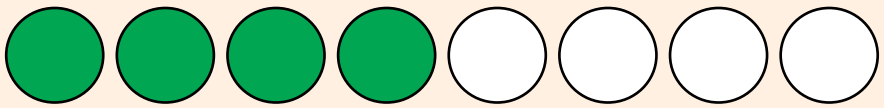
a. $\frac{2}{9} + \frac{5}{9}$	b. $\frac{4}{6} + \frac{1}{6}$	c. $\frac{1}{5} + \frac{2}{5}$
d. $\frac{3}{8} + \frac{1}{8}$	e. $\frac{4}{7} + \frac{2}{7}$	f. $\frac{6}{7} - \frac{5}{7}$
g. $\frac{7}{10} - \frac{3}{10}$	h. $\frac{5}{8} - \frac{3}{8}$	i. $\frac{4}{6} - \frac{2}{6}$

Fractions and Decimals

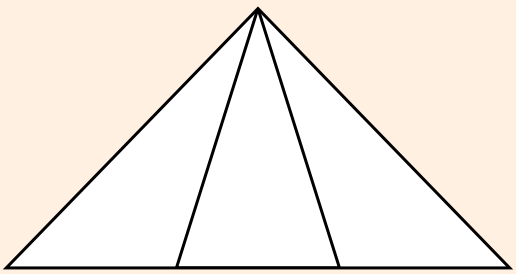
1. Tick (✔) the shapes that are divided in half.



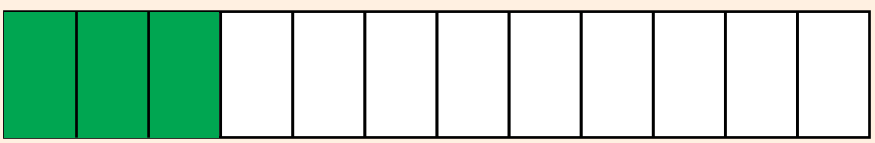
a. Colour $\frac{1}{2}$ of the shapes.



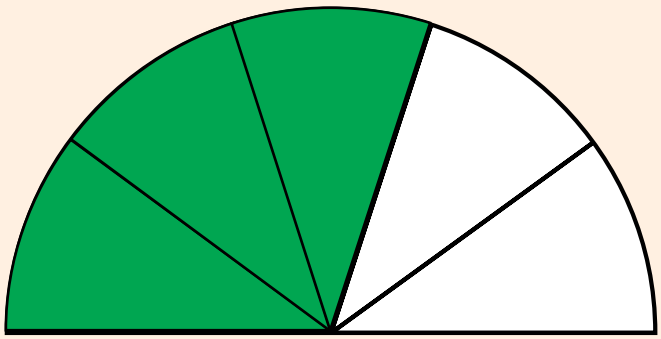
b. Colour $\frac{1}{3}$ of the shape.



c. Colour $\frac{1}{4}$ of the shape.



d. Colour $\frac{3}{5}$ of the shape.



2.

3. Identify proper and improper fractions from the given set of fractions. Write them in the correct column.

$\frac{3}{5}$	$\frac{7}{6}$	$\frac{9}{8}$	$\frac{1}{3}$	$\frac{2}{7}$	$\frac{5}{3}$	$\frac{4}{9}$	$\frac{2}{3}$	$\frac{8}{7}$	$\frac{3}{4}$	$\frac{7}{5}$	$\frac{11}{9}$

Proper fractions	Improper fractions
$\frac{1}{3}, \frac{2}{7}, \frac{3}{5}, \frac{4}{9}, \frac{2}{3}, \frac{3}{4}$	$\frac{7}{6}, \frac{9}{8}, \frac{5}{3}, \frac{8}{7}, \frac{11}{9}$

4. Fill in the boxes with <, >, or =.

a. $\frac{3}{4}$ [>] $\frac{4}{5}$ b. $\frac{2}{3}$ [>] $\frac{3}{5}$ c. $\frac{7}{10}$ [>] $\frac{6}{10}$

d. $\frac{2}{9}$ [=] $\frac{8}{36}$ e. $\frac{5}{6}$ [<] $\frac{6}{7}$ f. $\frac{3}{8}$ [>] $\frac{6}{16}$

5. Solve the following.

a. $\frac{2}{9} + \frac{5}{9}$

$\frac{2 + 5}{9} = \frac{7}{9}$

b. $\frac{4}{6} + \frac{1}{6}$

$\frac{4 + 1}{6} = \frac{5}{6}$

c. $\frac{1}{5} + \frac{2}{5}$

$\frac{1 + 2}{5} = \frac{3}{5}$

d. $\frac{3}{8} + \frac{1}{8}$

$\frac{3 + 1}{8} = \frac{4}{8}$

e. $\frac{4}{7} + \frac{2}{7}$

$\frac{4 + 2}{7} = \frac{6}{7}$

f. $\frac{6}{7} - \frac{5}{7}$

$\frac{6 - 5}{7} = \frac{1}{7}$

g. $\frac{7}{10} - \frac{3}{10}$

$\frac{7 - 3}{10} = \frac{4}{10}$

h. $\frac{5}{8} - \frac{3}{8}$

$\frac{5 - 3}{8} = \frac{2}{8}$

i. $\frac{4}{6} - \frac{2}{6}$

$\frac{4 - 2}{6} = \frac{2}{6}$

Unit 4 Measurement: Length, Mass, Capacity, and Temperature

Learning Framework

Unit 4 Measurement: Length, Mass, Capacity, and Temperature

Recognising and Using Standard Units of Length

Pupils will learn to recognise and use the standard units of length, including kilometre, metre, centimetre, and millimetre, and their abbreviations. Teachers can use measuring tapes, rulers, or metre sticks to help pupils measure and record the length of different objects. For example, the teacher can ask pupils to measure the length of a pencil using a ruler and record the measurement in centimetres.

To teach pupils to add and subtract lengths, teachers can use number lines, measurement charts, or real-life scenarios, such as measuring the length of a room or the distance between two objects. Pupils can practice adding and subtracting lengths using word problems, such as "If a bookshelf is 120 cm long and a vase is 30 cm long, how long are they together?"

Classwork: complete Exercise 1 and 2

Recognising and Using Standard Units of Mass

Pupils will learn to recognise and use the standard units of mass, including kilogram, gram, and milligram, and their abbreviations. Teachers can use balance scales, weights, or measuring cups to help pupils measure and record the mass of different objects. For example, the teacher can ask pupils to measure the mass of a pencil using a balance scale and record the measurement in grams.

To teach pupils to add and subtract mass, teachers can use number lines, measurement charts, or real-life scenarios, such as measuring the mass of ingredients for a recipe. Pupils can practice adding and subtracting mass using word problems, such as "If a bag of flour weighs 2 kg and a bag of sugar weighs 1 kg, how much do they weigh together?"

Classwork: Complete Exercise 3 and 4

Recognising and Using Standard Units of Capacity

Pupils will learn to recognise and use the standard units of capacity, including litre and millilitre, and their abbreviations. Teachers can use measuring cups, jugs, or containers to help pupils measure and record the capacity of different objects. For example, the teacher can ask pupils to measure the capacity of a water bottle using a measuring cup and record the measurement in millilitres.

To teach pupils to add and subtract capacities, teachers can use number lines, measurement charts,

or real-life scenarios, such as measuring the capacity of liquids for a recipe. Pupils can practice adding and subtracting capacities using word problems, such as "If a juice carton holds 1 L of juice and a water bottle holds 500 mL of water, how much liquid do they hold together?"

Classwork: Complete Exercise 5 and 6

Reading and Writing Temperature

Pupils will learn to read and write temperature to the nearest appropriate unit using pictorial representations and relating temperature scales to number lines. Teachers can use thermometers, temperature charts, or real-life scenarios, such as measuring the temperature of a room or the outside temperature. For example, the teacher can ask pupils to read the temperature on a thermometer and record it in degrees Celsius.

To teach pupils to compare and order temperature, teachers can use number lines, temperature charts, or real-life scenarios, such as comparing the temperature of different rooms or the outside temperature at different times of day. Pupils can practice comparing and ordering temperature using symbols <, >, and =. For example, the teacher can ask pupils to compare the temperature of two rooms and write the correct symbol to show which room is warmer or cooler.

Classwork: Complete exercise 7

Lessons Plan

Suggested Time: 1-2 Periods

Objectives:

To enable students to:

- Recognise and use the standard units of capacity (litre and millilitre including abbreviations) to measure and record the capacity of different objects.
- Add and subtract capacities given in the same units (without carrying and borrowing) to solve real-world word problems.

Concept Connector:

Students are already aware of what capacity is and how it is measured. Capacity is the maximum amount of liquid a container can hold. For smaller containers, millilitres are the unit for measurement while for larger containers, litres are used.

Exploring the Objectives:

Revise the definition of capacity and the units used to measure it using Page 76 of the textbook. Using examples 4 and 5, explain to them that addition and subtraction of same units of capacity is done the same way as addition and subtraction of whole numbers. Pages 43-45 of Math Lab 3 can be used as support worksheets to be done as guided practice in class during explanation of the topic.

Activity:

What you need:

- Different containers
- Chits with the names of containers

How to Play:

Pair students in groups of twos.
Ask them to pick a random chit from a bowl.
The pair must tell which unit of capacity is best suited to measure the capacity of the container on the chit.

Reflection:

- Students develop an understanding of how to measure capacity.
- Students know how to use number operation on the same units of capacity.

Exercise:

Exercise 5 deals with the student's understanding of recognizing the correct unit to measure the capacity of different objects. This exercise is an easy level an can be done as homework or classwork.

Before assigning Exercise 6, remind students that number operation works the sae way on capacity as they do for whole numbers. The only thing they need to pay extra attention to is the unit used in the question. Assign alternate parts of Question 1 as individual practice to be done in classroom. The rest of the parts can be given as homework. Question 2 is a real-life application of number operations involving capacity that serve as medium-hard questions. This can, therefore, be assigned as guided practice to be done in the classroom under the supervision of the teacher.

For added practice, the QR code activity sheet on Page 77 can be used as extension practice or reinforcement.

Extension Activity:

Use Math Quest on Page 77 as an extension activity. Once the students try to do it, ask for their feedback and address the issues that they may have faced while doing it.

Unit 4 Measurement: Length, Mass, Capacity, and Temperature

Measurement: Length and Mass

Learning Objective:

- Subtract measures of length in same units without borrowing.
- Solve real-life situations involving same units of length for subtraction without borrowing.
- Subtract measures of mass in same units without borrowing.
- Solve real-life situations involving same units of mass for subtraction without borrowing.
- Subtract measures of capacity in same units without borrowing.

Let's talk math:

Ask pupils if they know how tall they are. And how tall they were last year. Explain that keepingtrack of your height and the amount and speed it changes at every year is something important that people do.

Activity: Splash & Subtract

Duration: 1 Lesson Whole Class Activity

Let's Try It:

- Tell a subtraction number story involving metres, centimetres, and kilometres.
- Repeat Activity 1 with subtraction until students are comfortable, ensuring no borrowing is needed.
- Give students 5 minutes to create their own number stories, ideally based on real-life experiences.
- Have each pupil read their story aloud while others solve it in their notebooks, noting the number sentence.
- Encourage peer review after all stories are shared.
- Draw three swimming pools on the board: Smallest pool: 50 litres.
- Middle pool: 100 litres. Largest pool: 300 litres.
- Explain that a family of three (father, mother, child) splashes water: Father splashes out 5 litres per pool.
- Mother splashes out 3 litres per pool. Child splashes out 8 litres per pool.
- Ask pupils to calculate how much water remains in each pool after the family swims.
- Once solved, have students create their own number stories involving litres and millilitres.

Assessment:

Divide the class into groups of 3 - 5 pupils. Hand out various water containers at random, making sure to give at least one to each student, and a measuring cup to each group.

Capacity

Learning Objective:

- Use standard metric units of capacity (litre and millilitre) including abbreviations.
- Add measures of capacity in same units without carrying.
- Solve real-life situations involving same units of capacity for addition without carrying.

Let's Talk Math: Discuss with pupils how measurement allows us to document and record things, and to recreate exact proportions.

Make Sure You Have: Water Bottles

Activity: Measure and Solve

Duration: 1 Lesson **Whole Class Activity**

Let's Try It:

- Remind the class of the abbreviations: l (litres) and ml (millilitres).
- Show examples of containers with their capacities labeled in litres and millilitres.
- Read out a number story related to liquid measurements.
- Pupils come to the board in pairs.
- One pupil constructs a number sentence using the correct units (l or ml).
- The other pupil solves the number story and writes the answer on the board, including the correct units.
- Ensure the stories are realistic and avoid addition problems requiring carrying.

Assessment: Ask pupils to solve up to 20 addition questions using units like kg or g.

Name: _____

Date : _____

Working With Measuring Units

1. Ali's house is 5 km from Zain's, and Hassan's house is 3 km from Ali's. If Ali's house is in the middle, how far is Zain's house from Hassan's?

2. Sarah is buying 20 metres of wallpaper for a 13 metre wall. How much paper will she have left?

3. Ayesha used to give her dog 150 g of food when he was a puppy, but now that he is grown up, he needs 120 g more. How much will he now get in total?

4. Shazia is flying to Islamabad, and her baggage allowance is 35 kg. Her mother gives her 17 kgs to carry, as a favor. How many kgs of her own things can Shazia take?

5. Mahnoor needs 50 ml of medicine while she is sick. She already has 37 ml at home, so how much more will she need?

6. Alia's pool needs 210 litres to be filled. She has filled it 100 l. So how much more water should she add to fill it.

Solve the above questions, being sure to write the units in tne answer. Once you are done, try to write your own real-life story sum.	*Measurement: length, mass, and capacity*

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Name: _____

Date : _____

Units of Measurement

Units: centimetre, metre, kilometre, gram, kilogram, litre, millilitre

- The length of a water bottle. _____
- The distance between school and home. _____
- The amount of water in a water tank. _____
- The weight of an elephant. _____
- The amount of juice in a bottle. _____
- The height of a tree. _____
- A small teaspoon full of sugar. _____
- The single spoon of medicine. _____
- The amount of water in a pool. _____
- Your own mass. _____

From the statements above, decide which **unit of measurement** is suitable for the measurements mentioned. Ask students to share more examples for each unit of measurement.	*Measurement: length, mass, and capacity*

Name: _____

Date : _____

Units of Measurement

1.	1 m is	shorter than / longer than / the same as	90 m.
2.	500 m is	shorter than / longer than / the same as	1 km.
3.	1000 m is	shorter than / longer than / the same as	1 km.
4.	5 m is	shorter than / longer than / the same as	500 m.
5.	7 m is	shorter than / longer than / the same as	7 m.
6.	80 m is	shorter than / longer than / the same as	80 cm.
8.	2 m is	shorter than / longer than / the same as	20 cm.
9.	2000 m is	shorter than / longer than / the same as	20 km.
10.	1 m is	shorter than / longer than / the same as	160 cm.

Choose the correct phrase to compare lengths.	*Length*

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Measurement: Length, Mass, Capacity, and Temperature

1. Tick (✓) the correct measuring unit that will be used to measure:

a.	the length of a pencil?	cm	m	km
b.	the length of a dining table?	cm	m	km
c.	the length of a classroom?	cm	m	km
d.	the distance between two cities?	cm	m	km
e.	the length of a notepad?	cm	m	km
f.	the length of a river?	cm	m	km

2. Solve the following.

a. 69 cm + 20 cm	b. 821 km 633 m + 78 km 106 m
c. 56 cm – 30 cm	d. 2638 km 212 m – 198 km 111 m

3. Solve the following real-life problems.

Problems	Working
a. Ayesha's mother bought two pieces of lace for Ayesha's shirt. One piece is 75 cm long and the other is 20 cm long. What is the total length of both the pieces of lace?	
Answer: ☐ cm	
b. On Monday a painter drew a picture on a wall 34 m 50 cm long. Next day he drew another picture on the wall 26 m 37 cm long. What length of the wall did he paint altogether?	
Answer: ☐ m ☐ cm	
c. A plumber had a pipe 87 m long. He used 35 m of the pipe. What length of the pipe is left?	
Answer: ☐ m	
d. An electric pole is 18 m 75 cm long. 3 m 25 cm of the pole is below the ground. What length of the pole is above the ground?	
Answer: ☐ m ☐ cm	

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4. Write the correct unit to measure. (kilogram or gram)

   a. the mass of a book. ____

   b. the mass of a cupboard. ____

5. Solve the following.

a. 78 g + 30 g	b. 74 kg 62 g + 43 kg 28 g
c. 83 g – 50 g	d. 354 kg 66 g – 71 kg 43 g

6. Solve the following real-life problems.

	Problems	Working
a.	A shopkeeper had 20 kg 250 g of potatoes. He sold 12 kg 125 g of potatoes in a day. What is the mass of potatoes left?	

Answer: kg g

b. Mr Saleem bought two sacks of rice with a total mass of 180 kg 500 g. If the mass of one of the sacks of rice is 95 kg 450 g, what is the mass of the other sack of rice?

Answer: kg g

c. Asad weighs 10 kg 120 g and his brother weighs 4 kg 100 g. What is the difference of their masses?

Answer: kg g

7. Write the correct unit to measure. (millilitre or litre)

a. Water in an aquarium. ____

b. A tablespoon of oil. ____

8. Solve the following.

a. 88 ml + 90 ml

b. 45 l 14 ml + 29 l 25 ml

c. 87 ml – 10 ml

d. 986 l 66 ml – 65 l 22 ml

9. Solve the following real-life problems.

Problems	Working
a. A chef wants to cook a special dessert for a party. He needs 20 l 500 ml of milk for this dish. He has 15 l 125 ml only. How much more milk is required?	
Answer: l ml	
b. Aslam works in a hospital. He bought 55 l 275 ml of Dettol in the first week and 60 l 125 ml in the next week. How much Dettol did he buy altogether?	
Answer: l ml	
c. A water tank has a capacity of 100 l. If it already has 54 litres of water in it, how much more water should be poured into it to fill it completely?	
Answer: l	
d. A family uses 12 litres of oil in a month and 10 l 650 ml in the second month. How much oil has been used in two months?	
Answer: l ml	

Measurement: Length, Mass, Capacity, and Temperature

1. Tick (✓) the correct measuring unit that will be used to measure:

a.	the length of a pencil?	cm	m	km
b.	the length of a dining table?	cm	m	km
c.	the length of a classroom?	cm	m	km
d.	the distance between two cities?	cm	m	km
e.	the length of a notepad?	cm	m	km
f.	the length of a river?	cm	m	km

2. Solve the following.

a. 69 cm + 20 cm

69 cm + 20 cm = 89 cm

b. 821 km 633 m + 78 km 106 m

Convert km to m: 821 km = 821,000 m, 78 km = 78,000 m
Add: 821,000 m + 633 m + 78,000 m + 106 m = 899,739 m
Convert back to km and m: 899 km 739 m

c. 56 cm – 30 cm

56 cm - 30 cm = 26 cm

d. 2638 km 212 m – 198 km 111 m

Convert km to m: 2638 km = 2,638,000 m, 198 km = 198,000 m
Subtract: 2,638,000 m + 212 m - 198,000 m - 111 m = 2,440,101 m
Convert back to km and m: 2440 km 101 m

3. Solve the following real-life problems.

Problems	Working
a. Ayesha's mother bought two pieces of lace for Ayesha's shirt. One piece is 75 cm long and the other is 20 cm long. What is the total length of both the pieces of lace?	Total length = 75 cm + 20 cm = 95 cm
Answer: 95 cm	
b. On Monday a painter drew a picture on a wall 34 m 50 cm long. Next day he drew another picture on the wall 26 m 37 cm long. What length of the wall did he paint altogether?	Convert m to cm 3400 cm + 50 cm + 2600 cm + 37 cm = 6087 cm Convert back to m and cm: 60 m 87 cm
Answer: 60 m 87 cm	
c. A plumber had a pipe 87 m long. He used 35 m of the pipe. What length of the pipe is left?	Length of pipe left = Total length - Length used = 87 m - 35 m = 52 m
Answer: 52 m	
d. An electric pole is 18 m 75 cm long. 3 m 25 cm of the pole is below the ground. What length of the pole is above the ground?	Convert m to cm 1800 cm + 75 cm - 300 cm - 25 cm = 1550 cm Convert back to m and cm: 15 m 50 cm
Answer: 15 m 50 cm	

4. Write the correct unit to measure. (kilogram or gram)

   a. the mass of a book. Gram

   b. the mass of a cupboard. Kilo Gram

5. Solve the following.

a. 78 g + 30 g 78 g + 30 g = 108 g	b. 74 kg 62 g + 43 kg 28 g Convert kg to g Add: 74,000 g + 62 g + 43,000 g + 28 g = 117,090 g Convert back to kg and g: 117 kg 90 g
c. 83 g – 50 g 83 g - 50 g = 33 g	d. 354 kg 66 g – 71 kg 43 g Convert kg to g 354,000 g + 66 g - 71,000 g - 43 g = 282,023 g Convert back to kg and g: 282 kg 23 g

6. Solve the following real-life problems.

	Problems	Working
a.	A shopkeeper had 20 kg 250 g of potatoes. He sold 12 kg 125 g of potatoes in a day. What is the mass of potatoes left?	Mass of potatoes left = Initial mass - Mass sold = 20 kg 250 g - 12 kg 125 g = 8 kg 125 g

Answer: 8 kg 125 g

b. Mr Saleem bought two sacks of rice with a total mass of 180 kg 500 g. If the mass of one of the sacks of rice is 95 kg 450 g, what is the mass of the other sack of rice?

Mass of other sack of rice = Total mass – Mass of one sack
= 180 kg 500 g – 95 kg 450 g
= 85 kg 50 g

Answer: 85 kg 50 g

c. Asad weighs 10 kg 120 g and his brother weighs 4 kg 100 g. What is the difference of their masses?

Difference in masses = Asad's mass – Brother's mass
= 10 kg 120 g – 4 kg 100 g
= 6 kg 20 g

Answer: 6 kg 20 g

7. Write the correct unit to measure. (millilitre or litre)

a. Water in an aquarium. Litre

b. A tablespoon of oil. millilitre

8. Solve the following.

a. 88 ml + 90 ml

88 ml + 90 ml = 178 ml

b. 45 l 14 ml + 29 l 25 ml

Convert l to ml
45,000 ml + 14 ml + 29,000 ml + 25 ml = 74,039 ml
74 l 39 ml

c. 87 ml – 10 ml

87 ml – 10 ml = 77 ml

d. 986 l 66 ml – 65 l 22 ml

Convert l to ml:
986,000 ml + 66 ml – 65,000 ml – 22 ml = 921,044 ml
921 l 44 ml

9. Solve the following real-life problems.

Problems	Working
a. A chef wants to cook a special dessert for a party. He needs 20 l 500 ml of milk for this dish. He has 15 l 125 ml only. How much more milk is required?	Additional milk required = Required milk – Available milk = 20 l 500 ml – 15 l 125 ml = 5 l 375 ml
Answer: 5 l 375 ml	
b. Aslam works in a hospital. He bought 55 l 275 ml of Dettol in the first week and 60 l 125 ml in the next week. How much Dettol did he buy altogether?	Total Dettol bought = Dettol bought in first week + Dettol bought in second week = 55 l 275 ml + 60 l 125 ml = 115 l 400 m
Answer: 115 l 400 ml	
c. A water tank has a capacity of 100 l. If it already has 54 litres of water in it, how much more water should be poured into it to fill it completely?	Additional water required = Tank capacity – Available water = 100 l – 54 l = 46 l
Answer: 46 l	
d. A family uses 12 litres of oil in a month and 10 l 650 ml in the second month. How much oil has been used in two months?	Total oil used = Oil used in first month + Oil used in second month = 12 l + 10 l 650 ml = 22 l 650 ml
Answer: 22 l 650 ml	

Unit 5 Measurement: Time

Learning Framework

Unit 5 Measurement: Time

- Reading and Writing Time
- Recognising and Using a.m. and p.m.

Pupils will learn to read and write time in hours and minutes from analogue and digital clocks. Teachers can use interactive clock models, clock worksheets, or online clock games to help pupils practice telling time. For example, the teacher can use a classroom clock to demonstrate how to tell time and ask pupils to practice reading and writing the time.

To teach pupils to recognise and use a.m. and p.m. to record the time from a 12-hour clock, teachers can use daily schedules, routine charts, or morning and afternoon labels. Pupils can practice identifying a.m. and p.m. times using word cards or sentence stems. For instance, the teacher can create a daily schedule with a.m. and p.m. times and ask pupils to identify the correct times.

Classwork: Complete exercise 1 and 2

Adding and Subtracting Measures of Time

Pupils will learn to add and subtract measures of time given in the same units to solve real-world word problems. Teachers can use time lines, hour glasses, or elapsed time worksheets to help pupils practice adding and subtracting time. For example, the teacher can ask pupils to solve a word problem like "If a movie starts at 3:00 p.m. and lasts for 2 hours, what time will it end?"

Classwork: complete exercise 3

Reading and Writing Months, Days, and Dates

To teach pupils to read and write months, days, and dates from the Solar Calendar, teachers can use calendar worksheets, month labels, or date stamps. Pupils can practice reading and writing dates using calendar templates or sentence stems. For instance, the teacher can create a classroom calendar and ask pupils to identify and write the date for a specific day.

Classwork: Complete exercise 4

Lessons Plan

Suggested Time: 1-2 periods

Objectives:

- Read and write months, days and dates from the Solar Calendar.

Concept connector:

Ask students to share their date of birth and year with the class. Discuss how many days or months are left until their next birthday. Using Concept Connector given on Page 88, reinforce the concept of Solar calendar.

Exploring the Objectives:

Using the current year's calendar solve ***Example 3 given on Page 88*** to explain how to read a solar calendar and how to write dates, days, and months from the calendar. Explain that each month can be divided into weeks. There are 7 days in a week and 4 weeks in a month.

Activity: Calendar Puzzle

What you Need:

- Date Cards
- Days Cards
- Months Cards
- Current Year's Calendar

How to Play:

Distribute a set of cards to each student or group of students. Have them match the cards to form correct dates and encircle the date on the provided calendar. For example, they might match "Monday," "January," "15," and "2024" to form the date "Monday, January 15, 2024."

The group that has the highest number of circled dates will win.

Reflection:

- Students reinforced understanding of days, months, years, and the order of the calendar.
- Student read the calendar and displayed their understanding by matching with the dates.

Exercise:

Question 1 of Exercise 4 deals with the basic concept of solar calendar. Questions are asked for general information about weeks, months, and years. Provide this year's calendar while assigning ***Question 3*** for classwork. Assign ***QR Code Activity sheet*** given on ***Page 89*** for homework. Assign ***Maths Quest*** given on ***Page 89*** to discuss its answer with reasoning.

Extension Activity:

Design your own calendar. What special events will you include?

Mark the dates for winter vacations and summer vacations as well.

Unit 5 Measurement: Time

Learning Objective:

- Use a.m. and p.m. to record the time from 12-hour clock.
- Read and write time from analogue and digital clocks.
- Read and write days and dates from the calendar.
- Solve real-life situations involving measures of time.

Let's Talk Math:

- Ask pupils what role planning plays in their lives.
- Do they like to plan, or do they find it difficult?
- Ask them to come up with examples of how planning has or has not improved their lives. Ask them if they think it would be possible to plan ahead all the time.
- Solve real-life situations involving measures of time for addition of hours.

Make Sure You Have:

- Analogue Clock
- Digital Clock

Activity: Clock and Calendar Quest

Duration: 1 Lesson **Whole Class Activity**

Let's Try It:

- Discuss telling time using both analogue and digital clocks.
- Teach the difference between a.m. and p.m. using real-world examples.
- Engage students in calculating the day of the week for their classmates' birthdays using a calendar.

Assessment:

Ask pupils to create a weekly planner showing the days of the week, the dates,and a timetable for each day. Make sure that there are exactly 7 days on each calendar, and that every hour of the day is shown. Encourage creativity and accuracy, where the datesare concerned.

Name: _____

Date : _____

Date and Time

Special Event	Date	Day	Time of Event
Independence Day School Assembly	14th August	Friday	a.m.
Cousin's wedding reception			
Kashmir Day			
Sports Day			
Annual examinations begin			
Friend's birthday party			

Using a **solar calendar** of this year, have the students fill out the table. Ask them to guess if the events listed would be celebrated in the first half of the day (**a.m.**) or second half (**p.m.**). The first one has been done for you.	*Time*

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Name: _____

Date : _____

Reading a Calendar

1. Tariq's birthday is on 27th September.
   a. He wants to send out the invite to his party 1 week before. What will the day and date be?

      _____

   b. He has to order his cake 4 days before. What day and date should he order the cake?

      _____

   c. The photographer will return the pictures of his party 12 days later. On what day and date will he receive his pictures?

      _____

2. Mona's sister's wedding is on the weekend after 14th August.
   a. What day and date according to the solar calendar will that be?

      _____

   b. Mona's grandmother will come from abroad for the wedding exactly 2 days before. What will the day and date be?

      _____

   c. Mona wants to get a hair cut 1 week before. What will the day and date be?

      _____

Tell the students to work in pairs and use **the calenders of this year** to answer the questions.	*Time*

Name: _____

Date : _____

Reading a Calendar

3. For each given date write the corresponding day or vice versa.

a. 14th August _____

b. Last day of school _____

c. 9th November _____

d. 18th Saturday of the year _____

e. 23rd March _____

f. 3rd Monday of April _____

g. 25th December _____

h. First day of summer vacation _____

i. Your date of birth _____

Use current year's calendar.	*Time*

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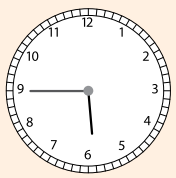
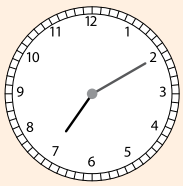
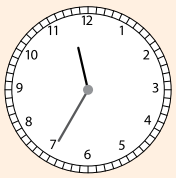
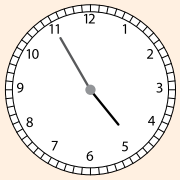
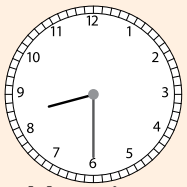
Measurement: Time

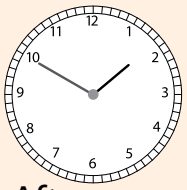
1. Write a.m. or p.m. in the boxes.
   a. Sana gets up at 6:15 to get ready for school. ☐
   b. The school assembly starts at 8:00. ☐
   c. The school gets over at 1:30. ☐
   d. My friends go to the park at 5:30 in the evening. ☐
   e. We have dinner at 9:00. ☐
   f. Sameer sleeps at 10:00. ☐

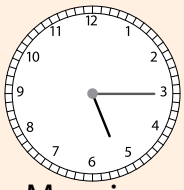
2. What time do the following analogue and digital clocks show?

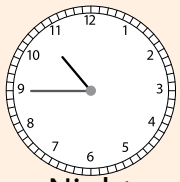
a. 	b. 	c. 	d. 
e. 7:35	f. 3:30	g. 1:50	h. 4:45

3. Match the time in the following analogue and digital clocks by joining them with a line.

a. 
Morning

b. 
Afternoon

c. 
Morning

d. 
Night

5:15 a.m. 8:30 a.m. 1:50 p.m. 10:45 p.m.

4. Look at the given page of a calendar and answer the following questions.

December						
M	**T**	**W**	**T**	**F**	**S**	**S**
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31			

a. What is the last day of December? ____

b. What is the date on the first Saturday of the month? ____

c. Which day of the week is December 14th? ____

d. How many Wednesdays are in the month? ____

5. Solve the following real-life problems.

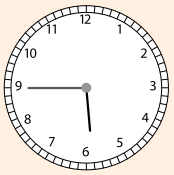
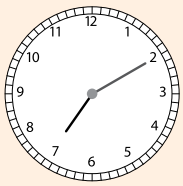
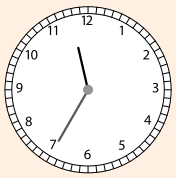
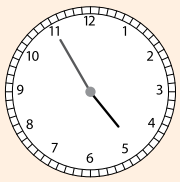
Problems	Working
a. Salma read a storybook for 1 hour on a Saturday and for 2 hours on a Sunday. How many hours did she spend reading her storybook?	
Answer: ____ hours	
b. A train took 10 hours to reach a city. Then another 8 hours to reach the second city. How much time did the whole journey take?	
Answer: ____ hours	
c. Mansoor studied Mathematics for 16 hours and English for 8 hours in a week. How many more hours did he study Mathematics than English?	
Answer: ____ hours	

Measurement: Time

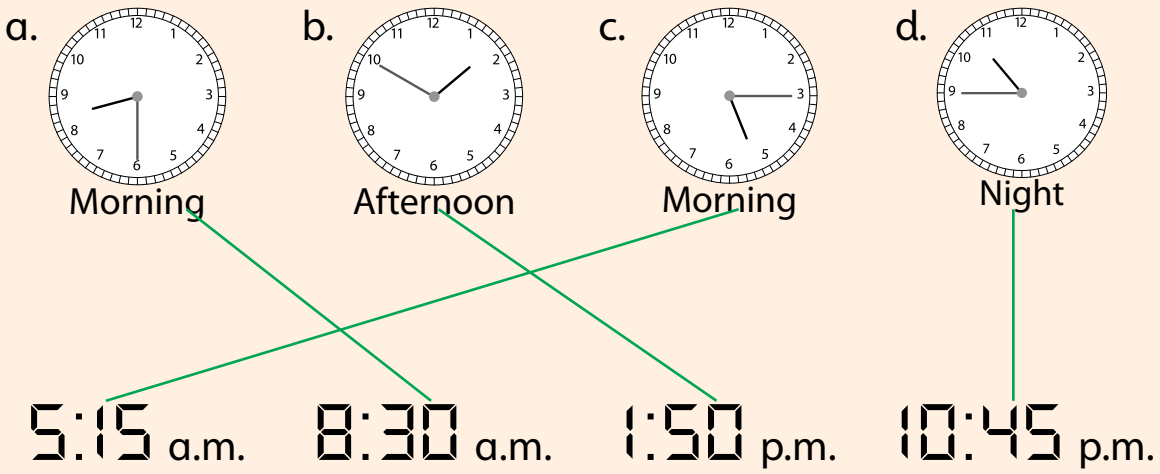
1. Write a.m. or p.m. in the boxes.

a.	Sana gets up at 6:15 to get ready for school.	am
b.	The school assembly starts at 8:00.	am
c.	The school gets over at 1:30.	pm
d.	My friends go to the park at 5:30 in the evening.	pm
e.	We have dinner at 9:00.	pm
f.	Sameer sleeps at 10:00.	pm

2. What time do the following analogue and digital clocks show?

a.	b.	c.	d.
			
6:45	7:10	11:35	4:55
e. 7:35	f. 3:30	g. 1:50	h. 4:45
7:35	3:30	1:50	4:45

3. Match the time in the following analogue and digital clocks by joining them with a line.



4. Look at the given page of a calendar and answer the following questions.

December						
M	**T**	**W**	**T**	**F**	**S**	**S**
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31			

a. What is the last day of December? Thrusday

b. What is the date on the first Saturday of the month? 5th

c. Which day of the week is December 14th? Monday

d. How many Wednesdays are in the month? Five

5. Solve the following real-life problems.

Problems	**Working**
a. Salma read a storybook for 1 hour on a Saturday and for 2 hours on a Sunday. How many hours did she spend reading her storybook?	2 + 1 3
Answer: 3 hours	
b. A train took 10 hours to reach a city. Then another 8 hours to reach the second city. How much time did the whole journey take?	10 + 8 18
Answer: 18 hours	
c. Mansoor studied Mathematics for 16 hours and English for 8 hours in a week. How many more hours did he study Mathematics than English?	16 - 8 8 Hours
Answer: 8 hours	

Unit

6 Perimeter and Area

Learning Framework

Unit 6 Perimeter and Area

Understanding Units of Measurement of Area and Perimeter

Pupils will learn to recognise and identify the units of measurement of area and perimeter. Teachers can use geoboards, graph paper, or online geometry tools to help pupils understand the concept of area and perimeter. For example, the teacher can use a geoboard to demonstrate how to find the perimeter of a rectangle by counting the number of units around the shape.

Finding Perimeter of 2D Figures

To teach pupils to find the perimeter of 2D figures, including squares, triangles, and rectangles, teachers can use real-life examples, such as measuring the perimeter of a room or a picture frame. Pupils can practice finding the perimeter using worksheets or online activities that involve calculating the perimeter of different shapes.

Finding Area of 2D Figures

Pupils will learn to find the area of 2D figures, including squares, triangles, and rectangles. Teachers can use arrays, number tiles, or base-ten blocks to help pupils understand the concept of area. For example, the teacher can use an array of tiles to demonstrate how to find the area of a rectangle by counting the number of tiles.

Finding Perimeter and Area of Irregular Figures

To teach pupils to find the perimeter and area of irregular figures on a square grid, teachers can use grid paper, dot paper, or online geometry tools. Pupils can practice finding the perimeter and area of irregular shapes by counting the number of units around and inside the shape. For instance, the teacher can ask pupils to find the perimeter and area of an irregular shape that covers either ½ or 1 square unit only.

Classwork: Complete exercise 1 and 2

Lessons Plan

Suggested Time: 1-2 Periods

Objectives:

Recognise and identify the units of measurement of area and perimeter, find the perimeter and area of 2D figures (squares, triangles and rectangles) and irregular figures

(figure covers either ½ or 1 square unit only) on a square grid.

Concept Connector:

Students already have learnt to read and measure lengths of different objects. Brainstorm students to share examples where they see the use of length of objects. Give them example of calculating the length of a boundary for fencing a garden or field. Share few more examples like, building a fence around a yard, framing a picture, and designing a room layout.

Exploring the Objectives:

Use a big sheet of square grid and paste it on the white board. Explain how to calculate perimeter of the shape as explained on ***Page 91***. ***Examples 1 and 2 on Page 92*** can be explained by drawing the shape on the same grid. Introduce the units to measure perimeter of any shape. If the length is given centimetres, the perimeter will also be measured in centimetres. Similarly, if the length is in metres, the perimeter will be calculated in metres. Draw the shape of ***Question 1(e) of Exercise 1*** on the board to further explain the method to calculate the perimeter.

Activity: Perimeter Hunt

What You Need:

- Grid paper
- Colored pencils or markers
- Rulers

How to Play:

- Divide students into pairs or small groups.
- Provide each group with grid paper and coloured pencils.
- Ask them to create different shapes (rectangles, squares, L-shapes, etc.) on the grid paper.
- Have students exchange their shapes with another group.
- Instruct them to count the units around the edge of the shape to find its perimeter.
- They can use rulers to measure the sides if needed.

Reflection:

- Students created different shapes using the edges of each square in the square grid.
- They confidently calculated the perimeter by adding the edges.
- Represented the method clearly.

Exercise:

Question 1(d, e, f), 2(a), 5, and 6 can be assign as classwork to reinforce the concept. Make sure that support has been provided while solving Question 5 and 6. After doing all these questions, ask students to attempt solving Question 7. Take feedback from the class and then challenge them with Maths quest given on Page 93. This time take feedback as whole class to generate discussion and come to the conclusion.

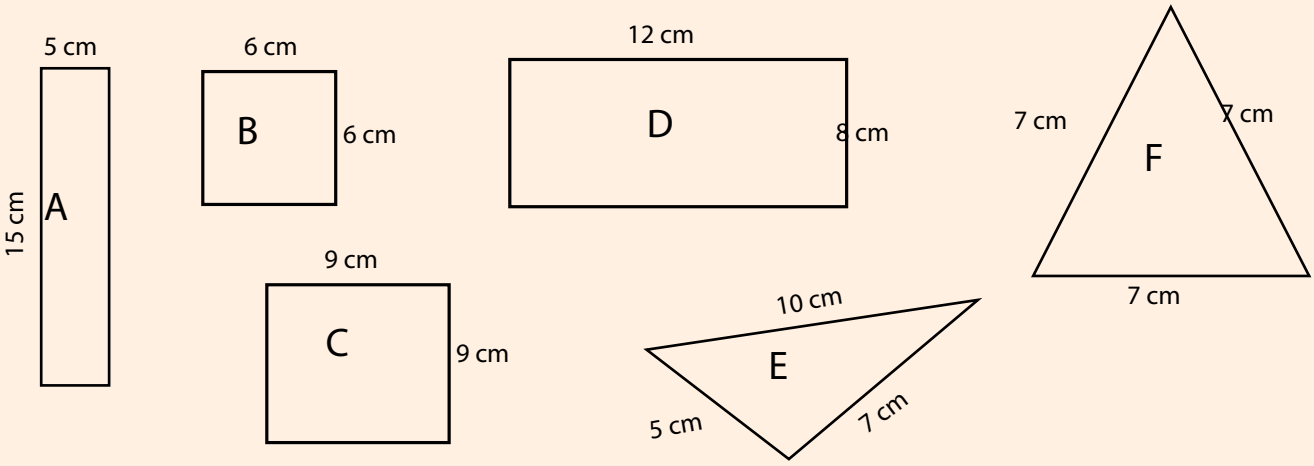
Extension Activity:

1. If you add a square to a rectangle, how will the perimeter change?
2. If you want to put a fence around your backyard that is 10 meters long and 8 meters wide, how much fencing do you need?
3. If you double the side length of a square, what happens to its perimeter?

Name: _____

Date : _____

Finding perimeter



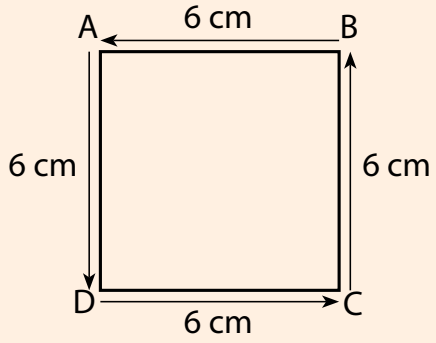
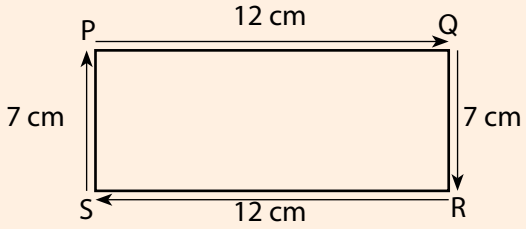
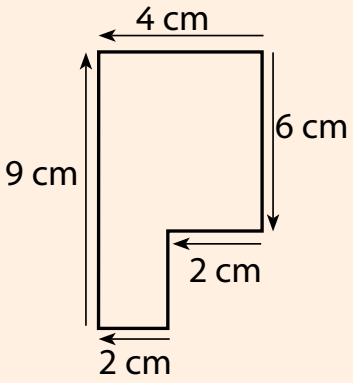
	Name of the shape	Perimeter
A.		
B.		
C.		
D.		
E.		
F.		

Find the perimeter of all shapes.	*Perimeter*

Note: Shapes not to scale.

Measurement: Perimeter and Area

1. Find the perimeter and area of the given shapes.

	Perimeter	Area
a. 		
b. 		
c. 		

2. Solve the following real-life problems.

Problems	Working
a. Fahim jogs on a rectangular track 300 m long and 150 m wide. How much distance does he cover in one round?	
Answer: ☐ m	
b. Anjum wants to make a triangular birthday card for her friend with each side of 25 cm. Find the perimeter of the card.	
Answer: ☐ cm	
c. A farmer has a rectangular field of length 850 m and a width of 600 m. i. If he wants to put a fence around the field, what will be the total length of the fence? ii. Find area of the field.	
Answer: ☐ m and ☐ m^2	

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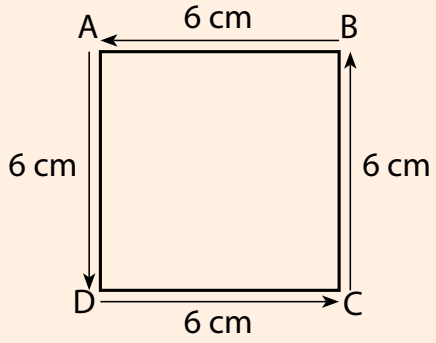
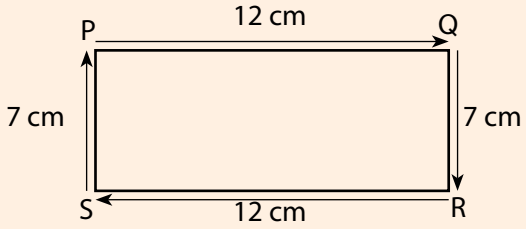
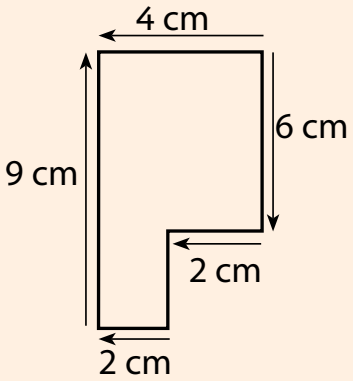
Measurement: Perimeter and Area

1. Find the perimeter and area of the given shapes.

	Perimeter	Area
a. 	4 × 6 = 24 cm	6 × 6 = 36 cm
b. 	2 (12 + 7) 2 (19) = 38 cm	12 × 7 = 84 cm
c. 	4 + 6 + 9 + 2 + 2 = 23 cm	4 × 6 = 24 cm

2. Solve the following real-life problems.

Problems	Working
a. Fahim jogs on a rectangular track 300 m long and 150 m wide. How much distance does he cover in one round?	2 (300 + 150) 2 (450) = 900 m
Answer: 900 m	
b. Anjum wants to make a triangular birthday card for her friend with each side of 25 cm. Find the perimeter of the card.	25 + 25 + 25 = 75 cm
Answer: 75 cm	
c. A farmer has a rectangular field of length 850 m and a width of 600 m. i. If he wants to put a fence around the field, what will be the total length of the fence? ii. Find area of the field.	i. 850 + 600 = 1450 m ii. 850 × 600 = 510,000 m^2
Answer: 1450 m and 510,000 m^2	

Unit 7 Geometry

Learning Framework

Unit 7 Geometry

Recognise point, line, ray, and line segment; draw and measure line segments to the nearest centimetre and millimetre.

Pupils will learn to recognise point, line, ray, and line segment, and draw and measure line segments to the nearest centimetre and millimetre. Teachers can use geometry software, graph paper, or measuring tools like rulers or protractors to help pupils understand these basic concepts. For example, the teacher can use a digital geometry tool to demonstrate how to draw and measure line segments.

Classwork: Complete exercise 1

Classifying Polygons

To teach pupils to differentiate and classify polygons with respect to their attributes, teachers can use real-life examples, such as shapes found in architecture or design. Pupils can practice identifying and classifying polygons using worksheets or online activities that involve sorting shapes into categories. For instance, the teacher can ask pupils to identify and classify a polygon as a square, triangle, rectangle, pentagon, hexagon, octagon, or decagon.

Understanding Circle Attributes

Pupils will learn to identify the centre, radius, and diameter of a circle. Teachers can use circular objects, such as plates or coins, to demonstrate these attributes. Pupils can practice identifying the centre, radius, and diameter of a circle using worksheets or online activities that involve drawing and labeling circles.

Identifying 3D Shapes

To teach pupils to identify, describe, and differentiate between cube, cuboid, prisms, and pyramids, teachers can use 3D models, geometry software, or real-life examples, such as buildings or monuments. Pupils can practice identifying and describing 3D shapes using worksheets or online activities that involve sorting shapes into categories.

Identifying Lines of Symmetry

Pupils will learn to identify reflective symmetry and lines of symmetry in 2D shapes and draw lines of symmetry. Teachers can use symmetry worksheets, geometry software, or real-life examples, such as reflections in mirrors or water. For example, the teacher can ask pupils to identify and draw

the lines of symmetry in a given shape.

Classwork: Complete exercise 2 and 3

Describing Movement of Objects

To teach pupils to describe the movement of objects, including slide and rotation, teachers can use real-life examples, such as moving toys or objects on a screen. Pupils can practice describing the movement of objects using worksheets or online activities that involve animating shapes.

Understanding Quarter Turns

Pupils will learn to recognise and identify quarter turns and identify quarter turns as right angles. Teachers can use geometry software, protractors, or real-life examples, such as rotating a wheel or a shape. For example, the teacher can ask pupils to identify a quarter turn as a right angle.

Understanding Half and 3-Quarter Turns

To teach pupils to identify half and 3-quarter turns as two and three right angles respectively, teachers can use geometry software, protractors, or real-life examples, such as rotating a wheel or a shape. Pupils can practice identifying half and 3-quarter turns using worksheets or online activities that involve rotating shapes.

Classwork: Complete Exercise 4 and 5

Lessons Plan

Suggested Time: 1-2 Periods

Objectives:

- Differentiate and classify polygons with respect to their attributes (square, triangle, rectangle, pentagon, hexagon, octagon, and decagon).
- Identify the centre, radius, and diameter of a circle.

Concept Connector:

Have students recall the 2D shapes they have learnt in Grade 2. Have students share the examples of various objects with base having the similar shape as the learnt 2D shapes. Using ***Concept Connector given on Page 100***, reinforce the properties of previously learnt shapes.

Exploring Objectives:

Explain that a polygon is a closed 2D shape with 3 or more straight sides. Poly means 'many' and gon means 'angled'. Draw some polygons and few non-polygon shapes on the board and have students identify the polygons from these shapes. Introduce and explain different types of triangles using the figures drawn on ***Page 100***. Discuss ***Maths in Action on Page 101*** and more examples of various objects with base shape similar to the polygons. Provide cut-outs of various polygons and ask students to explore the properties then use the table given on ***Page 101*** to explain the properties. Explain the parts of a circle by drawing a circle as shown on ***Page 101*** and highlighting its parts using different coloured markers.

Activity: Polygon Bingo

What You Need:

- Bingo cards with different polygons drawn on them.
- Polygon Name cards

How to Play:

- Call out the properties of a polygon.
- Students cover the corresponding shape on their card with a marker or counter.
- They will find the card with the name of the polygon.
- The first student to complete a row or column calls out "Bingo!"

Reflection:

- Students participated enthusiastically while doing the activity.
- Identified the polygons correctly.
- Maximum response from the students.

Exercise:

Assign ***Exercise 2 on Page 103*** as classwork. Take feedback from the class to share more examples on Polygons. To reinforce the concept, have students practice ***Math Lab Page 54. QR Code Activity***

sheet on Page 102 can be given as homework.

Extension Activity:

Find five things that are shaped like a circle.

Find something that is part of a circle.

Create a pattern using only triangles.

Create a pattern using squares and circles.

Create a pattern that repeats.

Unit 7 Geometry

Learning Objective:

- Draw and measure line segments to the nearest centimetre and millimetre.
- Recognise point, line, ray, and line segment.
- Classify figures according to number of sides as quadrilaterals (rectangles, squares, and triangles).
- Calculate perimeter of square, rectangle, and triangle.
- Identify centre, radius, and diameter of a circle.

Let's Talk Math:

- Ask pupils about the geometry they have studied previously.
- Ask them if they have applied in their everyday lives.

Make Sure You Have:

- Tape measure
- A4 sheet
- Rulers

Activity: Measure, Match, and Check

Duration: 1 Lesson **Group Activity**

Let's Try It:

- Pass rulers around the class, showing both centimetres and millimetres.
- Explain that a millimetre is a tenth of a centimetre.
- Allow students time to familiarize themselves with the measurements on the rulers.
- ivide the class into two groups: Group A and Group B.
- Provide each group A4 sheets and ten different measurements in centimetres and millimetres.
- Ask students to draw line segments according to the measurements, but without labeling them.
- Collect the sheets and swap the sheets between the two groups.
- Each student should measure the lines on their new sheet using a ruler.
- Draw another identical line on the other side of the sheet and label it.
- By the end, each group should have identical sheets.
- Ask group members to stand and read out the lengths they measured.
- Discuss any discrepancies or differences.

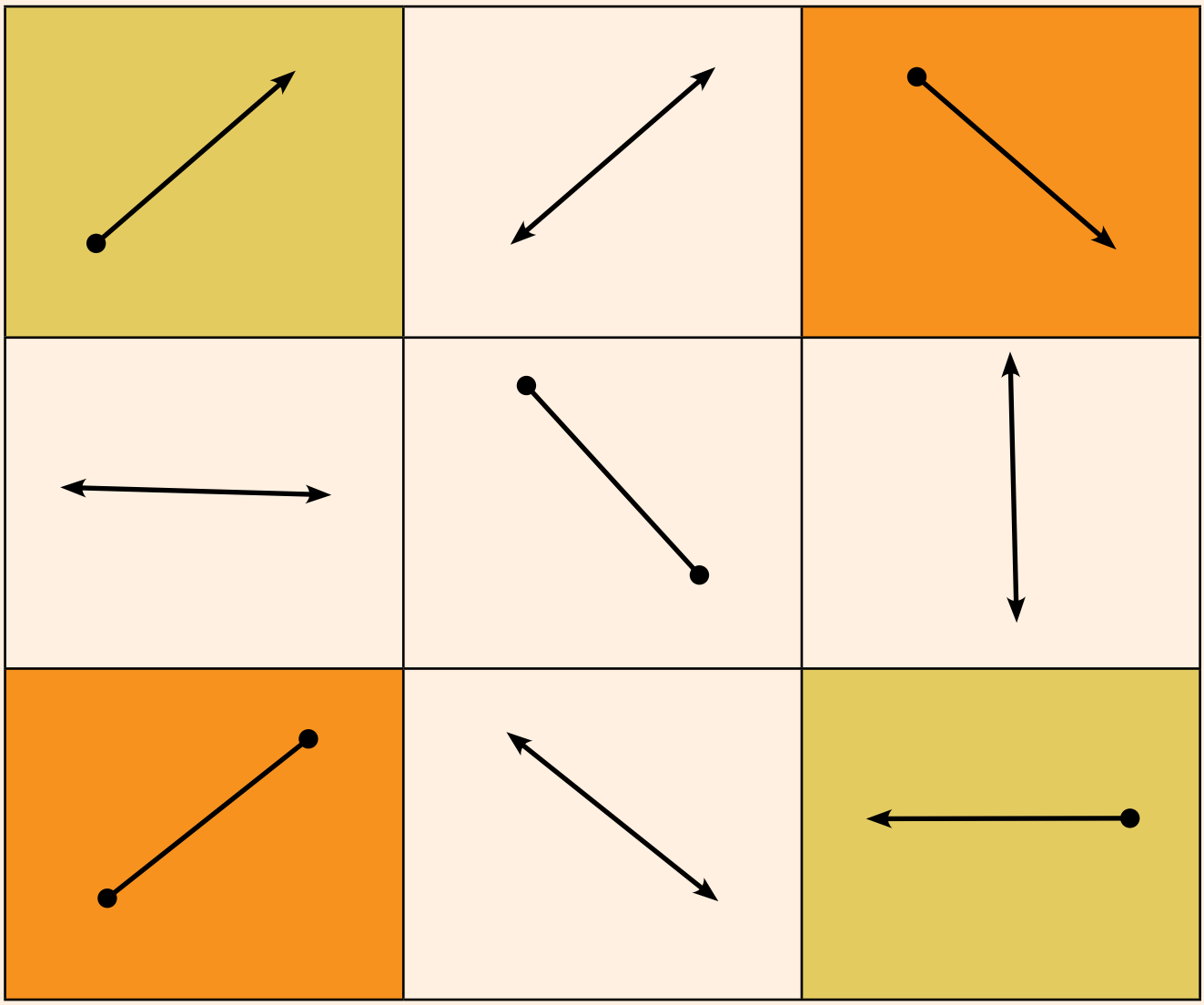
Assessment:

Revisit the line and explain its defining characteristic: it can extend infinitely in both directions.

Name: _____

Date : _____

Ray, Line, or Line Segment?



Tell the students that the above are examples of **lines**, **line segments, and rays.** Sort these into the table on the next page by drawing them correctly in each column.	*Basic Geometry*

Note: Make sure that pupils recognise the points.

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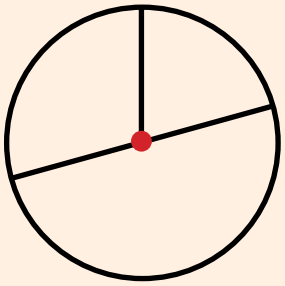
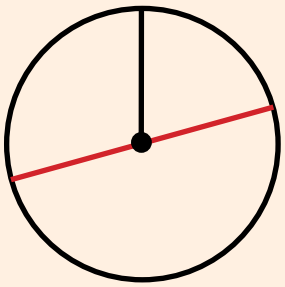
Name: _____

Date : _____

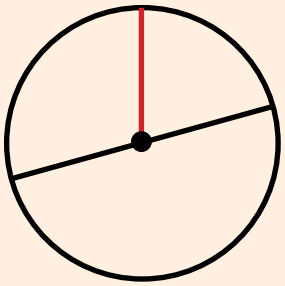
What Am I?



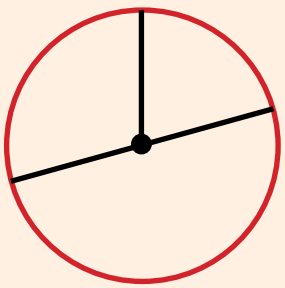
_____



_____



_____



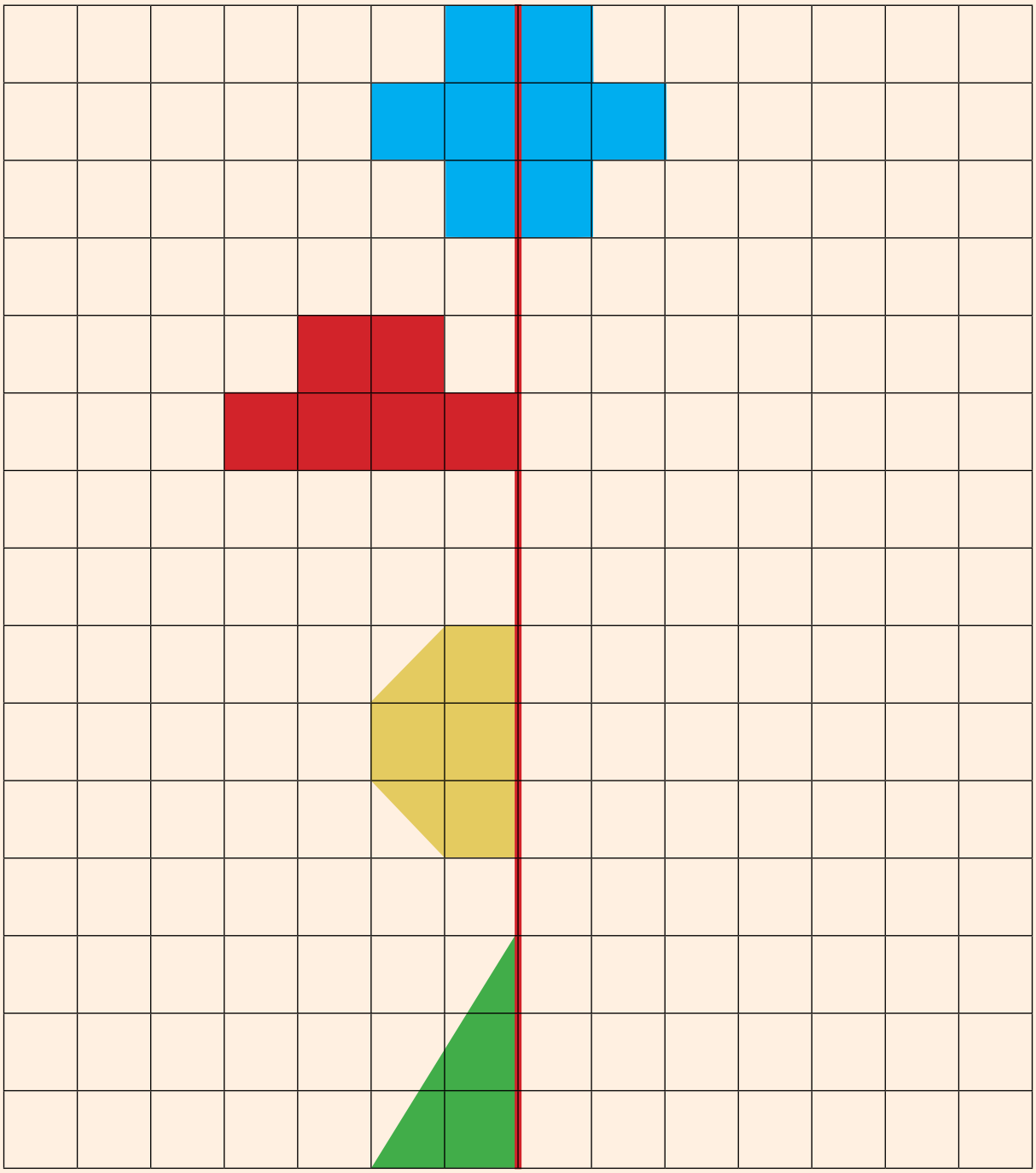
_____

Name the coloured **parts of the circle** correctly.	*Geometrical shapes*

Name: _____

Date : _____

Drawing Symmetrical Figures



Complete the above given symmetrical figures, according to the given line of symmetry. One is done for you.	*Symmetry*

Note: Geo boards can be used to show symmetrical figures.

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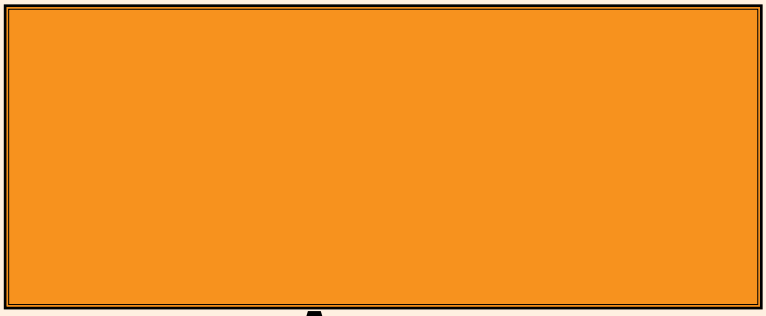
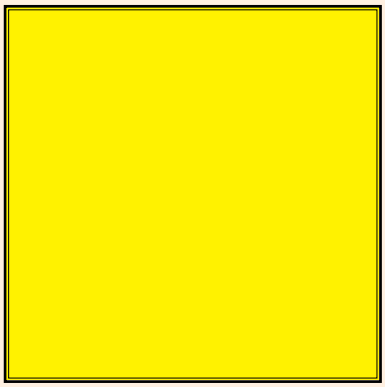
Name: _____

Date : _____

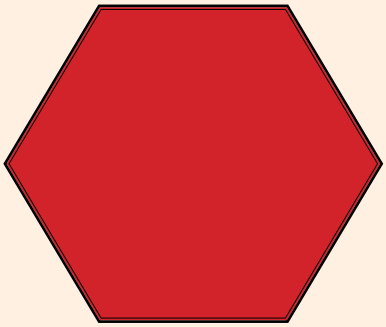
Lines of Symmetry



A



B



C

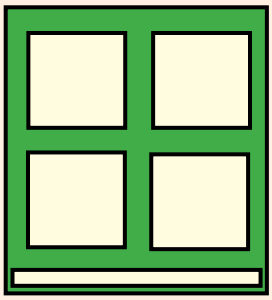
Draw the figures here.

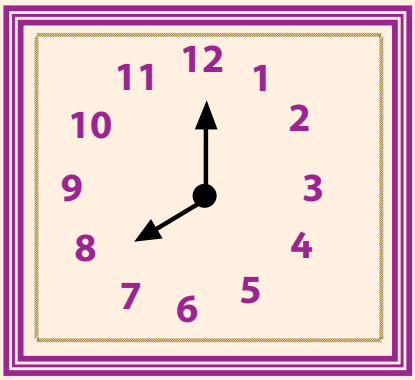
Tell the students to draw as many **lines of symmetry** on each figure as possible. Then ask them to draw more figures with at least one line of symmetry.	*Symmetry*

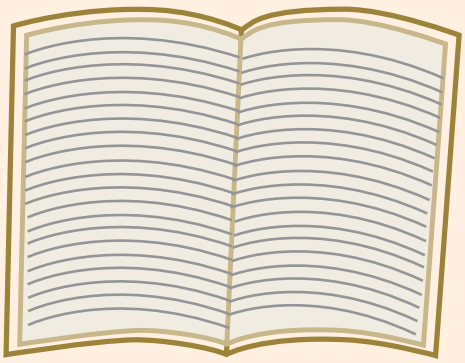
Name: _____

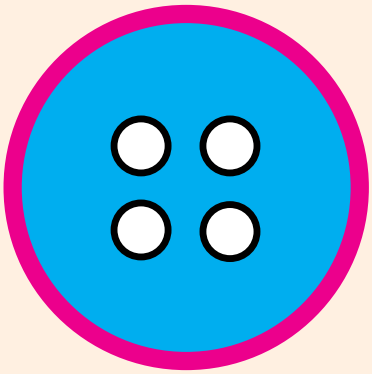
Date : _____

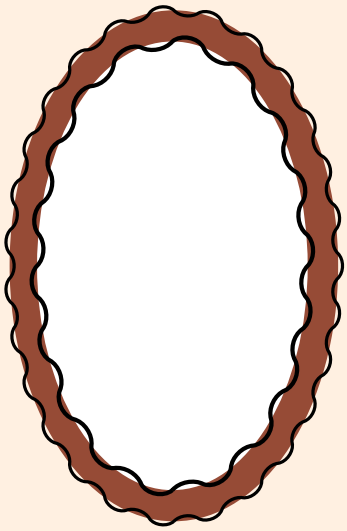
Symmetry at Home

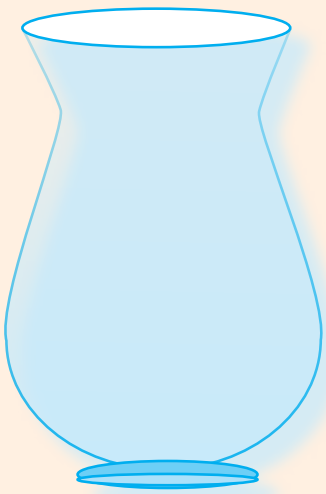












Find other objects around the classroom or at home and decide how many **lines of symmetry** each of them have.	*Symmetry*

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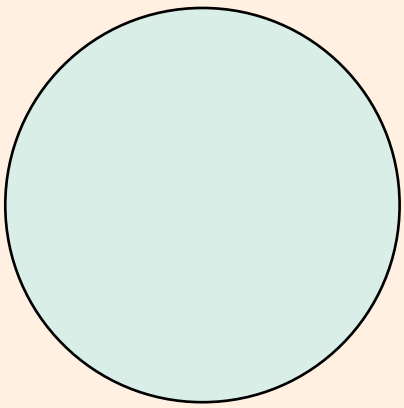
Geometry

1. Measure and write the length of each line segment.

a. A B	m $\overline{AB}$ = ☐ cm
b. C D	m $\overline{CD}$ = ☐ cm

2. Mark and name the centre, radius, and diameter in the given circle.

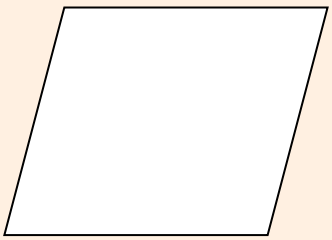
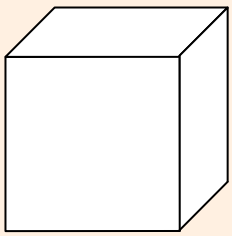
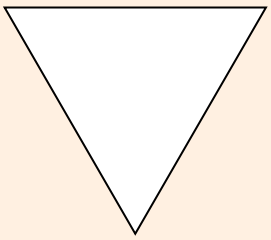
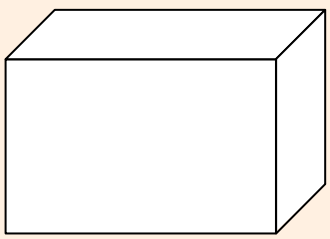
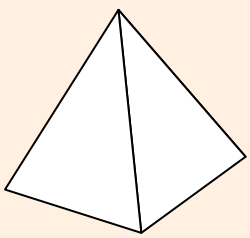


Centre: ☐

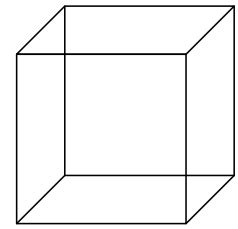
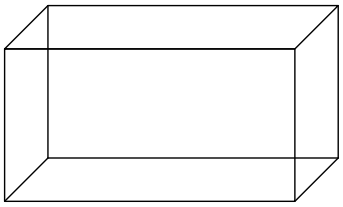
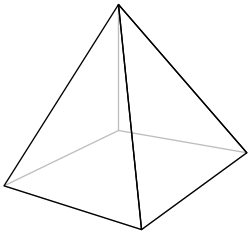
Radius: ☐

Diameter: ☐

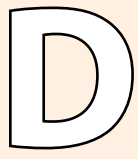
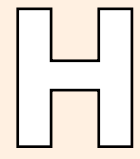
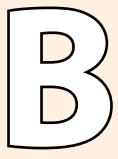
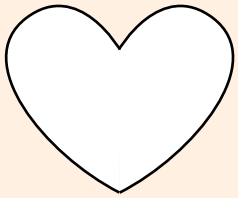
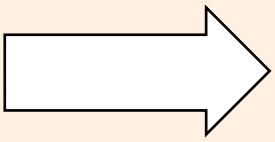
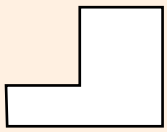
3. Identify and colour the 3D shapes.

4. Complete the table given below.

Shape	Name of the shape	Number of faces	Number of edges	Number of vertices
				
				
				

5. Identify and put a tick (✓) on the shapes with reflective symmetry.

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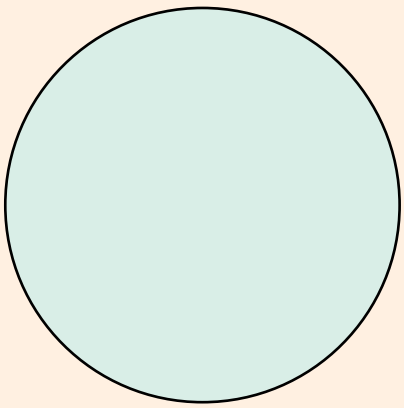
Geometry

1. Measure and write the length of each line segment.

a.	A B	m $\overline{AB}$ = ☐ cm
b.	C D	m $\overline{CD}$ = ☐ cm

2. Mark and name the centre, radius, and diameter in the given circle.

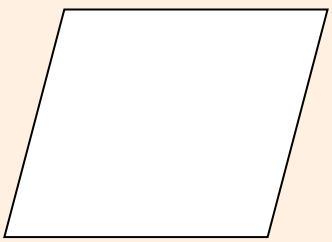
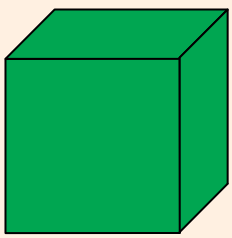
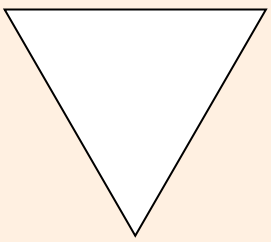
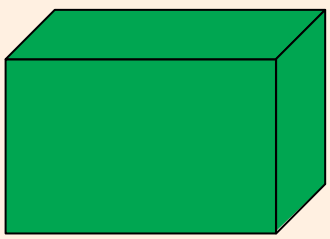
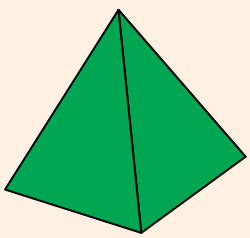


Centre: ☐

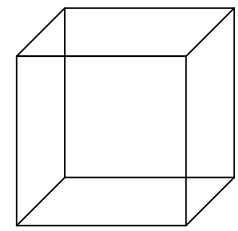
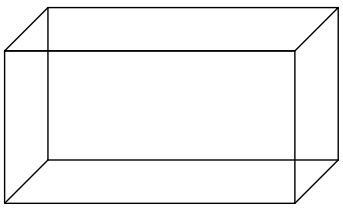
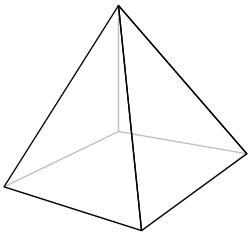
Radius: ☐

Diameter: ☐

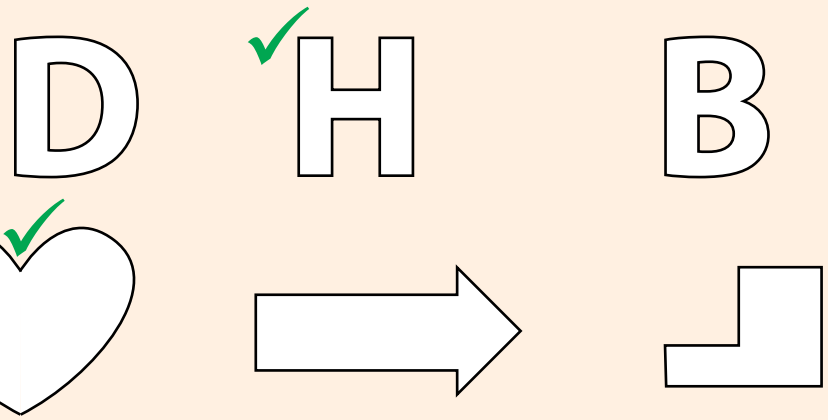
3. Identify and colour the 3D shapes.

4. Complete the table given below.

Shape	Name of the shape	Number of faces	Number of edges	Number of vertices
	Cube	6	8	8
	Cube	6	8	8
	Cube	4	5	6

5. Identify and put a tick (✓) on the shapes with reflective symmetry.



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Unit

8 Data Handling and Probability

Learning Framework

Unit 8 Data Handling and Probability

- Reading, Interpreting, and Representing Data
- Understanding Probability

Pupils will learn to read, interpret, and represent data using tally charts, Carroll Diagrams, and picture graphs, including real-world problems. Teachers can use interactive whiteboards, data analysis software, or online graphing tools to help pupils create and interpret graphs. For example, the teacher can use a picture graph to represent the number of pets owned by pupils in the class.

To teach pupils to describe the likelihood that everyday events will occur, using mathematical language, teachers can use probability spinners, dice games, or real-life scenarios, such as predicting the weather. Pupils can practice describing probability using vocabulary such as impossible, possible, less likely, more likely, equally likely, unlikely, and certain. For instance, the teacher can ask pupils to predict the likelihood of a coin landing heads up and describe their answer using mathematical language.

Classwork: complete exercise 1 and 2

Lessons Plan

Suggested Time: 1-2 Periods

Objectives:

Read, interpret and represent data using tally charts Carroll Diagrams and picture graphs (including real-world problems).

Concept Connector:

Ask students what their favourite colour, animal, or sport is. Have them raise their hands for their favourite choice and record the number of students with tally marks on the board. Using Concept Connector on Pages 111 and 112 recall the concept of tally marks and Picture graphs.

Exploring Objectives:

Involve students to create a picture graph using simple drawings to represent each student's choice. Decide on a key (e.g., one drawing = 2 students). Complete the graphs using students feedback on each step. Explain the ***Examples 1 and 2*** to demonstrate the steps involved in representing the information using Picture graphs. Discus the importance of Carroll diagram with the explanation of ***Example 3 on Page 113*** that a Carroll diagram is a method of sorting objects, numbers, and shapes with more than one property.

Activity:

Shapes Sorting

What You Need:

Cut-outs of various shapes (circles, squares, triangles, rectangles) in different colors (red, blue, yellow).

A large Carroll Diagram on a chart paper. Label the top row "Red" and "Not Red." Label the left column "Circles" and "Not Circles."

How to Play:

Divide the class in pairs and give each pair a shape.

Paste the Diagram on the board.

Instruct students to place their shapes correctly within the Carroll Diagram. After completing the diagram circulate the Carroll Diagram around the classroom to provide feedback.

Have a discussion by asking following question.

How did you decide where to place your shape?

Are there any shapes in the "Not Red" and "Not Circles" section? Why or why not?

Can you find a shape that is both red and a circle?

Reflection:

Student participation and engagement in the activities.

Students have correctly sorted the shapes based on the given criteria.

Students explained their reasoning for placing objects in specific categories.

Exercise:

Assign ***Question 1 and 2 of Exercise 1*** as classwork to make students reinforce the concept of Carroll Diagrams. Have a discussion while solving these two questions by taking feedback from the students. Assign ***Math Lab Page 60 and 61*** as homework to further practice the concept.

Extension Activity:

Ask students to do the previous activity with the following criteria. "Big circles" vs "small circles".

Unit 8 Data Handling and Probability

Learning Objective:

Represent data using the following graphs: Carroll diagram

Tally chart Picture graph

Read and interpret Carroll diagram, tally chart, and picture graph.

Let's Talk Math:

- Ask pupils what the purpose of using charts and diagrams is.
- Ask them if they have ever used them before.

Make Sure You Have:

- Chart paper
- Building blocks

Activity: Data Blocks & Charts

Duration: 1 Lesson **Whole Class Activity**

Let's Try It:

- Prepare a data sheet for pupils
- Divide the class into groups of up to five pupils.
- Hand out building blocks to each group.
- Ask the class to come up with a question to collect data from their classmates (e.g., number of books read this year or pencils in their pencil cases).
- Encourage creativity but keep the values low.
- Each group collects data based on the question and counts it using the blocks.
- Groups display their blocks (representing their data) at the front of the class.
- Ask the class to manually count the total number of blocks.
- Write the data on the board as a tally chart by asking each group for their count.
- Point out the efficiency of reading a tally chart compared to counting blocks.
- Compare the picture graph, tally chart, and Carroll diagram, and discuss which method best represents the data.

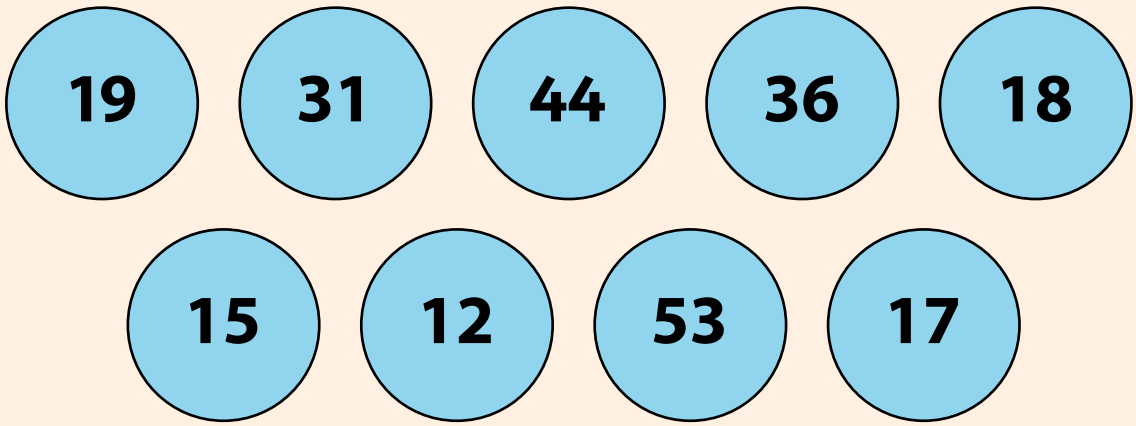
Assessment: Ask pupils to collect data as homework for a Carroll diagram. It must be real, and it must be drawn from personal experience.

Name: _____

Date : _____

Carroll Diagram

1. Put the numbers below into the correct box in the Carroll diagram.



	Less than 20	More than 20
Even		
Odd		

2. Write even numbers that are less than 20 = _____

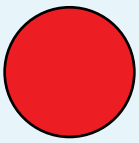
3. Write odd numbers that are more than 20 = _____

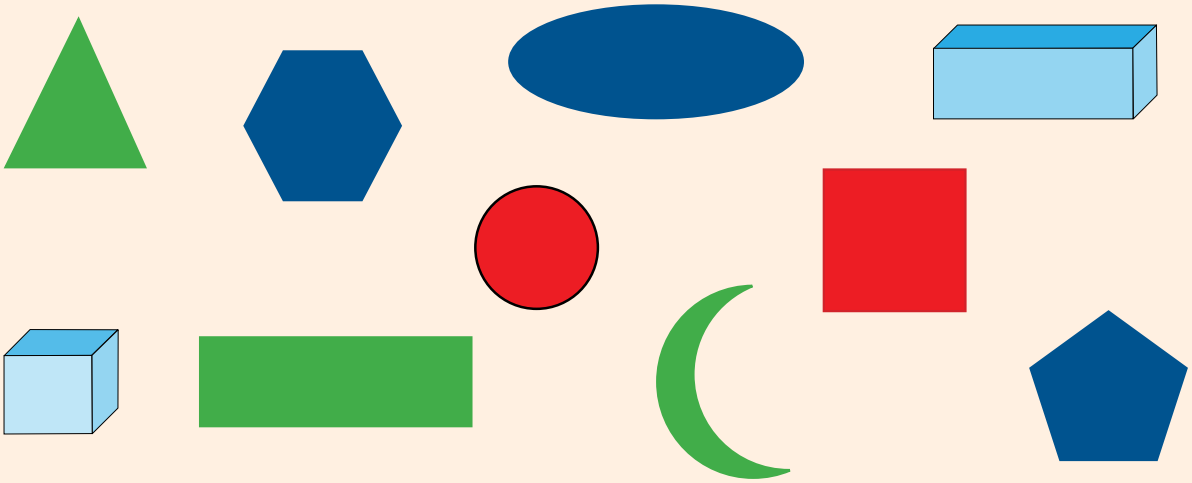
4. Colour the box of carroll diagram that shows odd numbers less than 20 = _____

Name: _____

Date : _____

Carroll Diagram

Object	Has Straight Lines	Has Curved Line
Red Shapes		
Green Shapes		
Blue Shapes		
3D Shapes		



Tell students to organise data in the Carroll diagram according to two attributes.	*Data Handling*

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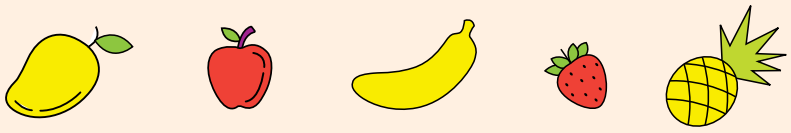
Data Handling and Probability

1. Students of Class 3 were asked about their favourite fruit. Sort out the fruits according to the colour red or yellow, and complete the Carroll diagram.



	Juicy	**Non-juicy**
Yellow colour		
Red colour		

2. Sort out the given numbers and complete the Carroll diagram.

9	12	15	18	25	30	36
35	39	42	45	50	54	60

	Even Numbers	**Odd Numbers**
Numbers divisible by 3		
Numbers divisible by 5		

3. Science test marks obtained by 24 students are given below:
Complete the table.

5	8	9	7	7	3	10	9	8	6	5	9
7	8	4	10	4	5	8	10	10	6	6	8

Marks Obtained	Tally Marks	Number of Students
3		
4		
5		
6		
7		
8		
9		
10		

4. The pictograph shows production of bicycles in different years.
Answer the questions given below.

Year	Number of vehicles
2008	🚲🚲🚲🚲🚲🚲🚲🚲
2013	🚲🚲🚲🚲🚲🚲🚲🚲🚲
2018	🚲🚲🚲🚲🚲🚲

Key:
Each 🚲 represents 1000 units.

a.	How many bicycles were produced in 2008?	
b.	How many bicycles were produced in 2018?	
c.	How many lesser numbers of bicycles were produced in 2018 as compared to 2008?	
d.	How many bicycles were produced altogether?	

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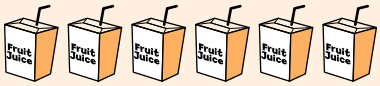
5. Children of two sections of Class 3 were asked what their favourite drink was. The result is shown on the pictograph.

Drink	Number of children
Milk	
Juice	
Tea	
Milkshake	

Key:
Each drink represents 3 children.

a. Which is the favourite drink?

b. Which drink is least popular?

c. Which two drinks are equally liked?

d. How many more children like milk as compared to tea?

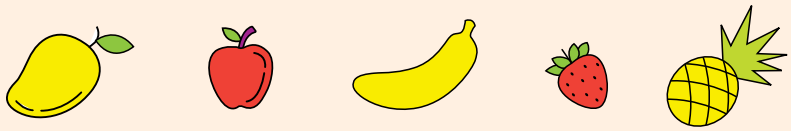
e. How many children were surveyed?

6. Students of Class 3 celebrate their birthdays in the following months. Draw a bar graph for the given information.

Month	Tally Marks
January	𝍸
February	𝍸
April	𝍸
May	𝍸
July	𝍸
September	𝍸 ‖
November	‖
December	𝍸 𝍸

Data Handling and Probability

1. Students of Class 3 were asked about their favourite fruit. Sort out the fruits according to the colour red or yellow, and complete the Carroll diagram.



	Juicy	Non-juicy
Yellow colour	Mango/Pineapple	Banana
Red colour	Strawberry	Apple

2. Sort out the given numbers and complete the Carroll diagram.

9	12	15	18	25	30	36
35	39	42	45	50	54	60

	Even Numbers	Odd Numbers
Numbers divisible by 3	12, 18, 30, 36, 42, 54, 60	9, 15, 39, 45
Numbers divisible by 5	30, 50, 60	15, 25, 35, 45,

3. Science test marks obtained by 24 students are given below:
Complete the table.

5	8	9	7	7	3	10	9	8	6	5	9
7	8	4	10	4	5	8	10	10	6	6	8

Marks Obtained	Tally Marks	Number of Students
3		
4		
5		
6		
7		
8		
9		
10		

4. The pictograph shows production of bicycles in different years.
Answer the questions given below.

Year	Number of vehicles
2008	🚲🚲🚲🚲🚲🚲🚲🚲
2013	🚲🚲🚲🚲🚲🚲🚲🚲🚲
2018	🚲🚲🚲🚲🚲🚲

Key:
Each 🚲 represents 1000 units.

a.	How many bicycles were produced in 2008?	8000
b.	How many bicycles were produced in 2018?	6000
c.	How many lesser numbers of bicycles were produced in 2018 as compared to 2008?	2000
d.	How many bicycles were produced altogether?	23000

5. Children of two sections of Class 3 were asked what their favourite drink was. The result is shown on the pictograph.

Drink	Number of children
Milk	
Juice	
Tea	
Milkshake	

Key:
Each drink represents 3 children.

a. Which is the favourite drink? ____

b. Which drink is least popular? ____

c. Which two drinks are equally liked? ____

d. How many more children like milk as compared to tea? ____

e. How many children were surveyed? ____

6. Students of Class 3 celebrate their birthdays in the following months. Draw a bar graph for the given information.

Month	Tally Marks
January	𝍸
February	𝍸
April	𝍸
May	𝍸
July	𝍸
September	𝍸
November	𝍸
December	𝍸

Unlocking the Power of Math: The Essential Glossary

A glossary in mathematics is a valuable tool that enhances learning and understanding. It serves as a reference guide, providing clear definitions and explanations of mathematical terms and concepts. Here are some key reasons why a glossary is important in math:

Clarity and Understanding: A glossary helps students understand the precise meaning of mathematical terms. This clarity is crucial because math often involves complex and abstract concepts. By having a glossary, students can quickly look up definitions and ensure they are using terms correctly.

Consistency: Mathematical language needs to be consistent. A glossary ensures that everyone uses the same definitions and understands terms in the same way. This consistency is important for effective communication, whether in the classroom, in textbooks, or in discussions.

Learning Aid: For students, a glossary is an essential learning aid. It helps them review and reinforce their understanding of key terms. When studying or doing homework, students can refer to the glossary to refresh their memory and clarify any doubts.

Problem-Solving: Understanding the terminology is the first step in solving math problems. A glossary helps students decode the language of math problems, making it easier to identify what is being asked and how to approach the solution.

Confidence Building: Having a glossary at hand can boost students' confidence. Knowing that they can easily find the meaning of unfamiliar terms reduces anxiety and encourages them to tackle challenging problems without fear of misunderstanding.

Accessibility: A glossary makes mathematical knowledge more accessible. It breaks down barriers for students who might struggle with the language of math, providing them with a tool to independently explore and understand new concepts.

In summary, a glossary in mathematics is an indispensable resource that supports clarity, consistency, learning, problem-solving, confidence, and accessibility. It empowers students to navigate the language of math with ease and enhances their overall learning experience.

Glossary

a.m.: a.m. short form of 'ante meridiem' representing time before noon.
anticlockwise: the opposite direction in which the hands of a clock move.
apex: a point where all the non-base faces of a cone or pyramid meet.
approximately: an estimate or approximation to an exact value.
area: the amount of surface inside a 2D shape, measured in square units.
ascending order: arranging numbers from smaller value to larger value.
attributes: feature of an object, such as size, shape, colour, or number of sides. same as property.
Carroll diagram: a way to sort and represent data based on given attributes.
centre point: a fixed point in a circle which is at equal distance from all points on the circle.
certain: the probability that an event will happen.
circle: set of points which are at equal distance from a fixed point.
clockwise: the direction in which the hands of a clock move.
compare: to identify similarities and differences of two or more quantities or numbers.
data: information that is gathered by counting, measuring, questioning, or observing.
decimal number: a number containing a decimal point.
decimal point a mark used to separate the whole number and fractional part in decimals.
denominator: the denominator is the number of equal parts into which the whole, has been divided.
descending order: arranging numbers from larger value to smaller value.
diameter: a line segment passing through the centre and joining two points on the circle..
digital clock: a clock that shows the time with number of hours and minutes, usually separated by a colon.
dimension a measure of an object, usually length, width, or height.
dividend: the number in division that is being divided.
divisor: the number that divides another number.
edge: a line segment where two surfaces of a geometric solid meet.
endpoint: a point at the end of a line segment or a ray.
equally likely: outcomes of a chance or situation that have the same probability of happening.
equivalent fraction: two or more fractions that are equal, even though they have different numerators and denominators.
estimation: an answer close to, or approximating, an exact answer.
expanded form: way of writing a number as the sum of the values of each digit.
face: a flat surface on a 3-dimensional figure.
fraction: part of a whole.
height: a measurement of the distance of an object from base to the top.
hundredths: number of parts out of 100 equal parts.
impossible: the probability that an event cannot happen.
improper fraction: a fraction in which the numerator is greater than the denominator.
interpret: to convert a diagram or a drawn graph into meaningful information.
irregular figures: 2-dimensional shapes where all angles and sides are not equal.
length: a measurement that shows the distance between two points.
like fractions fractions with same denominators.
likely: more chance of an event to happen.
line: 1-dimensional straight path that extends forever in opposite directions.
line segment: part of a line including two endpoints and is named by its endpoints.
line symmetry: a line that divides a figure into two parts that are reflection images of each other.
lowest term: a fraction that cannot be further simplified.
mass: the quantity of matter in an object, measured by how much something weighs.
midpoint a point halfway between two other points.

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mixed number: a mixed number is a combination of a whole number and a proper fraction.

number line: a line on which points are indicated by marks that are at equal intervals from a starting point that is zero.

number pattern: a list of numbers, generated by a rule.

numerator: part of a fraction above the line, representing the number of equal parts being considered.

operation: a rule performed on one or more numbers. addition, subtraction, multiplication, and division are the four basic arithmetic operations.

operation symbol: a symbol used in number sentences for a mathematical operation (+, –, ×, ÷).

perimeter: the distance around the boundary of a 2-dimensional figure.

place value: system that gives a digit a value according to its position, or place, in a number.

p.m.: p.m. short form of 'post meridiem' representing time after midday till midnight.

point an exact location in space, usually denoted with capital letters.

polygon: closed 2D shape formed by three or more sides that meet only at their endpoints.

probability: the likelihood or chance that an event will happen.

product: the result of multiplying two numbers.

proper fraction: a fraction in which the numerator is less than the denominator.

prism: a 3D solid object that has flat faces and two identical ends.

pyramid: a 3D shape with a base and triangular faces which meet at a common vertex.

quotient: the result of dividing one number by another number.

radius: the distance from the centre to any point on a circle.

ray: line segment with one end point and is named by its endpoint.

reflective symmetry: when one half of a shape or an object is the exact reflection of the other.

regular figures 2-dimensional shapes with all angles and sides equal.

remainder: an amount left over when one number is divided by another number.

represent: to show information on a chart, for example pictograph, bar graph or a line graph.

Roman numerals: letters that are used alone and in combination to represent numbers in roman system of numeration.

rotation: turning a shape around a fixed point.

rounding off: rounding off a number means converting it to the closest required place value.

side: one of a line segment that makes a polygon.

simplification: to rewrite a fraction in its lowest form.

slide: an up or down and right or left movement.

square unit: a unit to measure area.

standard unit: a measurement unit used as reference when measuring.

temperature: how hot or cold something is compared to another object.

tenths: number of parts out of 10 equal parts.

turn: another name for a rotation.

unlike fractions: fractions with different denominators.

unlikely: less chance of an event to happen.

unit fraction: a fraction whose numerator is 1.

weight: a measure of how heavy something is.

whole numbers: counting numbers, such as 0, 1, 2, 3, ...

vertex: the point at which the sides of a polygon meet, same as corner.