MATHS WISE

Teaching Guide
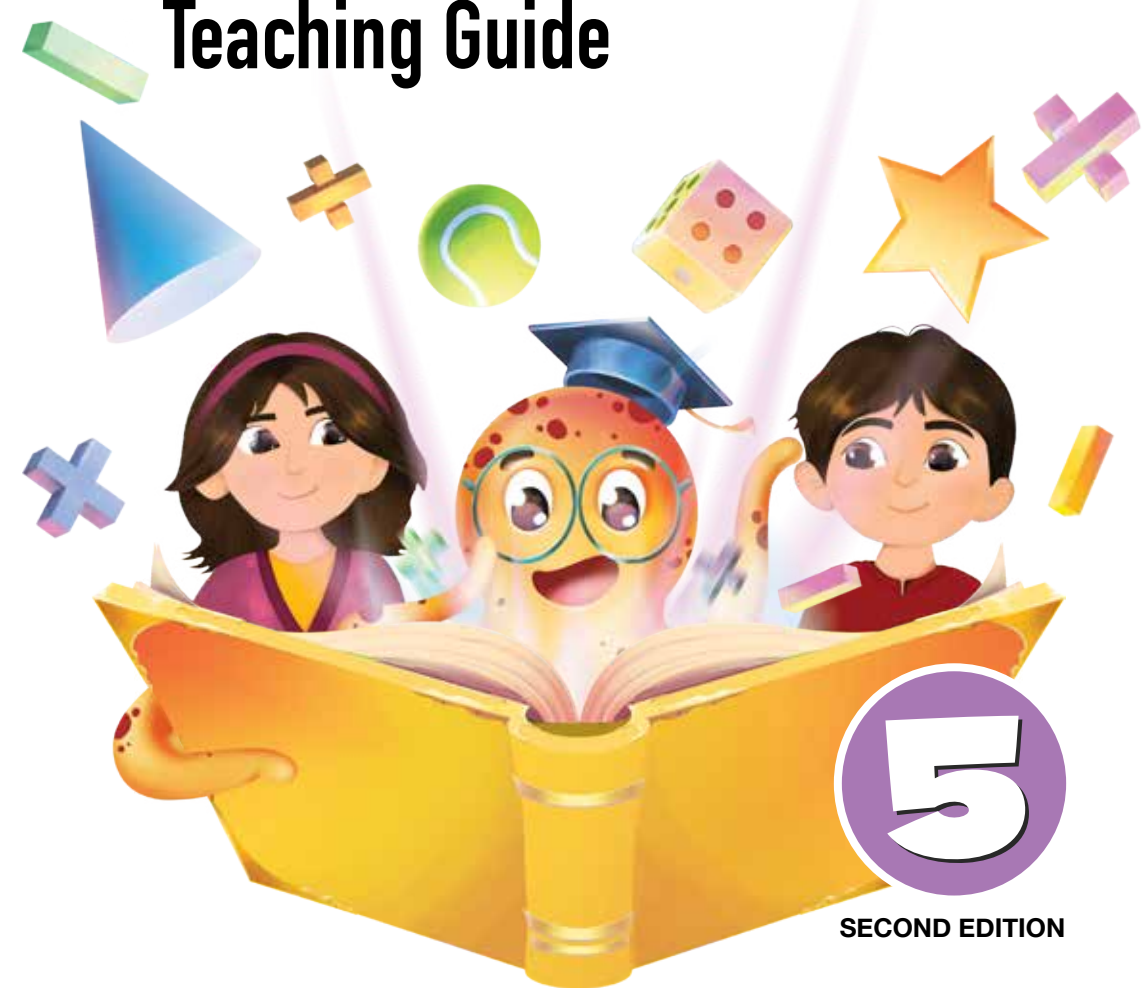
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SECOND EDITION

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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.

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- **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

- **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

① Whole Numbers and Operations

Learning Framework

Identify the place value of digits in the given number up to million. Write the name of the numbers up to the place value million as well as in expanded and standard form.

The pupils are already familiar with counting in six digits. A little recap of reading and writing the names of six-digit numbers will provide a stimulus to start seven-digit numbers. Use the following example on board to elaborate place value of a specific digit up to hundred thousand, in expanded form as well as in words.

Million	Hundred Thousand	Ten Thousand	Thousand	Hundred	Ten	One
5	8	6	5	7	4	2
5,000,000 + 800,000 + 60,000 + 5,000 + 700 + 40 + 2							
5,865,742							
Five million, eight hundred sixty-five thousand, seven hundred forty-two							

Classwork: Let your pupils complete (Exercise 1 Q1, 2, 3, 4) under your supervision.

Pupils will learn to add and subtract numbers up to seven digits with carrying and borrowing. They will solve problems involving real-life situations based on addition subtraction.

Pupils have learnt addition and subtraction in previous classes. Explain to them that the digits of the same place value are written under each other and then added or subtracted. Ask them small questions like:

- How will you read 2,899,568 – 1,978,459?

    (1,978,459 is subtracted from 2,899,568) or

    (Subtract 1,978,459 from 2,899,568)

- What is being subtracted?

    1,978,459

- From which number subtraction is being carried out?

    2,899,568

$$\begin{array}{r}
2\ 8\ 9\ 9\ 5\ 6\ 8 \\
-\ 1\ 9\ 7\ 8\ 4\ 5\ 9 \\
\hline
\end{array}$$

Classwork: Let your pupils complete Exercise 2

Pupils will learn to multiply a number up to five digits with a number up to three digits. They will also learn direct methods to multiply a given number with 10, 100, or 1000.

Elaborate on multiplication with simpler examples and then gradually move to difficult ones. Use example given on pages 4 and 5 to elaborate multiplication of two numbers including 10, 100, and 1000.

Refer to (Maths Wise 5 page 5 and 6) for explanation and examples.

Use Concept connector on page 5 to explain multiplication with 10, 100, 1000.

Classwork: Let your pupils complete (Exercise 3 Q1) independently.

Pupils will learn to divide a number up to five digits by a number up to two digits. They will also learn direct methods to divide a given number by 10, 100, or 1000.

Elaborate on division with simpler examples first and then gradually move to complicated ones. Use example given on pages 7 to elaborate on division of five-digit numbers by two-digit numbers.

Use Concept connector on page 5 to explain division with 10, 100, 1000.

Classwork: Let your pupils complete (Exercise 3 Q2) independently.

Pupils will solve real-life situations involving, multiplication, and division. Pupils will apply their skill to multiply and divide to solve the given word problems.

After comprehending the problem, they will decide which process is required to apply to get an appropriate solution to the problem.

Word problems have always remained a difficult area of learning at all age levels. To overcome the language barrier to understanding word problems, first write the problem on the board clearly and with the help of small questions, gather all the information given about the problem.

Provide mathematical equivalents of the given words and phrases in the problem. Use them according to the given situation to find the solution to the problem.

Classwork: Complete all the problems in Exercise 3 one by one with thorough explanation of mathematical equivalents of each phrase and word given in the problem.

Pupils will learn to identify the rule applied in the given pattern of numbers (which could be based on addition, subtraction, multiplication, or division) of a fixed number and use it to list more terms in the pattern of numbers.

Pupils already have the knowledge of 'increasing' and 'decreasing' patterns. Then elaborate on increasing patterns are formed by adding or multiplying a fixed number to a term to obtain the next term, while in a decreasing pattern, a fixed number is subtracted or divided every time to get the next term.

$$2, 6, 10, 14, 18, 22, 26, 30, 34, 38, 42, 46, \ldots$$

This is an increasing pattern of numbers as the numbers increase from 2 to 35 and onward. The rule to obtain next term every time is to 'add 4'.

$$1, 2, 4, 8, 16, 32, 64, 128, 256, 512, 1024, \ldots$$

This is an increasing pattern of numbers as the terms increase from 1 to 1024 and onward. The rule to obtain next term every time is to 'multiply by 2'.

$$100, 95, 90, 85, 80, 75, 70, 65, 60, 55, 50, \ldots$$

This is a decreasing pattern of numbers as terms decrease from 100 to 50 and onward. The rule to obtain next term every time is to 'subtract 5'.

$$1536, 768, 384, 192, 96, 48, 24, \ldots$$

This is a decreasing pattern of numbers as terms are decreasing from 1536 to 24 and onward. The rule to obtain next term every time is to 'divide by 2'.

Now elaborate on your pupils, examples given on page 12.

Classwork: Ask them to solve problems in (Exercise 6 Q 1, 2) one by one under your supervision. Encourage them to solve (Exercise 6 be done by your pupils independently.

Lesson Plan

Objectives:

Using pattern rules, describe the pattern found in a given table or chart.

Identify and apply the pattern rule of a given increasing and decreasing pattern to extend the pattern for the next three terms.

Concept Connector

Ask students to share real-life examples of various things that follow patterns. While taking feedback you can add more examples, honeycomb, peacock feather, and flowers. Patterns also exist in numbers. Reinforce the concept of increasing and decreasing number patterns using *Concept Connector* on *Page 11*. A number pattern is a sequence of numbers that follow a specific rule or order. Just as we have learnt about addition, subtraction, multiplication, and division, we can use these concepts to solve missing numbers in a sequence or extend a number pattern.

Exploring the Objective

Using the *examples* given on *Pages 11 and 12* explain to the students how previously learnt concepts of addition, subtraction, multiplication, and division can be used to solve number sequence problems. Moreover, recall ascending order to identify that sequences that follow an increasing pattern are solved by multiplication or addition. Use the *100-number chart* given in *Exercise 6, Question 3* for identification of decreasing number pattern to make students recall the concept that decreasing patterns are solved by subtraction or division.

Activity

Make your own patterns

What You Need:

Manipulatives or pattern blocks

Blank paper

Colour pencils

How to Play:

Give each student pattern blocks or manipulatives to make their own patterns

Challenge them to create their own patterns

Once they have created a pattern, they will write down the pattern rule and extend it for the next three terms.

Students can swap patterns with a partner to solve

Reflection:

Identified and applied pattern rules to extend sequences

Students developed a deeper understanding of the relationship between patterns and mathematical operations

Students demonstrated an understanding of ascending and descending order by creating and extending their own patterns.

Exercise:

To reinforce students' understanding of number patterns, assign **Question1 (a, c, d, f) Page 12** as in class work to be completed together with teacher guidance. For an easy-level individual assignment, have students attempt the last two questions on **Page 13**. To facilitate better understanding, have students attempt **Beyond the Horizon** question related to the above activity and QR worksheet to practice the overall unit of whole numbers and operations.

Extension Activity:

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

Look at this series: 2, 1, ($\frac{1}{2}$), ($\frac{1}{4}$), ... What number should come next?

$\frac{1}{3}$

$\frac{1}{8}$

$\frac{2}{8}$

$\frac{1}{16}$

36, 34, 30, 28, 24, … What number should come next? Identify the rule used.

544, 509, 474, 439, ... What number should come next?

Activity Sheet
Numbers up to One Million

Learning Objective:

- Read numbers up to 1,000,000 (one million) in numerals and words.
- Write numbers up to 1,000,000 (one million) in numerals and words

Let's Talk Math:

- Ask the class if anyone has ever had to use very large numbers for number operations in real-life.

Make Sure You Have: Number Cards

Activity: Figures and Words

Duration: 1 Lesson   **Whole Class Activity**

Let's Try It:

- Prepare two sets of number cards.
- One set should have 6 or 7-digit numbers written in figures.
- The second set should have the same numbers written in words.
- Distribute the cards among the pupils.
- Select one pupil to show their card to the class.
- If the card has a number written in figures, other pupils should quickly check if they have the matching card with the number written in words.
- The pupil with the matching card should read the number aloud.
- If the card is in words, pupils will find the matching card with the number in figures.
- Once a pair is found, stick both cards on the board.
- Repeat the process until all cards are paired.

Assessment:

- Show number cards randomly and ask students to identify the number and the name in words.

Number Operations

Learning Objective:

- Add numbers up to 6-digit numbers.
- Subtract numbers up to 6-digit numbers
- Multiply numbers, up to 5-digit, by 10, 100, and 1000
- Divide a number up to 5-digit numbers by 10,100 and 1000.

Let's Talk Math:

- It would be useful to discuss some interesting situations where we may have to deal with big numbers in real-life.

Make Sure You Have: Activity Cards

Activity: Math Fun Card Challenge

Duration: 1 Lesson   Whole Class Activity

Let's Try It:

- Provide each pupil with an activity card with questions on any of the four operations.
- This activity can be used for addition or subtraction of complex numbers and multiplication/ division of numbers up to 6-digits.
- Time the activity and get the activity cards peer checked.

Assessment:

- Give the pupils some multiplication and division exercises to do in class.

Number Patterns

Learning Objective:

- Identify and apply a pattern rule to determine missing elements for a given pattern.
- Identify the pattern rule of a given increasing and decreasing pattern and extend the pattern for the next three terms

Let's Talk Math:

- Ask the class if anyone has ever had to use very large numbers for number operations in real-life. If anyone has, encourage them to share with the class, but if not, ask if they think that being comfortable with could be helpful in real-life.

Make Sure You Have: Activity Sheets

Activity: Pattern Detective

Duration: 1 Lesson   Individual Activity

Let's Try It:

- Write different rules (using any of the four operations) for finding the number pattern in ascending or descending order.
- Give random numbers in rows which satisfy these rules.
- Give one sheet to each pupil. Tell them to find number patterns as instructed.

Assessment:

- Prepare worksheets and ask pupils to solve them in class and do a peer revie

Name: _____

Date : _____

Place Value

Number	Place Value (of the ringed digit)	Value of the ringed digit in the given number
③5	Tens	30
28⑧		
⑨37		
6⑦54		
2⑨302		
17⑤48		
④8936		
7③754		
902⑨6		

Identify and write the place value of the ringed digits.	*Numbers up to one million*

Note: Base ten blocks can be used to enhance the place value activity.

Place Value Chart

Hundred Thousands	Ten Thousands	Thousands	Hundreds	Tens	Ones

Hundred Thousands	Ten Thousands	Thousands	Hundreds	Tens	Ones

Hundred Thousands	Ten Thousands	Thousands	Hundreds	Tens	Ones

Hundred Thousands	Ten Thousands	Thousands	Hundreds	Tens	Ones

Hundred Thousands	Ten Thousands	Thousands	Hundreds	Tens	Ones

Make groups of 6 students each. Give dice to each group. Each member rolls the dice and writes the number in the chart above to make different combinations of 6-digit numbers.	*Numbers up to one million*

Name: _____

Date : _____

Place Value Chart

Million	Hundred Thousand	Ten Thousand	Thousand	Hundred	Tens	Ones

Million	Hundred Thousand	Ten Thousand	Thousand	Hundred	Tens	Ones

Million	Hundred Thousand	Ten Thousand	Thousand	Hundred	Tens	Ones

Million	Hundred Thousand	Ten Thousand	Thousand	Hundred	Tens	Ones

Million	Hundred Thousand	Ten Thousand	Thousand	Hundred	Tens	Ones

Million	Hundred Thousand	Ten Thousand	Thousand	Hundred	Tens	Ones

	Numbers up to one million

Number Cards

1

10

100

1000

10000

100000

1000000

Show these cards randomly and ask students to identify the number and the name in words.	*Numbers up to one million*

Note: Use these cards to help pupils learn to read and write numbers up to 1,000,000.

Name: _____

Date : _____

Note: Page is left blank for cutting purposes

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Number Cards

0	1	2	3	4
5	6	7	8	9

00	10	20	30	40
50	60	70	80	90

000	100	200	300
400	500	600	700
800	900		

Cut out all the number cards, and jumble them up in different bowls; one for **ones**, one for **tens**, and so on. Have students pick a chit from each bowl and then write the number correctly in the place value chart.

Numbers up to one million

Note: Use these cards to help pupils learn to read and write numbers up to 1,000,000.

Name: _____

Date : _____

Note: Page is left blank for cutting purposes

Number Cards

0000	1000
2000	3000
4000	5000
6000	7000
8000	9000

| Use these cards to help pupils learn to read and write numbers up to 1,000,000. | *Numbers up to one million* |

Name: _____

Date : _____

Note: Page is left blank for cutting purposes

Number Cards

00000	10000
20000	30000
40000	50000
60000	70000
80000	90000

Use these cards to help pupils learn to read and write numbers up to 1,000,000. | *Numbers up to one million*

Name: _____

Date : _____

Note: Page is left blank for cutting purposes

Number Cards

000000	**100000**
200000	**300000**
400000	**500000**
600000	**700000**
800000	**900000**

Use these cards to help pupils learn to read and write numbers up to 1,000,000. *Numbers up to one million*

Name: _____

Date : _____

Note: Page is left blank for cutting purposes

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Number Cards

0000000	1000000
2000000	3000000
4000000	5000000
6000000	7000000
8000000	9000000

Use these cards to help pupils learn to read and write numbers up to 1,000,000. | *Numbers up to one million*

Name: _____

Date : _____

Note: Page is left blank for cutting purposes

Missing Numbers

Ten	
One Hundred	
One Thousand	
Ten Thousand	
One Hundred Thousand	
One Million	

Fill in the boxes by writing numbers between 10 and 100, 1000 and 10,000, and 100,000 and 1,000,000. Use any number of your choice to complete the chain.

Numbers up to one million

Name: _____

Date : _____

Note: Page is left blank for cutting purposes

Pattern Chart

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

The first line indicates a clue about what numbers to shade from 1 to 50 and then 51-100. Identify and describe the **pattern of shading** in this grid to complete it.	*Number patterns*

Name: _____

Date : _____

Let's Operate

1. 583211 + 340000

2. 280600 + 108400

3. 900000 − 230050

4. 538200 − 200350

5. 920000 * 10

6. 361000 * 1000

7. 20520 * 300

8. 40000 ÷ 10

9. 35800 ÷ 100

10. 99000 ÷ 30

11. 12550 ÷ 25

12. Create 2 real-life story sums below, involving number operations, for your partner to solve.

Solve the above questions in pairs.	Addition and subtraction Multiplication and division

Review and Assess
Whole Numbers and Operations

1. Write the given numbers in words.

a.	731,208	
b.	980,009	
c.	1,000,000	

2. Write the given numbers in numerals.

a.	Seven million, two hundred thousand	
b.	Nine million, five hundred thousand	
c.	Five hundred thousand and seventy	

3. Write the place value of the ringed digit in each of the given number.

a.	1,48⑨,213		b.	5,⓪92,184	
c.	1,3⑤9,259		d.	8,908,1③7	

4. Write the given numbers in descending order.

478,295; 477,161; 777,480

5. Write the given number which is:

a.	7000 more than 3,259,779	b.	500 more than 2,362,000
c.	5200 less than 862598	d.	34,000 less than 8,183,450

6. Complete the number patterns. State the pattern rule.

    a. 550, 545; [   ] ; [   ] ; 530, 515

    b. 8, 16, [   ], 64, [   ], [   ], [   ]

    c. 224, 112, [   ], 28, [   ]

    d. 98, [   ], 106, [   ], 114

7. Identify the pattern rule and extend it for the next three terms.

    a. 115, 105, 95, 85, 75, [   ], [   ], [   ]

    b. 756, 752, 748, 744, [   ], [   ], [   ]

8. Solve the following real-life problems.

Problems	Working
a. In the month of July, Azam had Rs 45,900 in the bank. In August he earned a cash prize of Rs 90000 in a lucky draw. If he deposited this amount in the bank, what would be his total bank balance?	
Answer: Rs [ ]	
b. Sara earns Rs 7500 per month and spends Rs 3295 every month. What is her monthly saving?	
Answer: Rs [ ]	

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c. Faiza bought a wooden cupboard for Rs 218275. She gave Rs 250000 to the shopkeeper. How much amount would she get back?

Answer: Rs ☐

d. Kanwal travelled 723672 km in one month. The next month she travelled 31716 km. How much did she travel in two months?

Answer: ☐ km

e. Mohid placed 24 hoops on the ground. In each hoop he puts 738 toy cars. How many toy cars were in 24 hoops?

Answer: ☐ cars

f. Sarah needs to pack 7550 oranges in boxes. If each box can contain 25 oranges how many such boxes are required?

Answer: ☐ boxes

Review and Assess
Whole Numbers and Operations

1. Write the given numbers in words.

a.	731,208	Seven million three hundred twenty one thousand two hundred and eight
b.	980,009	Nine hundred eighty thousand and nine
c.	1,000,000	One million

2. Write the given numbers in numerals.

a.	Seven million, two hundred thousand	7,200,000
b.	Nine million, five hundred thousand	9,500,000
c.	Five hundred thousand and seventy	500,070

3. Write the place value of the ringed digit in each of the given number.

a.	1,48⑨,213	Thousands	b.	5,⓪92,184	Tens
c.	1,3⑤9,259	Hundreds	d.	8,908,1③7	Ones

4. Write the given numbers in descending order.

478,295; 477,161; 777,480

777480	478295	477161

5. Write the given number which is:

a.	7000 more than 3,259,779	b.	500 more than 2,362,000
	3266779		2362500
c.	5200 less than 862598	d.	34,000 less than 8,183,450
	857398		8149450

6. Complete the number patterns. State the pattern rule.

a.	550, 545; _____ ; _____ ; 530, 515	
b.	8, 16, _____ , 64, _____ , _____ , _____	
c.	224, 112, _____ , 28, _____	
d.	98, _____ , 106, _____ , 114	

7. Identify the pattern rule and extend it for the next three terms.

a.	115, 105, 95, 85, 75, **65** , **55** , **45**
b.	756, 752, 748, 744, **740** , **736** , **732**

8. Solve the following real-life problems.

Problems	Working
a. In the month of July, Azam had Rs 45,900 in the bank. In August he earned a cash prize of Rs 90000 in a lucky draw. If he deposited this amount in the bank, what would be his total bank balance?	45900 +90000 135900
Answer: Rs 135900	
b. Sara earns Rs 7500 per month and spends Rs 3295 every month. What is her monthly saving?	7500 +3295 4205
Answer: Rs 4205	

c. Faiza bought a wooden cupboard for Rs 218275. She gave Rs 250000 to the shopkeeper. How much amount would she get back?

250000 − 218275
= 31725

Answer: Rs 31725

d. Kanwal travelled 723672 km in one month. The next month she travelled 31716 km. How much did she travel in two months?

723672 + 31716
= 755388

Answer: 755388 km

e. Mohid placed 24 hoops on the ground. In each hoop he puts 738 toy cars. How many toy cars were in 24 hoops?

738 24
= 17712

Answer: 17712 cars

f. Sarah needs to pack 7550 oranges in boxes. If each box can contain 25 oranges how many such boxes are required?

7550 25
= 302

Answer: 302 boxes

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Highest Common Factor and Least Common Multiple

Learning Framework

Pupils will identify divisibility rules for 7 and 11 and use numbers up to 5 digits.

State the divisibility rule for 7. Refer to Maths Wise 5 page 15.

Now, write a number on the board and apply the divisibility rule for 7 to the number. Guide them through the following steps.

Double the last digit of the number.

Subtract this doubled value from the rest of the number.

If the result is divisible by 7 (including 0), then the original number is also divisible by 7.

Now write another number 12345 on the board and invite them to find the divisibility by themselves. Help the ones who are having difficulty.

Encourage them to follow the steps given below.

The last digit is 5. Double it: $5 \times 2 = 10$

Subtract from the rest. $1234 - 10 = 1224$

Repeat the process. The last digit of 1224 is 4, double it to get 8, subtract from 122: $122 - 8 = 114$

Continuing, the last digit of 114 is 4, double it to get 8, subtract from 11: $11 - 8 = 3$

Since 3 is not divisible by 7, 12345 is not divisible by 7.

State the divisibility rule for 11. Refer to Maths Wise 5 page 15.

Now, write a number on the board and apply the divisibility rule for 11 to the number. Guide them through the following steps.

Sum the digits in the odd positions and sum the digits in the even positions.

Subtract the smaller sum from the larger sum.

If the result is divisible by 11 (including 0), then the original number is also divisible by 11.

Now, write 12345 on the board and find the divisibility by 11.

Encourage them to apply the rule as given below.

Sum of numbers at odd positions = $1 + 3 + 5 = 9$

Sum of numbers at even positions = $2 + 4 = 6$

Subtract: $9 - 6 = 3$

Since 3 is not divisible by 11, 12345 is not divisible by 11.

Classwork: Help them out to attempt Exercise 1.

Pupils will learn to calculate the highest common factor (HCF) of the given numbers using division and factorisation methods.

Pupils have learnt 'factors' as 'a divisor which divides the dividend exactly without leaving a remainder. Before initiating the process of finding HCF

20 ÷ 4

$$\begin{array}{r} 5 \\ 4 \overline{)\ 20} \\ -20 \\ \hline 0 \end{array}$$ ⟶ Remainder

20 ÷ 3

$$\begin{array}{r} 6 \\ 3 \overline{)\ 20} \\ -18 \\ \hline 2 \end{array}$$ ⟶ Remainder

20 ÷ 6

$$\begin{array}{r} 3 \\ 6 \overline{)\ 20} \\ -18 \\ \hline 2 \end{array}$$ ⟶ Remainder

20 ÷ 5

$$\begin{array}{r} 4 \\ 5 \overline{)\ 20} \\ -20 \\ \hline 0 \end{array}$$ ⟶ Remainder

20 ÷ 7

$$\begin{array}{r} 2 \\ 7 \overline{)\ 20} \\ -14 \\ \hline 6 \end{array}$$ ⟶ Remainder

20 ÷ 8

$$\begin{array}{r} 2 \\ 8 \overline{)\ 20} \\ -16 \\ \hline 4 \end{array}$$ ⟶ Remainder

In given examples 20 is the dividend and 3, 4, 5, 6, 7, and 8 are divisors. Note that 4 and 5 divides exactly and leaves no remainder while other divisors cannot divide 20 exactly.

So, 4 and 5 are factors of 20.

To elaborate the concept of HCF, use the following example.

Find the HCF of 24 and 36, list all the factors of 24 and 36. Pupils have learnt to list all the factors of a given number in previous class.

All factors of 24 = 1, 2, 3, 4, 6, 8, 12, 24

(can divide 24 completely)

All factors of 36 = 1, 2, 3, 4, 6, 9, 12, 18, 36

(can divide 36 completely)

Common factors of 24 and 36 = 1, 2, 3, 4, 6, 12

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(can divide 24 and 36 completely)

Highest common factor of 24 and 36 = 12

(the highest number which can divide 24 and 36 completely)

So, HCF of 24 and 36 = 12

(12 is the highest possible number which can divide 24 and 36 exactly without leaving a remainder)

Now elaborate on the examples given on pages 17, 18, and 19. Explain to your

pupils that look for the following words in the real-life problem besides the context to decide

whether it involves HCF:

• highest

• greatest

• divides

• distribute etc.

Classwork: Complete some problems of in (Exercise 2 Q4 and Q5). Word problems may be done one

by one after a thorough discussion about its solution.

Pupils will learn to calculate the least common multiple (LCM) of the given numbers using division and factorisation method.

Pupils have learnt 'multiple' as 'the product of a number'. Before starting the process of

finding LCM, explain how to find multiples of a number:

Multiples of 2 = 2, 4, 6, 8, 10, 12, 14, 16, 18, 20, …

(exactly divisible by 2)

Multiples of 4 = 4, 8, 12, 16, 20, 24, 28, 32, 36, 40, …

(exactly divisible by 4)

To elaborate the concept of LCM, use the following example.

Find the LCM of 6 and 8, list multiples of 6 and 8.

Multiples of 6 = 6, 12, 18, 24, 30, 36, 42, 48, 54, 60, 66, 72, 78, …

(exactly divisible by 6)

Multiples of 8 = 8, 16, 24, 32, 40, 48, 56, 64, 72, 80, …

(exactly divisible by 8)

Common multiples of 6 and 8 = 24, 48, 72, …

(exactly divisible by both 6 and 8)

Least common multiple (LCM) of 6 and 8 = 24

(the smallest number which can be divided by 6 and 8 completely)

So, LCM of 6 and 8 = 24

(24 is the least possible number which can be divided by 6 and 8 exactly without leaving a remainder)

Now write to your pupils, examples given on pages 20 and 21. Explain to your pupils to look for the following words in the real-life problem besides the context to decide whether it involves LCM:

• least

• lowest

• divided

• Distributed etc.

Classwork: Complete some problems of in (Exercise 2 Q6 and Q7) . Word problems may be done one

by one after a thorough discussion about its solution.

Pupils will solve real-life situations involving HCF and LCM.

Guide them to read about the problems carefully to determine what is being asked. Identify the numbers involved.

Use the Least Common Multiple (LCM) when you need to find a common time or event that happens repeatedly over different intervals. Basically, LCM is used when you are looking for a common multiple of two or more numbers.

Use the Highest Common Factor (HCF) when you need to divide something into the largest possible equal parts or groups. Basically, HCF is used when you are looking for the greatest common divisor of two or more numbers. Discuss the examples on pages 22 and 23 Let them solve the word problems (Exercise3).

Lesson Plan
Suggested Time: 1 Period

Objectives:

Identify divisibility rules for 7 and 11 and use numbers up to 5 digits.

Concept Connector

Ask students to go through the examples given in *Concept Connector* given on *Page 15* to recall the divisibility rules that they have already learnt previously. Use the previously explained concepts of division and divisibility rule to develop students' understanding of the concept. To explain how large numbers up to 5 digits can be divisible by 7 or 11, implement the divisibility rule. A number is divisible by 7 if the difference between twice the digit at the ones place and the number formed by the remaining digits is divisible by 7. On the other hand, a number is divisible by 11 if the difference between the sum of the digits at the odd places and the sum of the digits at the even places is either 0 or a multiple of 11.

Exploring the Objective

Using the *examples* given on *Page 16* recall and explain to the students how divisibility rules of 7 and 11 are used to test the divisibility of a number. These patterns involve digit analysis, number patterns, and mathematical operations. Recognizing these patterns helps students develop a deeper understanding of divisibility rules.

Activity

Divisibility Rule Practice

What You Need:

A list of numbers up to 5 digits (can be generated randomly or selected from a textbook)

Pens/pencils for students to mark their answers

How to Play:

Provide students with a list of 5-digit numbers, make sure the list includes mixed numbers that are divisible by 7 and 11 and those that are not.

Divide the class into pairs and give each pair a handout with the list of numbers

Instruct the pairs to find numbers on the list that are divisible by 7 and 11

Remind them to use the divisibility rules they have learned.

Reflection:

Students to develop an understanding of divisibility rules for 7 and 11

Activity encouraged teamwork, critical thinking, and problem-solving skills.

Exercise:

To reinforce students' understanding of divisibility rules, assign the exercise on Page 16 as a medium-easy level in class work to be completed individually with teacher guidance.

To facilitate better understanding, have students attempt *Math Quest Question* related to the above activity on *Page 16*. The teacher may explain using his/her own example.

Extension Activity

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

Is 4321 divisible by 7? Explain why or why not.

Is 6543 divisible by 11? Explain why or why not.

Which of the following numbers is divisible by 11?

1210

1432

1653

1874

Activity Sheet
Highest Common Factor

Learning Objective:

- Find HCF of two and three numbers up to 2-digit using prime factorization method and division method.

Let's Talk Math:

- Discuss with pupils that HCF is used to find if an event will be repeated indefinitely.

Make Sure You Have: Two coloured counters

Activity: HCF Rectangle Match

Duration: 1 Lesson Whole Class Activity

Let's Try It:

- Use two sets of counters, each a different colour, for the two given numbers.
- Draw a demarcation line and arrange the counters as follows: Arrange the counters on the left in a vertical line.
- Arrange the counters on the right in rows, matching the number of rows on the left.
- If the right-side counters can form a rectangle, the number of rows is the HCF.
- If a rectangle cannot be formed, rearrange the counters on the left into the next possible rectangular arrangement and adjust the right-side arrangement.
- Continue until both sides form rectangles with the same number of rows.
- The number of rows is the HCF of the two numbers.
- Example: Finding the HCF of 6 and 20.

Assessment:

- Present pupils with questions to be solved individually. These questions should be based on real-life situations that require them to find the LCM and/or the HCF. Try to keep numbers 2-digit or less.

Least Common Multiple

Learning Objective:

- Find LCM of two and three numbers up to 2-digit numbers using prime factorization method and division method.
- Solve real-life situations involving HCF and LCM

Let's Talk Math:

- Discuss with pupils how LCM is used to find whether two or more events will happen repeatedly at the same time.

Make Sure You Have: Dice

Activity: Dice Multiples Challenge

Duration: 1 Lesson   **Whole Class Activity**

Let's Try It:

- Provide each pupil with a dice (or ask them to bring one from home).
- Instruct each pupil to roll their dice.
- Pair up students and have them find and write down the first ten multiples of the numbers they rolled.
- Repeat the dice roll and multiple-finding process three times.
- After three rounds, ask pupils to compare the three sets of multiples and find the Lowest Common Multiple (LCM) of the three numbers.
- Encourage pupils to repeat the process with different partners and more numbers for additional practice.

Assessment:

- Present pupils with questions to be solved individually. These questions should be based on real-life situations that require them to find the LCM and/or the HCF. Try to keep numbers 2- digit or less.

Matching LCM & HCF

6 and 7	LCM 42 HCF 1	12 and 30
LCM 10 HCF 5	16 and 32	LCM 75 HCF 5
15 and 25	LCM 40 HCF 4	5 and 10
LCM 60 HCF 6	8 and 20	LCM 32 HCF 16

Work in pairs to match the number pairs with corresponding **HCF** and **LCM** using the division method and the prime factorisation method. Colour the matching pairs the same colour.

HCF
LCM

Name: _____

Date : _____

HCF and LCM: Real-life Story Sums

1. Solve the following.

---

a) A shopkeeper has to pack 72 pens, 96 pencils, and 36 erasers equally in boxes, so that no item is left. What is the biggest possible number of boxes needed?
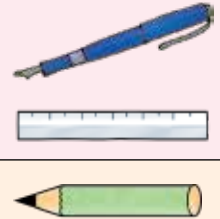
---

b) Nida wants to plant 42 rose plants and 35 jasmine plants in her garden. What is the greatest possible numbers of rows if each row has same number of rose plants and same number of jasmine plants?

	HCF
	LCM

HCF and LCM - Real-life Story Sums

c) Kashif goes for hiking after every 12 days and for swimming after every 6 days. He did both kind of exercise today. How many days from now will he go both hiking and swimming again.

e) Ali, Ahsan, and Hamza cycle everyday along the circular path and take 8, 12, and 16 minutes respectively to complete a round. If all of them start together from the same place, after how much time will they meet at the same place again?

	HCF
	LCM

Highest Common Factor and Least Common Multiple

1. Find HCF by listing method.

a. 48 and 98	b. 84, 126, and 189

2. Find the HCF of the following numbers using division method.

a. 640, 725, and 355	b. 600, 160, and 720

3. Find the LCM by prime factorisation.

a. 15, 30, and 55	b. 78, 70, and 91	c. 24, 32, and 40

4. Find the LCM by division method.

a. 35, 63, and 81	b. 85, 70, and 74

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5. Solve the following real-life problems.

Problems	Working
a. A fruit seller has to pack 126 apples, 105 oranges, and 154 peaches equally in cartons, such that no fruit is left. What is the biggest possible number of cartons needed?	
Answer: [ ]	
b. Nida wants to plant 42 rose plants and 35 jasmine plants in her garden. What is the greatest possible number of rows if each row has the same number of rose plants and the same number of jasmine plants?	
Answer: [ ]	
c. Find the smallest number which when added to 33, is exactly divisible by 40, 45, and 60.	
Answer: [ ]	
d. Find the least length of a string which can be cut into pieces of 35 cm, 45 cm, and 75 cm.	
Answer: [ ]	
e. Ali, Ahsan, and Hamza cycle everyday along the circular path and take 8 min, 12 min, and 16 min, respectively, to complete a round. If all of them start together from the same place, after how long will they meet at the same place again?	
Answer: [ ] min	

Highest Common Factor and Least Common Multiple

1. Find HCF by listing method.

a. 48 and 98	b. 84, 126, and 189
Factor of 48 = 1, 2, 3, 4, 6, 8, 12, 16, 24, 48 Factor of 98 = 1, 2, 7, 14, 49, 98, HCF = 2	Factor of 84 = 1, 2, 3, 4, 6, 8, 12, 16, 21, 84 Factors of 126 = 1, 2, 3, 6, 7, 9, 14, 18, 42, 63, 126 Factors 189 = 1, 3, 7, 9, 21, 27, 63, 189

2.   Find the HCF of the following numbers using division method.

a. 640, 725, and 355	b. 600, 160, and 720
1 is the common factor of 640, 725, and 355 HCF = 1	2 | 600, 160, 720 2 | 300, 80, 360 2 | 150, 40, 180 2 | 75, 20, 180 HCF = 2 2 2 = 8

3.   Find the LCM by prime factorisation.

a. 15, 30, and 55	b. 78, 70, and 91	c. 24, 32, and 40
15 = 3 5 30 = 2 3 5 55 = 5 11 LCM = 2 3 5 11 = 330	As shown in part a	As shown in part a

4.   Find the LCM by division method.

a. 35, 63, and 81	b. 85, 70, and 74
LCM = 3 3 3 3 5 7 = 2835	LCM = 2 5 7 17 37 = 44030

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5. Solve the following real-life problems.

Problems	Working
a. A fruit seller has to pack 126 apples, 105 oranges, and 154 peaches equally in cartons, such that no fruit is left. What is the biggest possible number of cartons needed?	Find the HCF of given numbers
Answer: 7	
b. Nida wants to plant 42 rose plants and 35 jasmine plants in her garden. What is the greatest possible number of rows if each row has the same number of rose plants and the same number of jasmine plants?	Find the HCF of given numbers
Answer: 6,5	
c. Find the smallest number which when added to 33, is exactly divisible by 40, 45, and 60.	Find the LCM of given numbers
Answer: 147	
d. Find the least length of a string which can be cut into pieces of 35 cm, 45 cm, and 75 cm.	Find the LCM of given numbers
Answer: 315	
e. Ali, Ahsan, and Hamza cycle everyday along the circular path and take 8 min, 12 min, and 16 min, respectively, to complete a round. If all of them start together from the same place, after how long will they meet at the same place again?	Find the LCM of given numbers
Answer: 48 min	

Learning Framework

Pupils will compare and order whole numbers, proper and improper fractions, and mixed numbers in ascending and descending order.

Recall whole numbers (e.g., 0, 1, 2, 3, etc.), proper fractions (for example 1/2, 3/4) and improper fractions (e.g., 5/4, 7/3) and mixed numbers (for example 1 1/2, 2 3/4).

Teach students to compare whole numbers by looking at the place value of each digit.

Provide examples and practice problems (for example comparing 345 and 567).

Now, explain how to compare fractions with the same denominator (for (example 3/8, 5/8).

Teach students to find a common denominator to compare fractions with different denominators for example 2/3 , 3/4.

Use fraction strips or number lines to visually compare fractions.

Show how to convert mixed numbers to improper fractions for comparison.

Provide examples and practice problems (e.g., comparing 1 2/3 and 2 1/4).

 Practice ordering whole numbers from least to greatest and vice versa.

Practice ordering fractions and mixed numbers using common denominators or converting them to improper fractions.

Mix whole numbers, fractions, and mixed numbers in ordering exercises.

Classwork: Ask them to practise comparing and ordering numbers (Exercise 1 Q1 and 2)

Pupils will learn to add and subtract unlike fractions and apply the same skills to solve real-life problems.

Begin your lesson with the recap of like and unlike fractions. Like fraction have the same denominator so, their numerators can be added or subtracted with the same denominator in the result, like

$$\frac{5}{13} + \frac{2}{13} = \frac{5 + 2}{13} = \frac{7}{13}$$

$$\frac{13}{17} + \frac{9}{17} = \frac{13 + 9}{17} = \frac{4}{17}$$

While working with unlike fractions, we cannot add or subtract directly as their denominators are not the same. To add or subtract unlike fraction, first we have to find the least common denominator

LCD can be found by calculating the LCM of denominators of all the fractions For example, 1/6+ 5/12+ 3/8

LCM of 6, 12 and 8 = 2 × 2 × 2 × 3 = 24

Now find the new numerator for each fraction for the new denominator, as

$$\boxed{\frac{1}{6} + \frac{5}{12} + \frac{3}{8}}$$

LCM of 6, 12 and 8 = 2 × 2 × 2 × 3 = 24

Now find the new numerator of each fraction for the new denominator, as

$$\frac{1}{6} + \frac{5}{12} + \frac{3}{18}$$
$$= \frac{4}{24} + \frac{10}{24} + \frac{9}{24} \text{ (Like Fractions)}$$
$$= \frac{4 + 10 + 9}{24}$$
$$= \frac{23}{24}$$

2	6,	12,	18
2	3,	6,	4
3	3,	3,	2
2	1,	1,	2
	1,	1,	1

$$\frac{1}{6} \times 24 = \frac{24}{6} = 4$$
$$\frac{5}{12} \times 24 \ \frac{120}{12} = 10$$
$$\frac{1}{6} \times 24 \ \frac{72}{8} = 9$$

$$\frac{5}{6} - \frac{7}{9}$$
$$= \frac{15}{15} + \frac{14}{18} + \frac{9}{24}$$
$$= \frac{15 - 14}{18}$$
$$= \frac{1}{18}$$

$$\frac{5}{6} \times 18 \ \frac{90}{6} = 15$$
$$\frac{7}{9} \times 18 \ \frac{126}{9} = 14$$

3	6,	9,
3	2,	3,
2	2,	1,
	1,	1,

LCM of 6 and 9 = 3 × 3 × 2 = 18

Classwork: Complete some problems from (Exercise 2 Q1 and Q2) and let your class complete the remaining parts themselves independently. Elaborate on each real-life related problem with thorough
explanation of mathematical equivalents.

Pupils will learn to multiply fractions given in different forms and apply the same skills to solve real-life problems.

There is only one rule for the multiplication of fractions i.e.,

Product of Fractions = Product of all numerators

$$\textit{Product of Fractions} = \frac{\textit{Product of all numerators}}{\textit{Product of all denumerators}}$$

$$\boxed{\frac{2}{3} \times \frac{3}{4} \times \frac{4}{5} = \frac{2 \times 3 \times 4}{3 \times 4 \times 5} = \frac{24}{60}}$$

To multiply fractions with whole numbers, just write whole numbers as fractions with denominator 1 and carry out multiplication in the same way as described before.

$$\frac{2}{13} \times 5 \; \frac{2}{13} \times \frac{5}{1} = \frac{2 \times 5}{13 \times 1} = \frac{10}{13}$$

To multiply fraction expressed as mixed numbers, first convert them to improper fractions as in the process of multiplying fractions, we need only numerators and denominators.

$$5\frac{1}{3} \times 1\frac{3}{4} \times \frac{7}{3} \times \frac{7}{4} = \frac{7 \times 7}{3 \times 4} = \frac{49}{12} = 4\frac{1}{12}$$

Classwork: Complete Exercise 3.

Pupils will learn to divide fractions given in different forms and apply the same skills to solve real life problems.

There is no process of division in fractions. While dividing fractions, we change divisor to its reciprocal and as a result division sign is replaced by multiplication, like

$$\frac{5}{6} \div \frac{2}{3}$$

Dividend   Divisor

Changing the divisor to its reciprocal, will change division to multiplication, as

$\frac{5}{6} \times \frac{3}{2}$ (Reciprocal of $\frac{2}{3} = \frac{3}{2}$)

Now simply multiply, as

$$\frac{5}{6} \times \frac{3}{2} = \frac{5 \times 3}{6 \times 2} = \frac{15}{12}$$

Dividing a fraction by a whole number, like

$$\frac{12}{16} \div 5 = \frac{12}{13} \div \frac{5}{1} = \frac{12}{13} \times \frac{1}{5} = \frac{12 \times 1}{13 \times 5} = \frac{12}{65}$$

Dividing a whole number by a fraction, like

$$5\frac{12}{13} = \frac{5}{1} \div \frac{12}{13} = \frac{5}{1} \times \frac{13}{12} = \frac{13 \times 5}{1 \times 12} = \frac{65}{12} = 5\frac{5}{12}$$

Dividing mixed number, like

$$5\frac{3}{5} \div 3\frac{2}{3} = \frac{13}{5} \div \frac{11}{13} = \frac{13}{5} \times \frac{3}{11} = \frac{13 \times 3}{5 \times 11} = \frac{39}{55}$$

Classwork: Complete Exercise 4.

Lesson Plan

Objectives:

Multiply a fraction by a 1-digit number.

Multiply two or three fractions involving proper, improper fractions, and mixed numbers.

Concept Connector

Many students struggle with multiplication and division of fractions when there are mixed numbers involved. A great deal of confusion can be overcome by paying close attention to the language in which the concepts are introduced, especially with division when the fraction needs to be reciprocated. Revise the concept of simplification with the students and make them practice and recall conversion of mixed numbers to improper fractions and vice versa.

Discuss with the class various real-life applications of multiplication and the keywords and mathematical language to identify where to use multiplication using *Concept Connector* given on *Page 33.*

Exploring the Objective

Use the examples on *Page 32 and 33* of the textbooks to explain the concept of multiplication of fractions which includes simplification of fractions, multiplying by whole numbers, unlike fractions, and real- life word problems on application of multiplication of fractions. To create a link between the mathematical concept and real-life scenario consult *Math in Action* on *Page 32*.

Activity:

Fraction Cake Activity

What You Need:

Circular paper cutouts (to represent cake)

Markers or colored pencils

Fraction charts or diagrams

Worksheet with fraction multiplication problems related to cake toppings

How to Play:

Review fractions multiplication concepts and provide examples of how fractions are used in real-life scenarios, such as cooking and ordering food.

Give each student a circular paper cutout and ask them to design their own cake. They should include toppings such as cherries, sprinkles, chocolate chips, etc.

Provide students with a worksheet containing fraction multiplication problems related to cake toppings. For example:

If you want 1/2 of your cake to be covered in sprinkles, and you have 3/4 of a cup of sprinkles, how much of the cake will be covered?

If you want to put 3/4 of a cup of cherries on your cake, and you have 1/2 of a cup of cherries already, how much cheese do you need?

Have students apply the fraction multiplication concepts to their cake designs. They should calculate the amount of each topping needed based on the fraction multiplication problems.

Allow students to present their cake designs and explain how they used fraction multiplication to determine the toppings.

Reflection:

Students demonstrated a deeper understanding of fraction multiplication concepts.

Applied fraction multiplication to real-world scenarios, showcasing problem-solving skills.

Exercise

To reinforce students' understanding of multiplication of fractions, assign question 2 on Page 34 as a hard difficulty level as an in-class work to be completed individually with teacher guidance. To facilitate better understanding, have students attempt the first question individually as assigned homework.

Extension Activity

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

What is the product of 2/3 and 5/6? Choose the correct answer and show your working.

5/9

10/18

5/6

2/3

A bookshelf has 5 shelves, and each shelf can hold 3/4 of a box of books. If the bookshelf is currently empty, how many boxes of books can be placed on it in total?

Multiply 2/3 and 3/4. Simplify your answer.

Activity Sheet
Addition and Subtraction of Fractions

Learning Objective:

- Add and subtract two or three fractions with different denominators. Let's talk math: Ask pupils how they use fractions in their daily life. Make Sure You Have:
- Bowls
- Chits
- Puzzle activity sheet

Activity: Fraction Puzzle

Duration: 1 Lesson   **Group Activity**

Let's Try It:

- Pair up the students and pass around a bowl of chits, each containing a fraction (with different denominators).
- Each pair picks three chits.
- On the board, demonstrate adding three fractions by finding a common denominator and simplifying the result.
- Rearrange the fractions from largest to smallest and demonstrate subtraction.
- Ask each pair to do the same: add, simplify, arrange, and subtract their fractions.
- Emphasise simplifying fractions at each step.

Assessment:

- Prepare a puzzle activity sheet and distribute to each pupil.
- Explain that they should solve the puzzle by adding or subtracting fractions across and down.
- When everyone is done with their work, discuss the answers as pupils check their work.

Division and Multiplication of Fractions

Learning Objective:
- Solve real-life situations involving multiplication of fractions.
- Solve real-life situations involving division of fraction.

Let's Talk Mmath:
- Explain how fractions are used in baking to tell what quantity of an ingredient to use, in telling time; where each minute is a fraction of an hour., and on a doctor's prescription to tell how much of a medicine should be taken.

Activity: Fraction Adventure

$$\frac{5}{3} \times \frac{3}{5} \quad \frac{5}{8} \div \frac{3}{6}$$

Duration: 1 Lesson   Whole Class Activity

Let's Try It:
- Ask pupils if they have ever used or seen fractions in real life.
- If many say no, explain using examples, such as sharing a slice of cake or pizza, or planning a part of a day.
- Go around the class and ask each pupil to think of a real-life situation where fractions are or could be used.
- Once they present their situation, ask them which number operation (addition, subtraction, etc.) they would need and why.
- Help the pupil form a math problem based on their situation and write it on the board.
- Have the rest of the class solve the problem together.

Assessment:
- Present pupils with this ingredient list for a 2-pound vanilla cake which can serve 12 people.
- Rewrite the list of ingredients needed to make a 1-pound cake.
- How many people will it serve?
- Work out which number operation will be necessary.

Making Like Fractions

$\dfrac{3}{8}$	$\dfrac{5}{12}$	$\dfrac{1}{6}$	$\dfrac{1}{2}$
$\dfrac{7}{9}$	$\dfrac{1}{3}$	$\dfrac{2}{9}$	$\dfrac{1}{6}$
$\dfrac{2}{5}$	$\dfrac{8}{15}$	$\dfrac{1}{30}$	$\dfrac{7}{10}$

Make denominators of fractions of each row the same to make them like fractions.	*Fractions*

Note: Fraction blocks can be used to find the equivalent fractions.

MATH LAB 5

Name: _____

Date : _____

Add and Subtract

$$\frac{3}{5} \qquad + \qquad \frac{3}{4}$$

$$\frac{4}{6} \qquad + \qquad \frac{3}{5}$$

$$\frac{2}{6} \qquad + \qquad \frac{1}{3}$$

Draw figures to solve the given questions.	*Addition and subtraction of fractions*

Note: Fraction blocks can be used to find the equivalent fractions.

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Multiplying Fractions

$$\frac{9}{10} \quad * \quad 2$$

$$\frac{5}{3} \quad * \quad \frac{3}{5}$$

$$\frac{12}{28} \quad * \quad 1\frac{11}{14}$$

	Multiplication of fractions

Name: _____

Date : _____

Dividing Fractions

1.

$$\frac{3}{4} \quad \div \quad \frac{5}{6}$$

2.

$$\frac{14}{18} \quad \div \quad 1\frac{7}{9}$$

3.

$$\frac{5}{8} \quad \div \quad \frac{3}{6}$$

4. Six people shared a bottle of juice among themselves. They used only $\frac{1}{2}$ of the bottle. If they drank an equal amount of juice, then how much did each person drink?

Draw figures to solve the given questions.	*Division of fractions*

Fractions

1. Add or Subtract as directed.

a. $\frac{4}{5} + \frac{2}{3} =$ [ ]

b. $\frac{8}{9} - \frac{7}{11} =$ [ ]

c. $\frac{1}{2} + \frac{3}{5} + \frac{7}{15} =$ [ ]

d. $4\frac{8}{9} + 3\frac{1}{7} + 2\frac{3}{5} =$ [ ]

e. $7\frac{1}{5} - 3\frac{2}{3} - 1\frac{5}{7} =$ [ ]

f. $15\frac{1}{6} + 11\frac{3}{4} =$ [ ]

2. Solve the following.

a. $\frac{3}{8} \times 8 =$ [ ]

b. $\frac{2}{5} \times 15 =$ [ ]

c. $\frac{9}{11} \times 33 =$ [ ]

d. $\frac{25}{30} \times \frac{4}{5} =$ [ ]

e. $\frac{3}{7} \times \frac{21}{9} =$ [ ]

f. $1\frac{3}{5} \times 4\frac{3}{7} \times 5\frac{4}{5} =$ [ ]

g. $\frac{9}{15} \div \frac{3}{25} =$ [ ]

h. $\frac{3}{25} \div \frac{4}{50} =$ [ ]

i. $\frac{4}{35} \div \frac{16}{7} =$ [ ]

j. $3\frac{11}{12} \div 2\frac{1}{2} =$ [ ]

3. A birthday cake has to be divided equally among 12 children. The first cut has been done for you. Draw the next cuts in the given figures.

4. Solve the following real-life problems.

Problems	Working
a. Arsal and four of his friends have $\frac{7}{9}$ of a bag of candy each. How many bags of candy do they have altogether?	
Answer: [ ]	
b. Hasan has 12 glasses that are $\frac{3}{4}$ filled with mango juice. He pours all the juice from the glasses into a container. If he fills the glasses again, how many glasses can be filled completely?	
Answer: [ ]	
c. Saba walked $5\frac{1}{8}$ km on Monday. She walked $5\frac{5}{8}$ km on Tuesday. When did she walk more and by how much?	
Answer: [ ] km	
d. Nimra brought 4 bags of cookies to school on her birthday. She distributed $2\frac{5}{6}$ bags among her friends and saved $\frac{1}{6}$ of the bags for her siblings. How many bags of cookies were left with her?	
Answer: [ ]	

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Fractions

1. Add or Subtract as directed.

   a. $\frac{4}{5} + \frac{2}{3} =$ [8/3]

   b. $\frac{8}{9} - \frac{7}{11} =$ [25/99]

   c. $\frac{1}{2} + \frac{3}{5} + \frac{7}{15} =$ [47/30]

   d. $4\frac{8}{9} + 3\frac{1}{7} + 2\frac{3}{5} =$ [3349/315]

   e. $7\frac{1}{5} - 3\frac{2}{3} - 1\frac{5}{7} =$ [191/105]

   f. $15\frac{1}{6} + 11\frac{3}{4} =$ [323/12]

2. Solve the following.

   a. $\frac{3}{8} \times 8 =$ [3]

   b. $\frac{2}{5} \times 15 =$ [6]

   c. $\frac{9}{11} \times 33 =$ [27]

   d. $\frac{25}{30} \times \frac{4}{5} =$ [2/3]

   e. $\frac{3}{7} \times \frac{21}{9} =$ [1]

   f. $1\frac{3}{5} \times 4\frac{3}{7} \times 5\frac{4}{5} =$ [7192/175]

   g. $\frac{9}{15} \div \frac{3}{25} =$ [5]

   h. $\frac{3}{25} \div \frac{4}{50} =$ [3/2]

   i. $\frac{4}{35} \div \frac{16}{7} =$ [1/980]

   j. $3\frac{11}{12} \div 2\frac{1}{2} =$ [47/30]

3. A birthday cake has to be divided equally among 12 children. The first cut has been done for you. Draw the next cuts in the given figures.

4. Solve the following real-life problems.

Problems	Working
a. Arsal and four of his friends have $\frac{7}{9}$ of a bag of candy each. How many bags of candy do they have altogether?	Total bags = 5 × 79 = 395
Answer: 399	
b. Hasan has 12 glasses that are $\frac{3}{4}$ filled with mango juice. He pours all the juice from the glasses into a container. If he fills the glasses again, how many glasses can be filled completely?	Total juice = $12 \times \frac{3}{4}$ = 9 9 × 2 = 18 So, 12 glasses can be filled completely.
Answer: 18	
c. Saba walked $5\frac{1}{8}$ km on Monday. She walked $5\frac{5}{8}$ km on Tuesday. When did she walk more and by how much?	Difference = 558 − 518 = 40 km She walked more on Tuesday by 40 km.
Answer: 40 km	
d. Nimra brought 4 bags of cookies to school on her birthday. She distributed $2\frac{5}{6}$ bags among her friends and saved $\frac{1}{6}$ of the bags for her siblings. How many bags of cookies were left with her?	$4 \times \frac{17}{4}$ = 7 $7 - \frac{1}{6}$ = 7 7 − 7 = 240 Bags left = 16
Answer: 000	

Unit

4 Decimal Numbers and Percentage

Learning Framework

Pupils will learn to compare the given decimal numbers and decide which decimal number is greater or smaller. Using the same skill, they will be able to write given decimal numbers in ascending and descending order.

Use the information and Example 1 given on page 39 to explain decimal numbers, their comparison, and write them in order.

Classwork: Help them complete Exercise 1.

Pupils will learn to add and subtract given decimals.

Pupils are already familiar with the addition and subtraction of decimals, just to recap, use the example given on page 40.

Classwork: Complete Exercise 1 Q 2, 3, and 4.

Pupils will learn to multiply given decimals by 10, 100, or 1000.

Pupils have already learnt multiplication of decimals with whole numbers, 10, 100, and1000. To recap, use the example given on page 41.

Classwork: Attempt Exercise 2 Q 2.

Pupils will learn to multiply the given decimals with the given whole number and another decimal.

Pupils have already learnt multiplication of decimals with the whole numbers. To recap, use the example given on page 42.

To explain multiplication of two decimals, consider the following example:

23.4×3.42

While multiplying decimal numbers, ignore the decimal point and assume that you multiply 234

$$
\begin{array}{r}
2 \quad 3 \quad 4 \longleftarrow \text{Multiplicand} \\
\times 3 \quad 4 \quad 2 \longleftarrow \text{Multiplier} \\
\hline
4 \quad 6 \quad 8 \longleftarrow 234 \times 2 \\
9 \quad 3 \quad 6 \quad 0 \longleftarrow 234 \times 40 \\
+ 7 \quad 0 \quad 2 \quad 0 \quad 0 \longleftarrow 234 \times 300 \\
\hline
8 \quad 0 \quad 0 \quad 2 \quad 8 \longleftarrow \text{(There are 3 digits after decimal point in multiplicand and multiplier)}
\end{array}
$$

Classwork: Complete Exercise 2.

Pupils will learn to divide the given decimals by 10, 100, and 1000.

Use the explanations given on page 44.

Classwork: Complete (Exercise 3 Q1).

Pupils will learn to divide the given decimal by a whole number and a decimal. They will also learn to apply the division of decimal numbers to real-life problems.

Use the examples given on page 44 as well as elaborate how the position of decimal point affects the quotient in the following demonstration of division of decimals.

$$616 \div 11$$

$$
\begin{array}{r}
5\,6 \\
11\,\overline{)\,6\,1\,6} \\
-5\,5 \downarrow \\
\hline
6\,6 \\
6\,6 \\
\hline
\times\times
\end{array}
$$

$$61.6 \div 11$$

$$
\begin{array}{r}
4 \\
11\,\overline{)\,6\,1\,.\,6} \\
-5\,5 \downarrow \\
\hline
6\,6 \\
6\,6 \\
\hline
\times\times
\end{array}
$$

Classwork: Complete (Exercise 3 Q2 and 3).

Pupils will learn to convert the given fractions to decimals by division.

Use the explanations given on pages 47.

Classwork: Attempt (Exercise 4 Q1).

Pupils will learn to convert the given fractions to decimals by division.

Use the explanations given on pages 47.

Classwork: Complete (Exercise 4 Q 2).

Pupils will learn to convert given fractions and decimals to percentages and convert given percentages to fractions and decimals. They will apply the same skill to given real-life related problems.

Elaborate the following vocabulary to your pupils first:

$$6.16 \div 11$$

$$
\begin{array}{r}
0\,.\,5\,6 \\
11\,\overline{)\,6\,.\,1\,6} \\
-5\ \ 5 \downarrow \\
\hline
6\,6 \\
6\,6 \\
\hline
\times\times
\end{array}
$$

Classwork: Complete Exercise 6.

Pupils will solve real-life problems involving decimals and percentage.

Encourage students to read about the problem multiple times to understand what is being asked.

Highlight or underline important numbers and keywords that indicate mathematical operations (e.g., total, difference, product).

Decide which mathematical operation(s) to use (addition, subtraction, multiplication, division).

Translate the word problem into a mathematical statement using the information.

Perform the necessary calculations to solve the equation.

Assist them to solve word problems in the class. (Exercise 5 and Exercise 6 Q8).

Lesson Plan

Objectives:

Compare numbers up to 3 decimal places using signs <,> or =.

Arrange numbers up to 3 decimal places in ascending and descending order.

Add and subtract numbers up to 3 decimal places.

Concept Connector:

Discuss real-life scenario given on the unit opener. Ask students to share their experiences of using decimal numbers. Using concept connector given on Page 39, reinforce the place value of decimal numbers. Write a random decimal number with one decimal place on the board and discuss place value of each digit in the number.

Explore the Objectives:

Explain the concept of like and unlike decimal numbers using the examples given on *Page 39* and elaborate that unlike decimal numbers can easily be changed into like decimal numbers by adding the required number of zeros at the end. Use place value chart to compare and arrange decimal numbers. Emphasise the importance of placement of decimal point while explaining addition and subtraction of decimal numbers using *Examples 2 and 3* given on *Page 40.* Explain how to extract information while solving real-life *Examples 4 and 5* given on *Page 40*.

Activity:

Compare the Decimals

What You Need:

Decimal number cards

How to Play:

Divide the class into pairs.

Give each pair a set of cards with decimal numbers written on them.

Students take turns drawing two cards and comparing the numbers.

The student with the larger number wins the round.

Next ask them to add both the numbers.

Then subtract smaller number from the bigger number.

Reflection:

Students successfully compared the decimal numbers.

They demonstrated deeper understanding of the concept while placing decimal points for addition and subtraction of numbers.

Exercise:

Question 1 of Exercise 1 based on the comparison. ***Parts a, b, e, and f*** can be done as classwork and assign remaining parts as homework. Assign Math Lab Page 33 to further practice comparing decimal numbers. To reinforce the concept of addition and subtraction of decimal numbers assign ***Question 2(a, d, e, f)*** and ***3(a, d, e, f)*** as classwork. Provide support to ensure the correct placement of decimal point while adding and subtracting numbers. For further practice assign ***QR Code Activity sheet*** given on ***Page 41***.

Extension Activity:

Assign ***Math Quest given on Page 41*** in pairs and then draw a magic number puzzle as shown on the board.

2.4		
1.2	2.7	

Let them figure out on their own how to solve the puzzle. Ask them to solve the magic number puzzle below, in which each row, column, and diagonal line must add up to 5.5.

Activity Sheet
Decimal Numbers

Learning Objective:

- Add and subtract 4-digit numbers up to 3-decimal places.

Let's Talk Math:

- Recall the concept of addition and subtraction of decimal numbers as they have done in previous class. Introduce the symbol of %.

Make Sure You Have:

- Paper chits with addition and subtraction sums

Activity: Number Puzzle

Duration: 1 Lesson   **Whole Class Activity**

Let's Try It:

- Provide each pupil with a magic number puzzle as shown in the given sample.
- Let them figure out on their own how to solve the puzzle.
- Ask them to solve the magic number puzzle as given above, in which each row, column, and diagonal line must add up to 5.5.

Assessment:

- Ask pupil to solve the given word problem. I had Rs 54.93. I earned Rs 340.25. Then I spent Rs 246.79. How much is left with me now?

Percentages

Learning Objective:

- Recognise percentage as a special kind of fraction.
- Solve real life situations involving percentages.

Let's Talk Math:

- Introduce the symbol of %. Tell them that percentage is a part out of 100.

Make Sure You Have:

- Worksheets

Activity: Percentages Challenge

Duration: 1 Lesson   **Whole Class Activity**

Let's Try It:

- Prepare worksheets with percentage questions related to real-life scenarios.
- Have pupils research their favourite cricketer's statistics, including:
- o   Matches played
- o   Runs scored
- o   Wickets taken in test and one-day matches
- Instruct pupils to calculate percentages, such as:
- Provide a real-life example:
- o   Sara's Pocket Money: Calculate if Sara can afford a dress with a 35% discount from her shopping budget after saving half of her Rs 2000 pocket money.
- Encourage pupils to share findings and calculations with the class.

Assessment:

- Ask pupils to solve some realistic problems that involve percentages. Examples include:
- o   In a class of 30 students, 70% were present on a particular day. How many students were absent that day?
- o   Ashir covered 35% of his journey in the morning. If he had to travel 1500 km, what percentage of the journey was left?

Name: _____

Date : _____

Division of a Decimal Number by a Decimal Number

Divide

---

a) $2.72 \div 1.7$

---

b) $4.95 \div 4.5$

---

c) $9.36 \div 1.3$

Hint: First convert divisor into a whole number and then divide.

To remove the decimal point of the divisor, multiply the numerator and the denominator by 10.	*Decimal numbers*

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Fractions and Decimals

$2\dfrac{3}{8}$
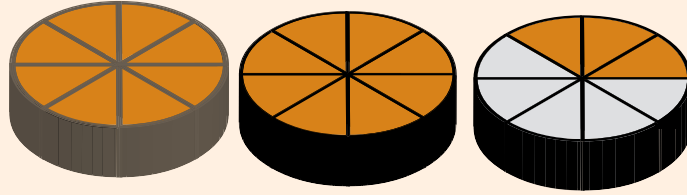
$2\frac{3}{8}$ Cake

$3\dfrac{1}{2}$

1.75

5.5

Write <, >, or = in the boxes.

2.35 ☐ 2.4   9.08 ☐ 9.2   5.3 ☐ 5.03

Using the example above, draw real-life examples to represent the **fraction** or **decimal** next to it and use them to help you arrange them in ascending order, after converting the fractions to decimals. Hint: Convert the decimal number into a mixed fraction.

Decimal numbers

Note: Hundredth circle can be used for this activity.

Name: _____

Date : _____

Making Changes

$$\frac{9}{10}$$

$$\frac{55}{10}$$

$$\frac{22}{50}$$

$$\frac{99}{1000}$$

$$\frac{20}{25}$$

$$\frac{245}{100}$$

In pairs, convert fractions in decimals, using division show your work.

Decimal numbers

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How to Operate with Decimals

Solve the following in pairs, and show your work.

1. 4.301 + 7.728

2. 3.452 − 3.009

3. 5.10 * 1000

4. 9.99 * 20

5. 6.52 * 10

6. 5.22 ÷ 10

7. 7.35 ÷ 11

8. 3.81 ÷ 1.1

9. Three friends go on a road trip. The total driving time is 13.61 hours. If each friend drives for the same amount of time as the other, how many hours will each of them drive?

Solve the above questions, and then create your own real-life story sum for your partner.	*Decimal numbers*

Name: _____

Date : _____

Ascending/Descending Order

1. | 2.09 | 3.00 | 2.29 |

2. | 5.45 | 5.54 | 5.55 |

3. | 1.03 | 0.03 | 1.3 |

4. | 0.65 | 0.62 | 0.72 |

Ask students to arrange any two sequences in ascending order and any two in descending order.

Decimal numbers

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Rounding Off

1. List all possible 2-digit decimal numbers that can be rounded off to 4. Use digits 1, 3, 8, and 4 to make the decimal number.

<u>3.8</u>   <u>4.1</u>   <u>4.3</u>

2. List out all possible 2-digit decimal numbers that can be rounded off to 8. Use digits 5, 9, 7, and 6 to make the decimal number.

_____

3. List all possible 2-digit decimal numbers that can be rounded off to 2. Use digits 2, 7, 6, and 1 to make the decimal number.

_____

4. List all possible 2-digit decimal numbers that can be rounded off to 10. Use digits 1, 4, 7, and 9 to make the decimal number.

_____

Work out different combinations with the digits to form **decimal numbers** that answer the statement above.	*Estimation*

Name: _____

Date : _____

Rounding Off

5. List all possible 2-digit decimal numbers that can be rounded off to 7. Use digits 6, 2, 8, and 7 to make the decimal number.

    _____

6. List all possible 2-digit decimal numbers that can be rounded off to 8. Use digits 5, 8, 3, and 7 to make the decimal number.

    _____

7. List all possible 2-digit decimal numbers that can be rounded off to 1. Use digits 2, 6, 0, and 1 to make the decimal number.

    _____

8. List all possible 2-digit decimal numbers that can be rounded off to 3. Use digits 9, 2, 1, and 3 to make the decimal number.

    _____

	Estimation

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Design your Own Mural

6% dark green: _____ squares

9% grey: _____ squares

10% purple: _____ squares

3% red: _____ squares

18% black: _____ squares

1% yellow: _____ squares

2% orange: _____ squares

10 % pink: _____ squares

25% blue: _____ squares

8% light green: _____ squares

Follow the instruction and colour in the grid appropriately. Check what **percentage of grid** will stay white.

Percentages

Name: _____

Date : _____

Equivalent Sets

55%	0.14	20%	37%
$\dfrac{100}{10000}$	0.55	$\dfrac{1}{5}$	14%
$\dfrac{3}{4}$	0.6	1%	26%
75%	0.26	60%	0.37

Colour equivalent sets the same colour.	*Percentages*

Note: 'Percent' means over 100, so percentages are like fractions.

Decimal Numbers and Percentages

1. Compare using < or >.

   a. 8.08 ⬚ 8.88

   b. 50.8 ⬚ 50.7

   c. 5.57 ⬚ 5.55

   d. 4.01 ⬚ 4.01

   e. 3.67 ⬚ 3.76

   f. 9.08 ⬚ 9.10

2. Solve the following.

a. 15.153 + 15.098	b. 9.113 − 8.110	c. 9.19 × 48
d. 4.75 × 2.15	e. 7.253 × 1000	f. 2.22 × 0.19
g. 35.1 ÷ 27	h. 2.72 ÷ 1.7	i. 72.6 ÷ 10

3. Convert the fractions to decimals.

a. $\frac{14}{100}$ =	b. $\frac{7}{100}$ =	c. $\frac{35}{1000}$ =
d. $\frac{135}{1000}$ =	e. $7\frac{27}{100}$ =	f. $\frac{654}{100}$ =
g. $\frac{45}{2}$ =	h. $\frac{7}{20}$ =	i. $\frac{55}{25}$ =
j. $\frac{78}{30}$ =	k. $\frac{54}{4}$ =	l. $\frac{157}{50}$ =

4. Express the following as directed.

a. **percentage**		b. **decimals**		c. **fractions**	
$\frac{70}{100}$		13%		25%	
$\frac{1}{100}$		52%		33%	

5. Convert the following into percentage.

a. $\frac{1}{20}$		c. 0.09	
b. $\frac{3}{50}$		d. 0.15	

6. Round off the given decimals.

Decimal	to the nearest tenth	to the nearest hundredth
4.154		
0.595		
1.926		
7.008		

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7. Solve the following real-life problems.

Problems	Working
a. Ahmed bought 4.25 kg of apples and 4.39 kg of strawberries. Which fruit has greater mass and by how much?	
Answer: ⬚ kg	
b. Sonia has 8.5 m of blue ribbon, 14.25 m of yellow ribbon, and 7.855 m of red ribbon. What is the total length of all the ribbons?	
Answer: ⬚ m	
c. If a group of people consume 3.25 kg of flour in one day, how much flour will be needed for 25 such groups?	
Answer: ⬚ kg	
d. Ahsan walks 5.72 km in one hour. How far would he walk in 3.5 hours?	
Answer: ⬚ km	

Decimal Numbers and Percentages

1. Compare using < or >.

a.	8.08	>	8.88	b.	50.8 > 50.7	
c.	5.57	>	5.55	d.	4.01 = 4.01	
e.	3.67	<	3.76	f.	9.08 < 9.10	

2. Solve the following.

a. 15.153 + 15.098	b. 9.113 − 8.110	c. 9.19 × 48
15.153 + 15.098 = 30.251	9.113 − 8.110 = 1.003	9.19 48 = 441.12
d. 4.75 × 2.15	**e. 7.253 × 1000**	**f. 2.22 × 0.19**
4.75 2.15 = 10.2125	7.253 1000 = 7253	2.22 0.19 = 0.4218
g. 35.1 ÷ 27	**h. 2.72 ÷ 1.7**	**i. 72.6 ÷ 10**
35.1 27 = 1.3	2.72 1.7 = 1.6	72.6 10 = 7.26

3. Convert the fractions to decimals.

a. $\frac{14}{100}=$	0.14	b. $\frac{7}{100}=$	0.07	c. $\frac{35}{1000}=$	0.035
d. $\frac{135}{1000}=$	0.135	e. $7\frac{27}{100}=$	7.27	f. $\frac{654}{100}=$	6.54
g. $\frac{45}{2}=$	22.5	h. $\frac{7}{20}=$	0.35	i. $\frac{55}{25}=$	2.2
j. $\frac{78}{30}=$	2.6	k. $\frac{54}{4}=$	13.5	l. $\frac{157}{50}=$	3.14

4. Express the following as directed.

a. **percentage**		b. **decimals**		c. **fractions**	
$\frac{70}{100}$	70%	13%	0.13	25%	1/4
$\frac{1}{100}$	1%	52%	0.52	33%	3/100

5. Convert the following into percentage.

a. $\frac{1}{20}$	5%	c. 0.09	9%
b. $\frac{3}{50}$	6%	d. 0.15	15%

6. Round off the given decimals.

Decimal	to the nearest tenth		to the nearest hundredth	
4.154	4.154	4.	4.154	4.15
0.595	0.595	0.6	0.595	0.60
1.926	1.926	1.9	1.926	1.93
7.008	7.008	7.0	7.008	7.01

7. Solve the following real-life problems.

Problems	Working
a. Ahmed bought 4.25 kg of apples and 4.39 kg of strawberries. Which fruit has greater mass and by how much?	Strawberries have greater mass by 0.14 kg.
Answer: 0.14 kg	
b. Sonia has 8.5 m of blue ribbon, 14.25 m of yellow ribbon, and 7.855 m of red ribbon. What is the total length of all the ribbons?	8.5 m + 14.25 m + 7.855 m = 30.605 m
Answer: 30.605 m	
c. If a group of people consume 3.25 kg of flour in one day, how much flour will be needed for 25 such groups?	Multiply 3.25 by 25: 3.25 20 = 65 3.25 5 = 16.25 Add the two results: 65 + 16.25 = 81.25 kg
Answer: 81.25 kg	
d. Ahsan walks 5.72 km in one hour. How far would he walk in 3.5 hours?	5.72 km/hour 3.5 hours = 20.02 km
Answer: 20.02 km	

Unit

5 Unitary Method

Learning Framework

Pupils will learn to apply unitary methods to solve real-life problems.

Unitary method is a classical technique used in Mathematics to solve real-life problems containing proportional quantities.

The word 'Unitary' has been driven from 'Unit'. In unitary method, to solve a problem, first value of one unit is calculated then the value of required units is found. Elaborate the following example to your class in the same way: The price of 5 sweets is Rs 45. Find the price of 7 sweets.

Opening Statement

↓

Quantity 1 ← The **price** of 5 **sweets** is Rs 45. → Quantity 2

Problem

↓

Find the **price** → Required

Given ← of 7 **sweets**.

Opening Statement → 5 sweets cost Rs 45

More —— (Divide) —→ Unit

Opening Statement → 1 sweet costs Rs 45 ÷ 5
1 sweet costs Rs 9

Unit —— (Multiply) —→ More

Problem → 7 sweet costs Rs 9 × 7
7 sweet costs Rs 63
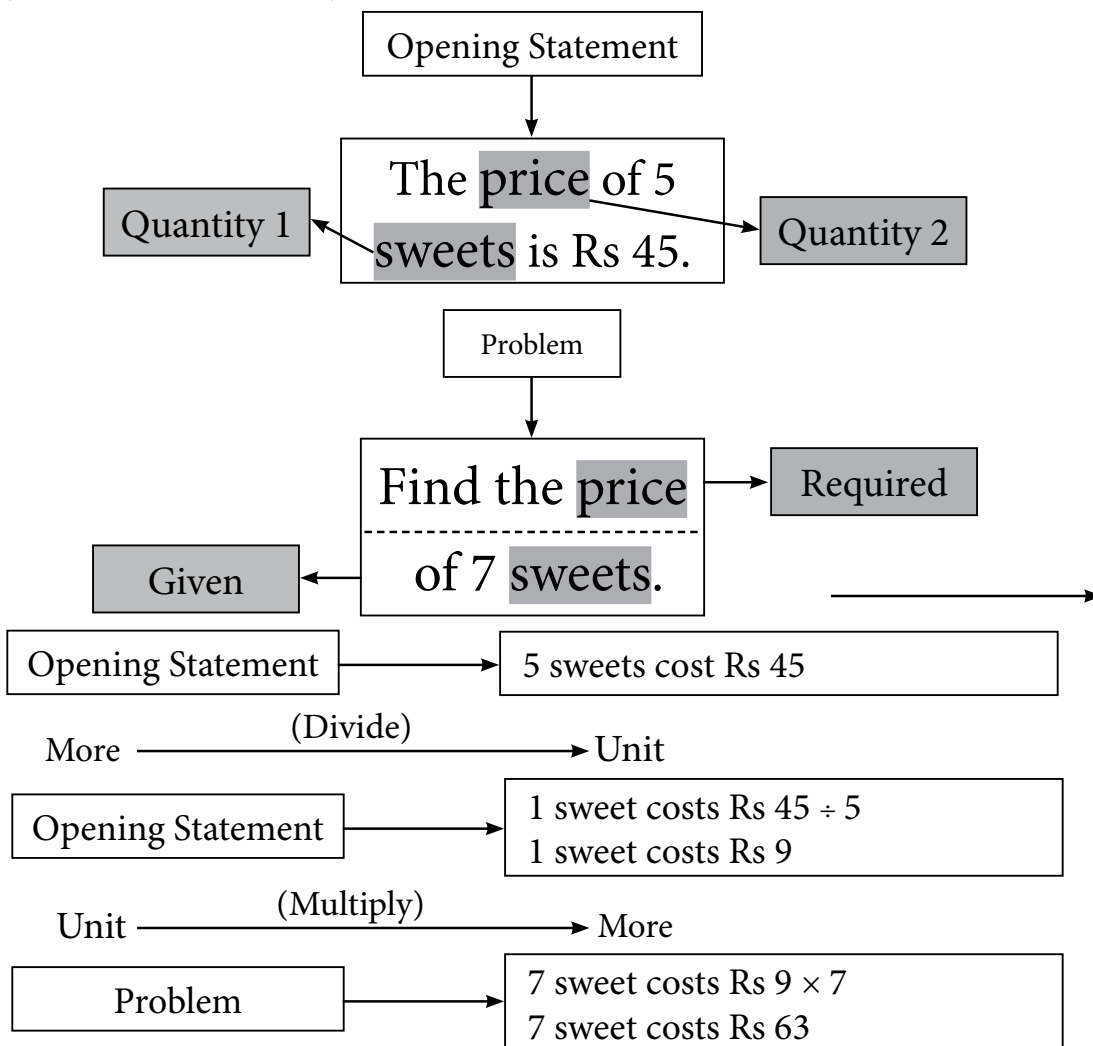
Classwork: Complete Exercise 1.

Lesson Plan

Objectives:

Calculate the value of many objects of the same kind when the value of one of these objects is given.

Calculate the value of one object of the same kind when value of many of these objects are given.

Calculate the value of many objects of the same kind when the value of some of these is given.

Concept Connector:

Discuss the real-life scenario given on the Unit opener Page with the class. Brainstorm them with the mathematical operations used to solve the problem. Reinforce various situations where multiplication is used to find the answer. Similarly, discuss situations where division is applied to solve the problem.

Exploring the Objectives:

Collect at least ten copies of the same book. This can be one of the class textbooks, but it is not necessary. Place one book in front of the class and ask pupils to find out how many pages there are. Once they have checked, write the number on the board, and then place four books on top of the first one. Suppose the book has 100 pages. Ask students how many pages there are now in the pile. Since there are five books, the class should be able to deduce that there are 500 pages. Explain that this calculation that they have just made involved, or at least should have involved, the unitary method. Write number of pages: number of books on the board. So, when you multiply the number of books by 5, you also multiply the number of pages. Now add three more books to the pile. And write 8 under number of books. Ask a student to come to the board to explain to their peers how to calculate how many pages 8 books would have. Discuss the *Examples given on Page 58* to build the concept of Unitary Method on their prior knowledge. Explain that unitary method is a process by which we find the value of a single unit using the values of multiple units and the value of multiple units using the value of single units.

Activity:

Tomato soup Recipe

RECIPE CARD	
TOMATO SOUP	
To make tomato soup for 4 people, I need:	To make tomato soup for 8 people, I need:
6 tomatoes	_____ tomatoes
1 potato	_____ potato
1 onion	_____ onion
1 carrot	_____ carrot
2 table spoon of olive oil	_____ table spoon of olive oil
2 cups of vegetable stock	_____ cups of vegetable stock
4 pieces of bread	_____ pieces of bread

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What You Need:

How to Play:

Divide the class into pairs. Explain how to calculate and find different quantities, using unitary method. Each pair should be given a recipe card and a worksheet related to the recipe card. Responses are to be shared with the rest of the class

Reflection:

Students calculated quantities correctly.

Exercise:

Before assigning individual classwork, reinforce the concept by assigning *Math Lab Page 41, 42* in pairs. Assign *Exercise Questions 1(d to i) on Page 59* as classwork. *QR code Activity sheet on Page 59* can be assigned for further practice.

Extension Activity:

Ask students to create at least three word problems on unitary method to challenge their peers. Take feedback from the class before assigning for solution.

Activity Sheet
Distance

LearningObjective:

- Convertmeasuresgivenin
  - o   kilometrestometresandviceversa
  - o   meterstocentimetresandviceversa
  - o   Centimetrestomillimetresandviceversa.
- Solvereal-lifesituationsinvolvingconversion, additionandsubtractionofmeasuresof distance.

Let'sTalkMath:

- Explaintothepupilsthat
  - o   Kilomeans1000,centimeans100,andmillimeans1/1000.
- Whenabiggerunitisconvertedtoasmallerunit:wemultiplywiththeconversionfactor.
- When a smaller unit is to be converted to a bigger unit; we divide with the conversionfactor.
  1km=1000m;   1m=100cm;   1cm=10mm

Duration:1Lesson   WholeClass Activity

Let'sTryIt:

- Aftergivingpupils abreakdownofalltheconversions,givethemsomereal-lifeexamples of distance and ask them to help you do some conversions on the board.
- Herearesomeexamplesofquestionsyoucanuse:JawadwasgoingtodistributeEid sweets in his neighbourhood.
- Hewalked20metrestothefirsthouse.Howmanycentimetresdidhe walk?
- Hewalked100meterstothenexthouse.Howmanycentimetresdidhewalk?
- Hewalked100meters.Howmanymillimetresdidhewalk?
- Hewalked4500centimetrestothenexthouse.Howmanymetresdid hewalk?
- Hecouldn'tmakeittothe nexthousebecause it was2000metresaway.Howmany kilometres was it?

Assessment:

Askpupilstosolvesomerealisticproblemsthatinvolvedistance.Herearesomeexamplesof questions below:

- JaveriaandTinadrovetotheiraunt'shouse.Javeriadrove9¾kilometres.Tina drove 3500 metres before they arrived. How many kilometres did they drive in total?
- Miraflew1234kilometrestoLahoretovisitheruncle.AfterpickingupMira,heruncle drove 20 kilometres to his house from the airport. How many kilometres had Mira travelled in all?
- Nobody wanted to ride the 22 kilometres back to town after the family reunion. So, relativesrode10kilometrestothenearesthotel.Howmanykilometresdidthefamily ride in all?

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Time

LearningObjective:

- Addandsubtractintervalsoftimeinhoursandminuteswithcarryingandborrowing.
- Solvereal-lifesituationsinvolvingconversion,additionandsubtractionofintervalsoftime.

Let'sTalkMath:

- Explaintopupilsthat:
- Whenhoursareconvertedtominutes,multiplyby60.
- Whenminutesareconvertedtohours,divideby60.
- Whenminutesareconvertedtoseconds,multiplyby60.
- Whensecondsareconvertedtominutesdivide,by60.
- One hour = 60 minutes   Halfanhour=30minutes
  Quarterof anhour =15minutes
  Three-quartersofan hour=45minutes

MakeSureYouHave: Worksheets

Duration:1Lesson   GroupActivity

Let'sTryIt:

- Draw this activity sheet on the board for pupils to create a worksheet of it. Ask pupils to fill them out in groups of three.

1. Yousuf decides to start practising for his Maths exam on Friday at 3:15 p.m. which is due after the weekend. Day: Friday Time: 3:15 p.m.	2. 5 hours later he gets bored and decides to take a break for dinner. Day: Time:	3. 15 hours later he picks up his science book and starts reading the new topic his teacher gave him for homework. Day: Time:
After 2 hours he decides to take a break for lunch. Days: Time:	Half an hour later he takes a nap for 45 minutes. Day: Time:	Then he goes for a bicycle ride with his friends for an hour. What time is it now? Day: Time:

Assessment:

- Ask pupils to solve the worksheet given above in class.

Name: _____

Date : _____

The Word 'Unit' Means One

1. Use the unitary method to fill in the boxes.

   a. One pack of soap weigh 250 g, so 5 packs of soap will weigh [ ] g.

   b. 9 pens cost Rs 810, so 1 pen will cost Rs [ ].

   c. 5 candies cost Rs 35, so 8 candies will cost Rs [ ].

   d. Price of 7 flower pots = Rs 700

      Price of 1 flower pots = Rs [ ]

      Price of 9 flower pots = Rs [ ]

Ask students to solve the above questions.	*Unitary method*

Real-life Story Sums

1. Sana has to make 250 cookies for a party. She decides to put an almond on each cookie. After completing 197 cookies she runs out of almonds. How many more almonds does she need?

2. Ahsan goes to stationery shop to buy some notebooks. If 2 notebooks cost Rs 720 and he decides to buy 5 notebooks, how much should he pay?

3. Sarim pays Rs 80,000 as rent for 4 months. Now he wants to pay 6 months rent altogether. How much will he pay?

Ask students to solve the above questions.	*Unitary method*

Unitary Method

1. Solve the following real-life problems.

    a. The cost of 8 books is Rs 320.
        What is the cost of one book?
        Rs [ ]
        What is the cost of 10 books?
        Rs [ ]

    b. The cost of 7 litre milk is
        Rs 1050.
        What is the cost of one litre?
        Rs [ ]
        What is the cost of 10 litres?
        Rs [ ]

    c. Three cows eat 15 kg of fodder.
        How much will one cow eat?
        [ ] kg
        How much will 13 cows eat?
        [ ] Kg

    d. Aslam reads 250 pages in 5
        days.
        How many pages will he read
        in one day? [ ] pages
        How many pages will he read
        in 17 days? [ ] pages

2. Solve the following.

Problems	Working
a. A car requires 25 litre of petrol to travel 200 km. How many litres will be needed to travel 300.50 km?	
Answer: [ ] litre	
b. Ahmed bought 8 packs of chocolates, each with 6 bars for Rs 960. What will be the cost of 30 bars of chocolate?	
Answer: Rs [ ]	
c. Nine students collected an equal amount and donated Rs 5409 to a welfare trust. What amount will be collected by 15 students?	
Answer: Rs [ ]	

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Unitary Method

1. Solve the following real-life problems.

   a. The cost of 8 books is Rs 320.
      What is the cost of one book?
      Rs [40]
      What is the cost of 10 books?
      Rs [400]

   b. The cost of 7 litre milk is Rs 1050.
      What is the cost of one litre?
      Rs [150]
      What is the cost of 10 litres?
      Rs [1500]

   c. Three cows eat 15 kg of fodder.
      How much will one cow eat?
      [5] kg
      How much will 13 cows eat?
      [65] Kg

   d. Aslam reads 250 pages in 5 days.
      How many pages will he read in one day? [50] pages
      How many pages will he read in 17 days? [850] pages

2. Solve the following.

Problems	Working
a. A car requires 25 litre of petrol to travel 200 km. How many litres will be needed to travel 300.50 km?	25 litres 200 km = 0.125 l 0.125 l 300.50 km = 37.5625 l

Answer: [37.562] litre

Problems	Working
b. Ahmed bought 8 packs of chocolates, each with 6 bars for Rs 960. What will be the cost of 30 bars of chocolate?	960 48 = 20 20 30 = 600

Answer: Rs [600]

Problems	Working
c. Nine students collected an equal amount and donated Rs 5409 to a welfare trust. What amount will be collected by 15 students?	5409 9 = 601.00 601.00 15 = 9015

Answer: Rs [9015]

Learning Framework

Pupils will learn to classify given angles into acute, right, and obtuse angles. They will also learn to calculate the complementary and supplementary angle of the given angles.

Elaborate the following concepts to your pupils.

• Two rays having the same end point, form an angle.

Arm

Vertex

Size of the angle

Arm

A

B

C
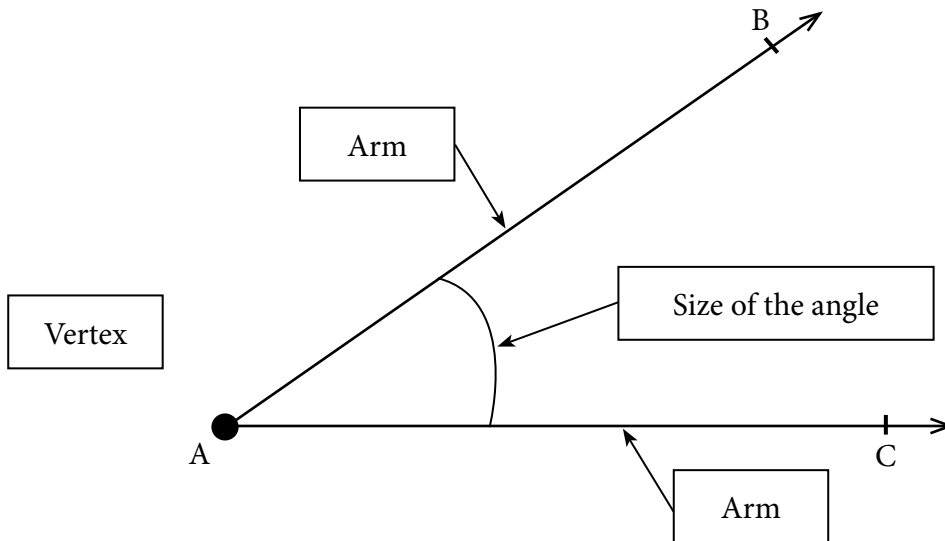
Ray AB (AB) with end point A.

Ray AC (AC) with end point A.

A is the common end point of two rays, which are called the Vertex of the angle.

Ray AB and ray AC are called the arms of the angle.

Angles can be named with the points of rays as angle BAC .

Angle is also named with the name of its vertex as angle A .

Elaborate examples given on page 62 and 63.
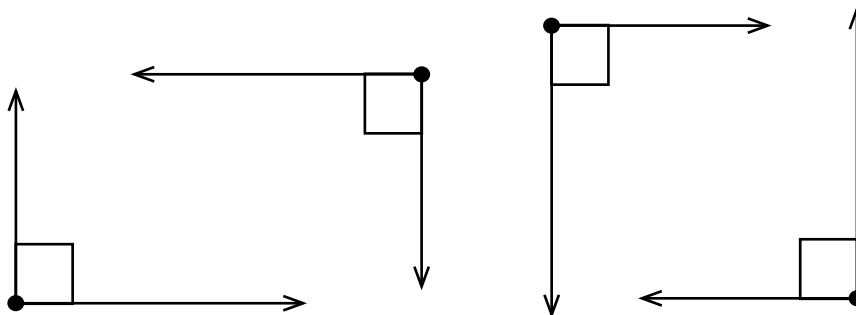
Classwork: Complete (Exercise 1).

Pupils will learn to identify types of triangles based on their sides and angles.

Use information given on pages 65 and 66 to elaborate on triangles and types of triangles.

Pupils will learn to construct the triangle based on its two sides and included angle or two angles and included side.

Use information given on pages 67 and 68 to elaborate on the construction of triangles.

Classwork: Complete Exercise (2 Q 5 – 8).

Pupils will learn to identify square, rectangle, parallelogram, rhombus, trapezium, and kite among the given quadrilaterals and list their distinguishing properties.

Use information given about squares, rectangles, parallelogram, rhombus, trapezium, and kite on pages 71 and 72 to highlight their properties.

Pupils will learn to construct a square and a rectangle with ruler and protractor.

Rationale: Use (Examples 7 and 8 on pages 72 and 73) to elaborate on the construction of square and rectangle.

Classwork: Attempt (Exercise 3 Q5 and Q 6).

Pupils will learn to recognise reflective symmetry in the given shape and draw line of reflective symmetry in it.

Use examples 1 on page 75 to elaborate the reflective symmetry and line of reflective symmetry.

Classwork: Complete Q1 of Exercise F.

Pupils will learn to recognise reflective symmetry in the given shape and draw line of reflective symmetry in it.

Use Concept connector on page 70 to elaborate the reflective symmetry and line of reflective symmetry.

Classwork: Attempt (Exercise 3 Q1 and 2 of).

Pupils will learn to find the order of rotational symmetry for a given shape and mark the centre of rotational symmetry on it.

Use explanation on page 70 and 71 to elaborate on the order of rotational symmetry and centre of rotational symmetry.

Classwork: Complete of (Exercise 3 Q2 and Q4).

Pupils will learn to distinguish between faces, edges, vertices, and draw net diagrams of cube, cuboid, sphere, pyramid, and cone.

Share the information given on pages 75 to elaborate on faces, edges, vertices, and net diagram of

cube, cuboid, sphere, pyramid, and cone. The best way to teach 3D objects is to show the models of wood, clay, or any material to enable your pupils to visualize the concepts of edges, vertices, and faces of 3D objects. Better wrap up paper around a 3D object to explain net diagram of the shape.

Classwork: Attempt (Exercise 4 Q1 and 2).

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Lesson Plan

Objectives:

Recognise straight and reflex angle.

Identify, describe and classify angles as acute, right or obtuse.

Compare angles with right angles and recognise that a straight line is equivalent to two right angles.

Use protractor and ruler to construct.

A right angle - A straight angle

Reflex angles of different measures.

Describe adjacent, complementary and supplementary angles

Calculate complementary and supplementary angles.

Concept Connector:

Discuss *Math in Action given on Page 61* to generate discussion on importance of angles in our daily life. Involve student by asking them to share various examples from their own experiences. Using *Concept Connector given on Page 61* make them recall the types of angles.

Exploring the Objectives:

Introduce more types of angles using the figures given on *Pages 61 and 62*. Emphasise the proper mathematical vocabulary and terms for naming angles and using degrees as unit of measurement of angles. Explain Complementary and supplementary angles by drawing various examples on board. Take *Examples 1, 2, and 3 on Page 63* to explain step-by-step solution to calculate supplementary and complementary angles.

Activity:

Real-world Angle Hunt

What You Need:

Analogue clocks, book, cap, etc.

Or Pictures of these objects

How to Play:

Ask students to bring pictures of different items or objects (easily available at home), on which they can identify and make angles. For example, a table and chain, clock, flag, or any geometrical shape. Ask them to identify the type of angle. They may bring a picture of a clock with angles marked as shown.

Take students on a "geometry walk" around the school.

Have them identify and draw rough pictures of examples of complementary and supplementary angles in real-world objects.

Back in the classroom, students can share their pictures and explain why the angles are complementary or supplementary.

Reflection:

Students enthusiastically participated in the activity.

Collected objects/pictures that relate to various types of angles.

Demonstrated deeper understanding while explaining the angles.

Exercise:

Reinforce the identification of types of angles by assigning *Question 1 and 3of Exercise 1* as an individual task. Take feedback from the class. Have students identify supplementary and complementary angles while solving *Question 4*. Assign **Question 5(a, b, e, f)** as classwork to calculate supplementary angles. Assign **Question 6(a, b, e, f)** as classwork to calculate complementary angles. *Math Lab Pages 43-46* can be assigned for further practice.

Extension Activity:

Assign *Math Quest given on Page 65* in pairs.

Or Provide the same figure to find how many right angles there are in this diagram of a tennis court?
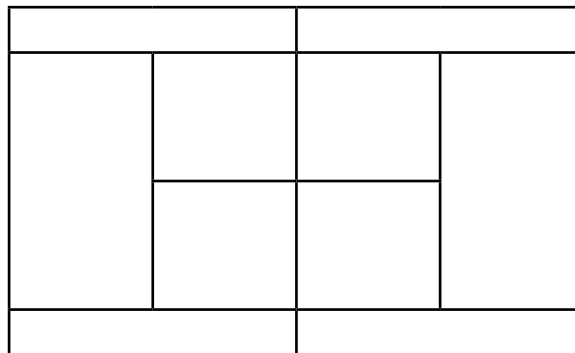
Activity Sheet
Unitary Method

Learning Objective:
- Calculate the value of many objects of the same kind when the value of one of these objects is given.
- Calculate the value of one object of the same kind when value of many of these objects are given.
- Calculate the value of many objects of the same kind when the value of some of these is given.

Let's Talk Math:
- Explain that unitary method is a process by which we find the value of a single unit using the values of multiple units, and the value of multiple units using the value of single unit.
- Unitary method is used in solving variation problems in our daily life. For example, it helps find the number of people required to complete a given task.

Make Sure You Have:
- Books
- Recipe Cards

Activity: Pages in a Pile

Duration: 1 Lesson   **Whole Class Activity**

Let's Try It:
- Collect at least 10 copies of the same book (textbook or otherwise).
- Place one book in front of the class.
- Ask pupils to find out the number of pages in the book.
- Write the number of pages on the board (e.g., 100 pages).
- Add four more books on top of the first one, making a total of 5 books.
- Ask pupils to calculate the total number of pages in the pile (5 books x 100 pages = 500 pages).
- Explain that this calculation involves the unitary method.
- Write on the board: 'Number of pages = Number of books × Pages per book.'
- Add three more books to the pile (total 8 books) and ask a pupil to calculate the total pages for 8 books.
- Have the pupils explain their calculation to their peers (8 books x 100 pages = 800 pages).

Assessment:
- Prepare an activity sheet and provide the activity sheet to each pupil to work individually.

Name: _____

Date : _____

Know Your Angles
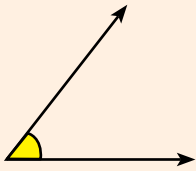
Acute angle _____

_____

_____

_____

_____

_____
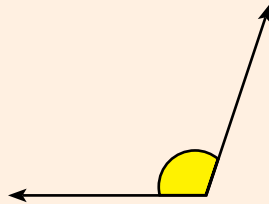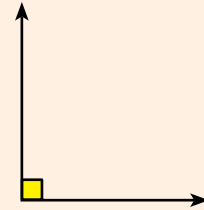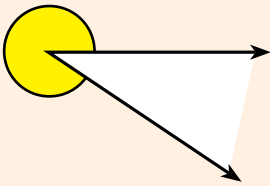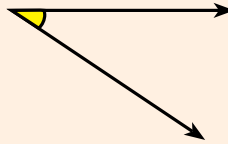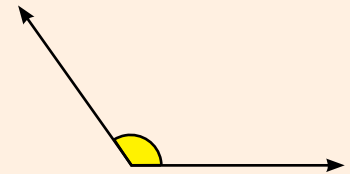
How many right angles do you see in each digit?

1 ☐   2 ☐   3 ☐   4 ☐   5 ☐

6 ☐   7 ☐   8 ☐   9 ☐
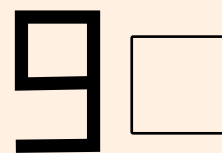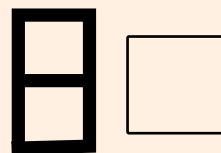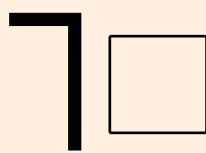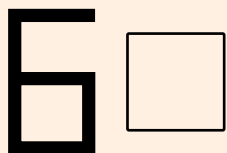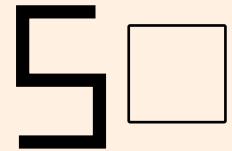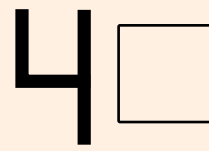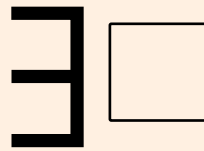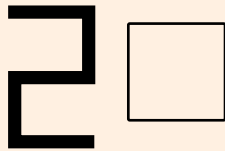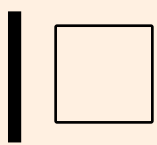
Identify each angle and write its name.	Angles

Note: Geo strips can be used for this activity.

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Adjacent, Complementary, and Supplementary Angles

Choose the correct type of angles from the given word bank to fill in the boxes.

adjacent	supplementary	complementary

a)

∠AOB + ∠BOC = 90°

∠AOB and ∠BOC are [   ] angles.
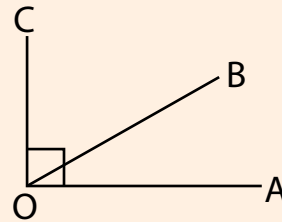
b)

In ∠AOB and ∠BOC
O is the common vertex.

OB is the common arm.

∠AOB and ∠BOC are [   ] angles.
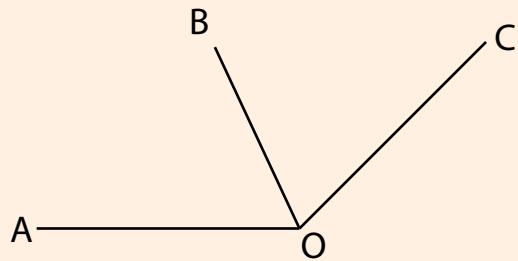
c)

∠AOB + ∠BOC = 180°

∠AOB and ∠BOC are
[   ] angles.
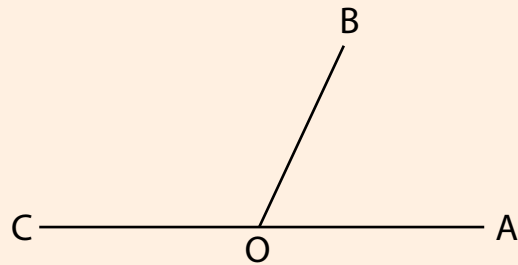
Explain the terms 'adjacent, supplementary, and complementary' angles to the students. Ask them to make different combinations to form these angles.	*Angles*

Name: _____

Date : _____

Constructing Angles

Use a protractor and ruler to construct right angles, straight angles, and reflex angles.

Angles

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Name: _____

Date : _____

What's in a Name?

SARAH

TARIQ

SALEEM

Have the students write their names in large capital letters. Then find and name as many **angles** hidden in the letters as possible. Including adjacent, complementary, and supplementary angles.	*Angles*

Note: Students should recognise that two right angles are equal to a straight line.

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Teaching Guide 105

Name: _____

Date : _____

Measuring Angles

4 cm

5 cm

6 cm

6 cm

6 cm

4 cm
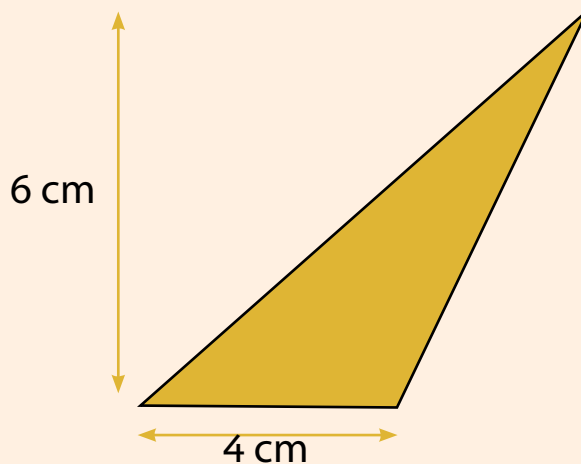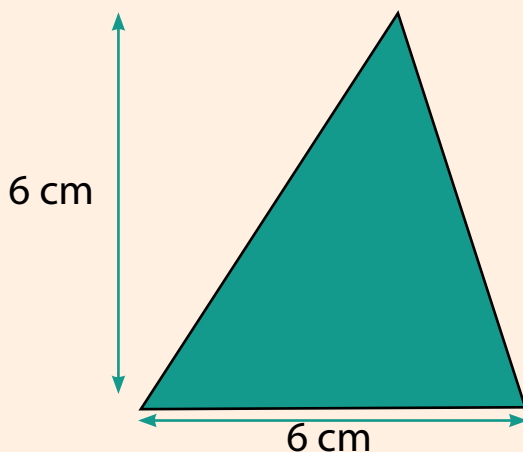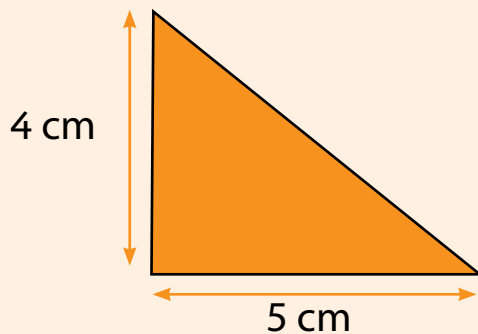
For each triangle, **measure the angles** to name the triangles.	*Angles*

Know Your Triangles

According to sides

Triangle ABC: _____

Triangle EFG: _____

Triangle LMN: _____

Triangle XYZ: _____

Identify the **types of triangles** according to the sides.

Triangles

Name: _____

Date : _____

Know Your Triangles
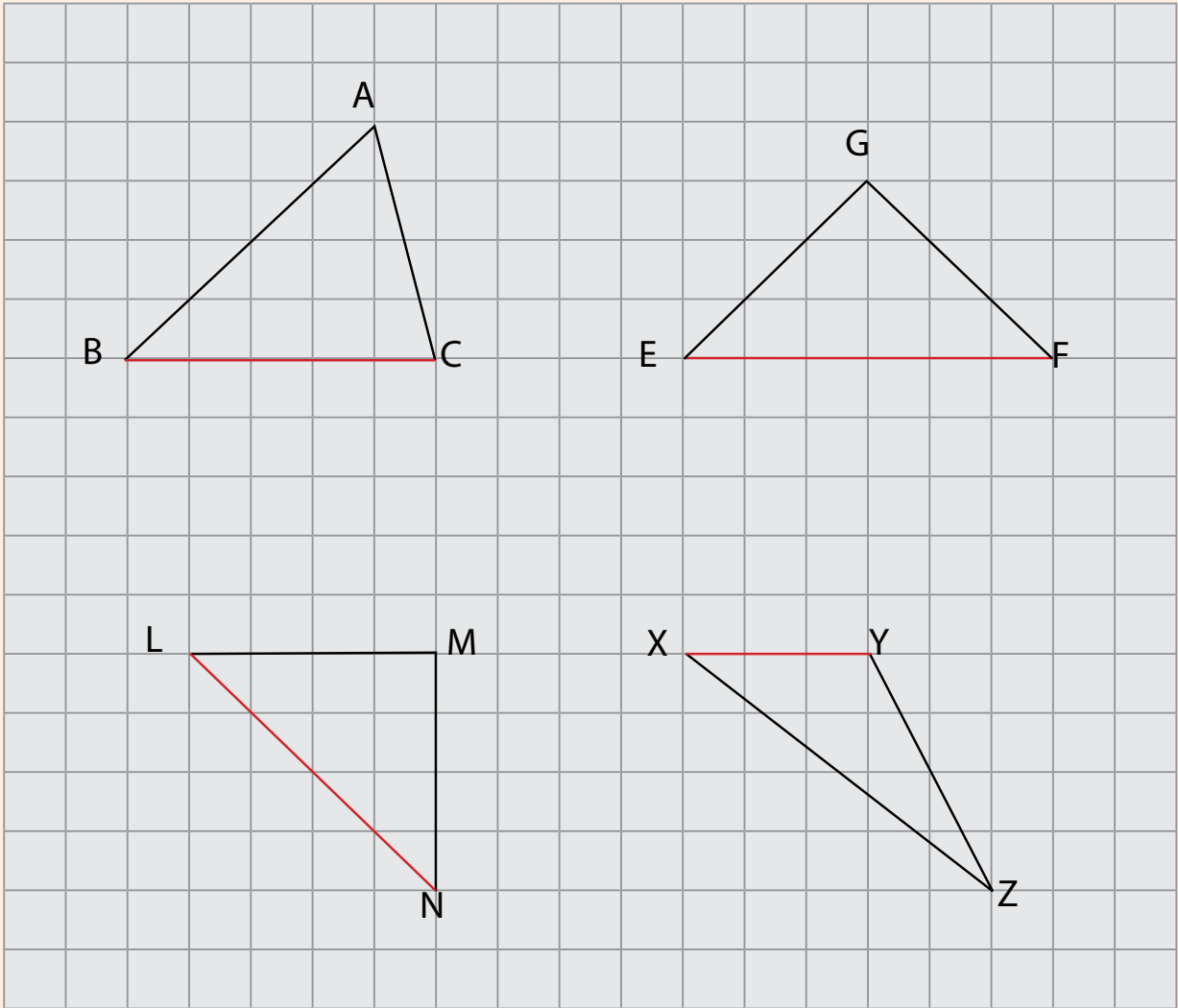
According to angles

Triangle ABC: _____

Triangle EFG: _____

Triangle LMN: _____

Triangle XYZ: _____

Identify the **types of triangles** according to the angles.	*Triangles*

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Constructing Triangles
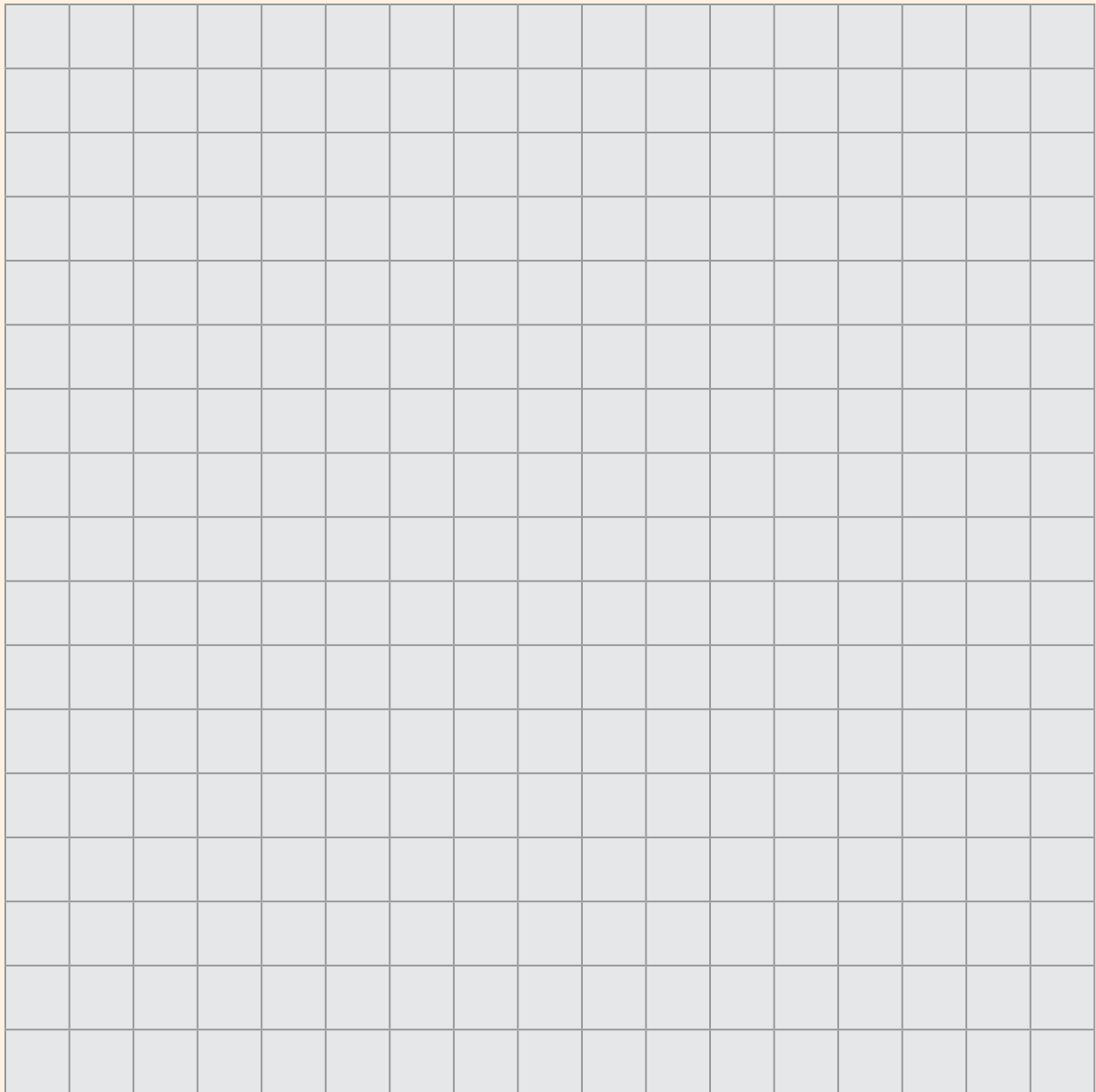
Each side of the square of the above grid are 1 cm.

- Draw a triangle such that the base is **4 cm shorter** than your pencil, and the height is **1 cm more** than the base, and it is a **right-angled triangle**.
- Draw a triangle with each side of **6 cm** and each angle of **60°**.
- Draw a triangle with two sides of **8 cm** and included angle of **75°**.

Triangles

Note: Geo boards and geo strips can be used to conduct this activity.

Name: _____

Date : _____

Interior Angles of a Triangle
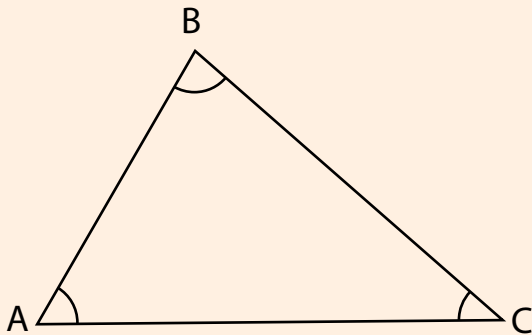
$\angle$ A = _____

$\angle$ B = _____

$\angle$ C = _____

_____ + _____ + _____ = 180°
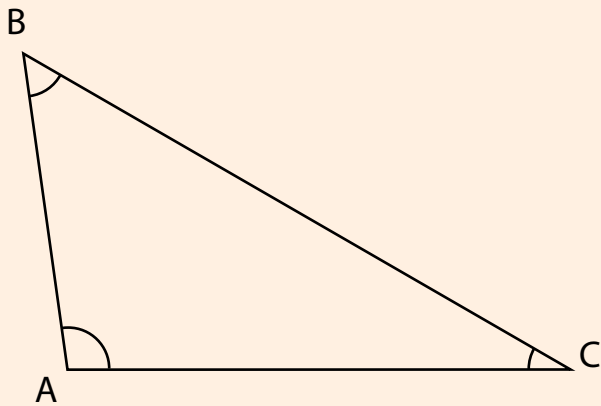
$\angle$ A = _____

$\angle$ B = _____

$\angle$ C = _____

_____ + _____ + _____ =
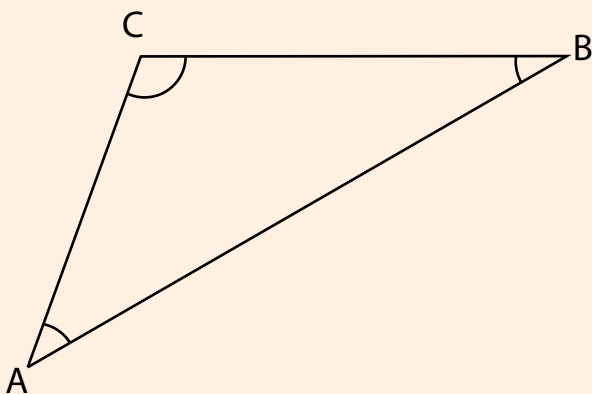
$\angle$ A = _____

$\angle$ B = _____

$\angle$ C = _____

$\angle$ A + $\angle$ B + $\angle$ C = _____

_____ + _____ + _____ =

Ask the students to use protractor to measure the angles and find their sum. The sum of angles for each triangle should be 180°.

Triangles

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Know your Quadrilaterals

Clue	Drawing	Name of Shape
Two opposite sides are equal		Square, Rectangle, Parallelogram, Rhombus, Trapezium
All the sides are not equal		
All angles are equal		
Has no right angle		
Adjacent sides are equal		
Has parallel side		
Opposite angles are obtuse		

Use cut-outs of **quadrilaterals** to fill out the table appropriately, after completing the matching activity on page 53.

Quadrilaterals

Name: _____

Date : _____

Quadrilaterals

Match the quadrilaterals to their names.

Square
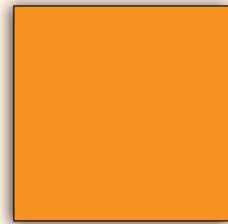
Rectangle
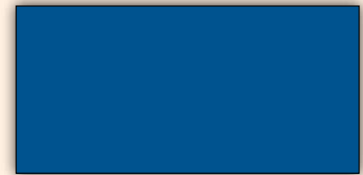
Parallelogram

Rhombus
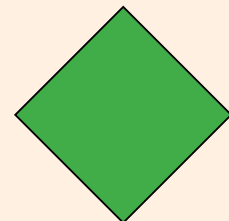
Kite
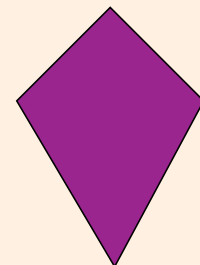
Trapezium
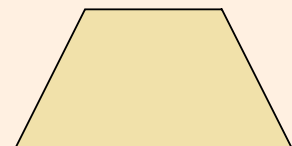
Use cut-outs of **quadrilaterals** to fill out table.	*Quadrilaterals*

Note: Geo boards and geo strips can be used to conduct this activity.

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Name: _____

Date : _____

Name: _____

Date : _____

Constructing Quadrilaterals
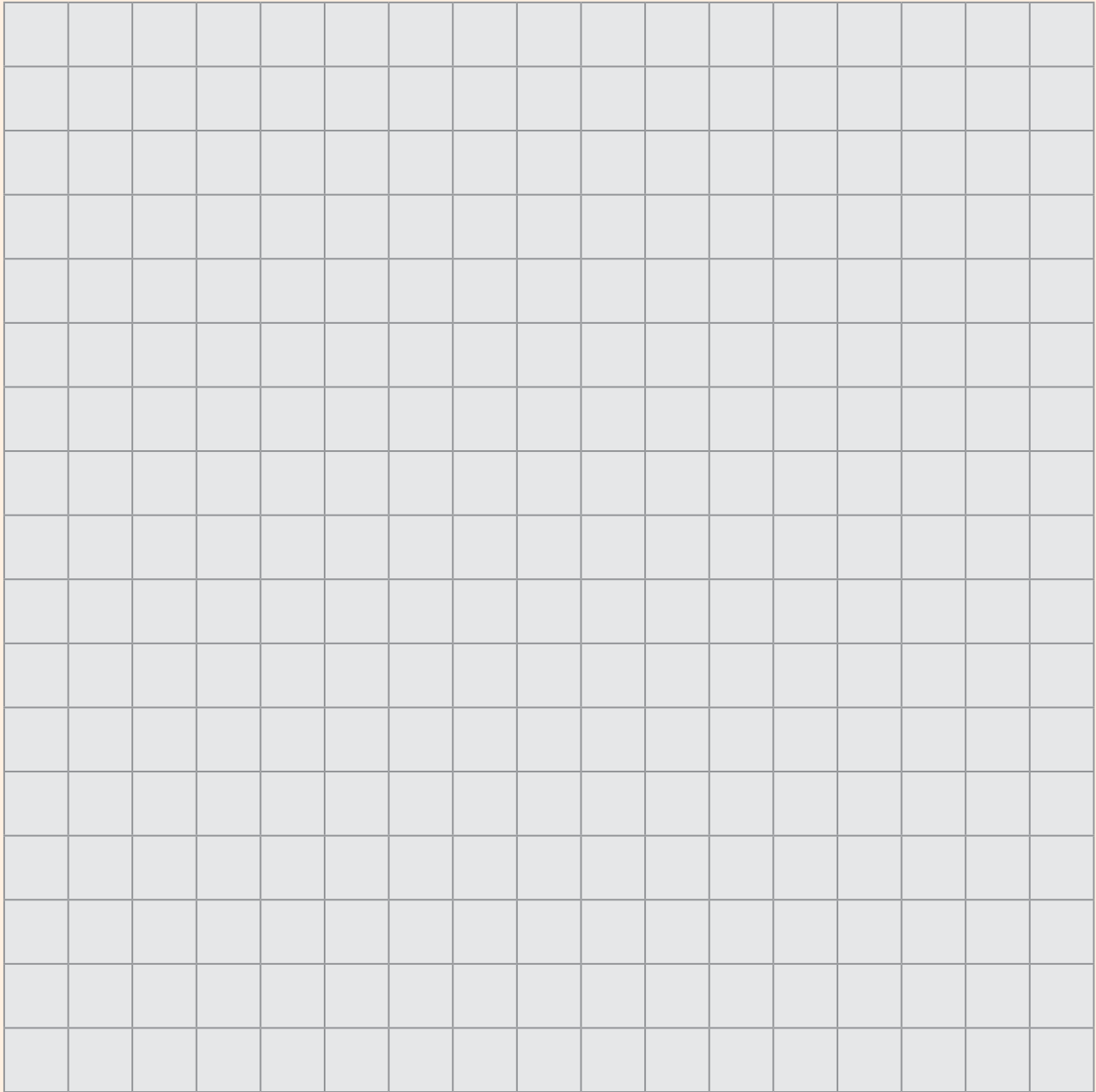
Each small square in the above grid is of 1 cm.

- Construct a quadrilateral with side $\overline{AB}$ = 6 cm and $\overline{BC}$ = 3 cm.

- Construct a square with each side of 4 cm.

- Construct four squares and two rectangles of any measurement of your choice.

Quadrilaterals

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Constructing Quadrilaterals
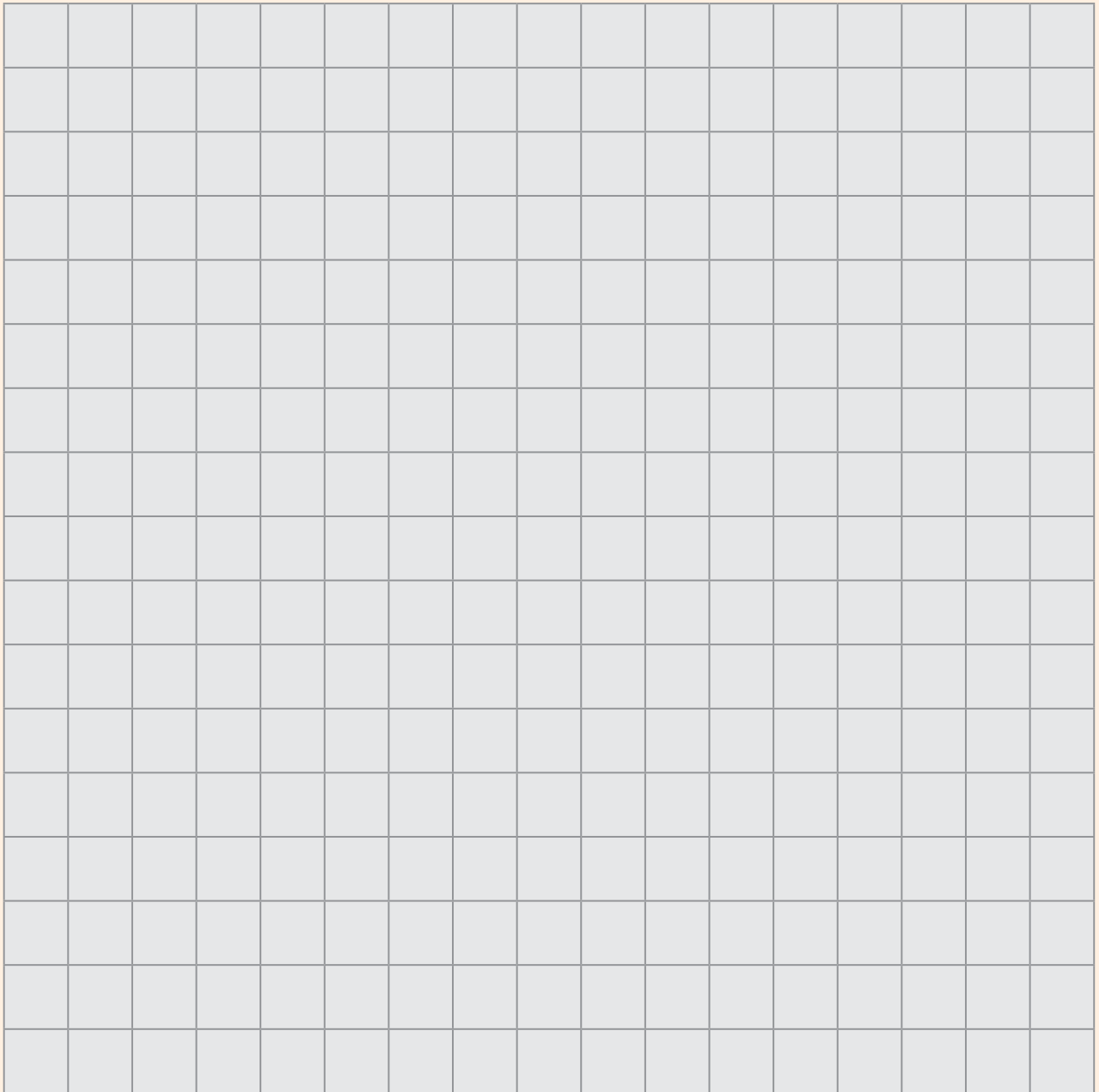
Quadrilaterals

Name: _____
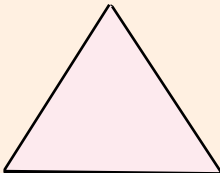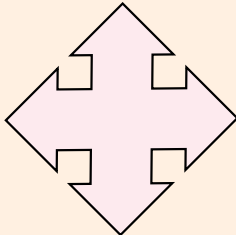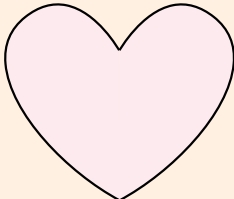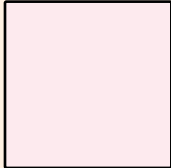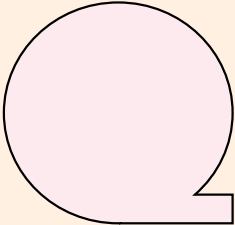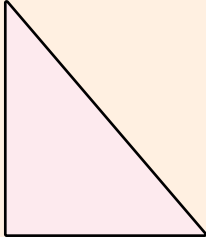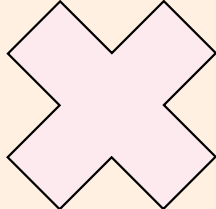
Date : _____

Point of Rotation and Order of Rotational Symmetry

Do the following figures have rotational symmetry?

If yes, then mark their point of rotation and write the order of rotational symmetry.

a)	b)	c)
Order of Rotational Symmetry = _____	Order of Rotational Symmetry = _____	Order of Rotational Symmetry = _____
d)	e)	f)
Order of Rotational Symmetry = _____	Order of Rotational Symmetry = _____	Order of Rotational Symmetry = _____
g)	h)	i)
Order of Rotational Symmetry = _____	Order of Rotational Symmetry = _____	Order of Rotational Symmetry = _____

Ask pupils if they see the difference between reflective symmetry and rotational symmetries	*Symmetry*

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Drawings of Cubes and Cuboids

Square Grid
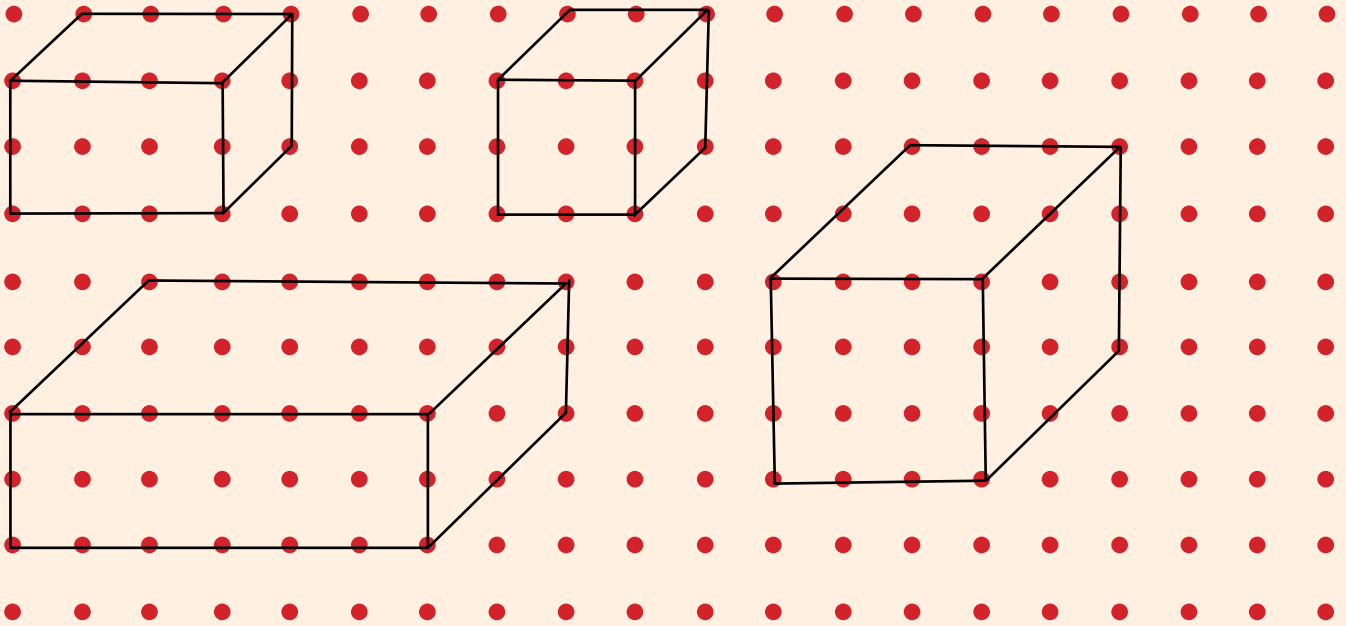
Isometric Grid
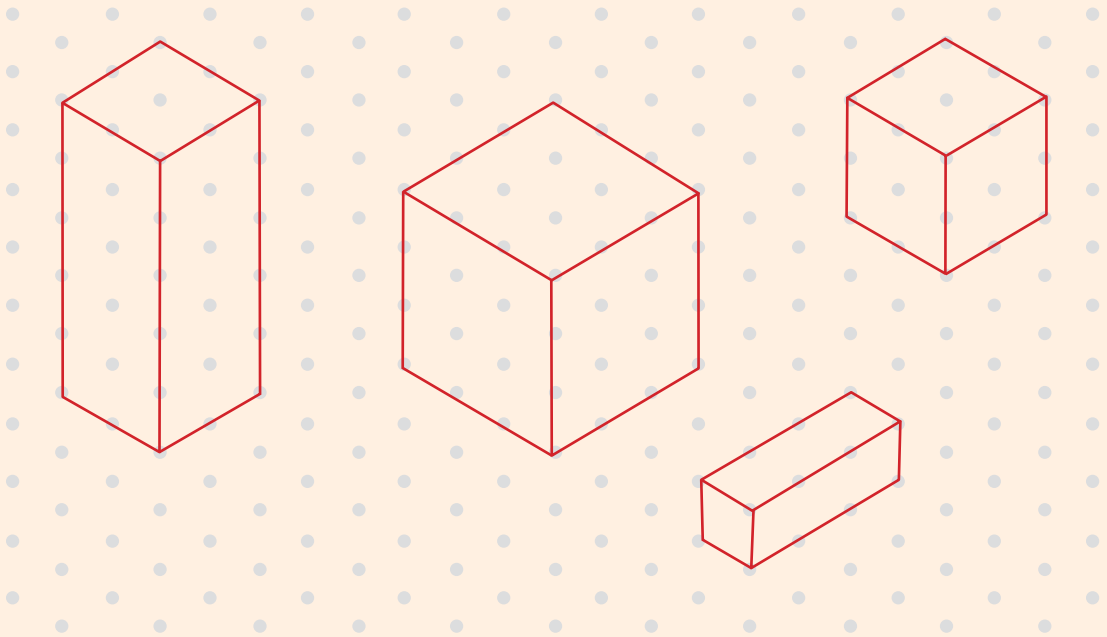
	Three dimensional objects

Name: _____

Date : _____

Drawing Cubes and Cuboids

Draw **four** cubes and **four** cuboids of your choice on this grid. | *Three dimensional objects*

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Drawing Cubes and Cuboids

Draw **four** cubes and **four** cuboids of your choice on this grid. | *Three dimensional objects*

Name: _____

Date : _____

Nets of Cubes and Cuboids

Draw nets of cubes and cuboids of your choice on this grid.	*Three dimensional objects*

Note: Polydrons can be used for this activity.

Geometry

1. Fill in the blanks.

    a. The standard unit for measuring an angle is [   ].
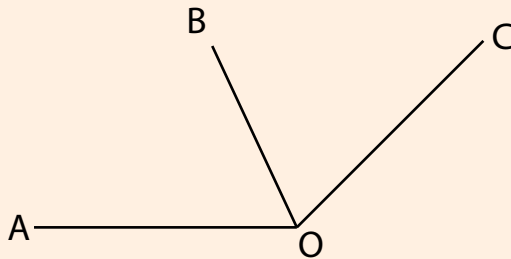
    b. An obtuse angle is greater than [   ] and less than [   ].

    c. A reflex angle is greater than [   ] and less than [   ].

    d. The measure of a straight angle is [   ].

2. Complete the given statements.
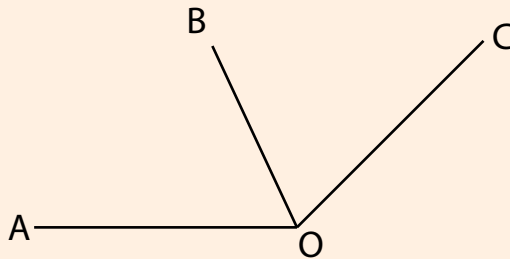
    a.

    In ∠AOB and ∠BOC
    O is the common [   ].

    OB is the common [   ].

    ∠AOB and ∠BOC are [   ] angles.

    b.

    m∠AOB + m∠BOC = [   ]

    m∠AOB and m∠BOC are [   ] angles.

    c.
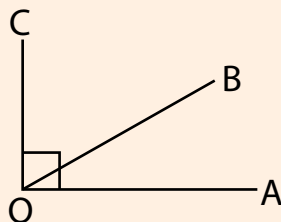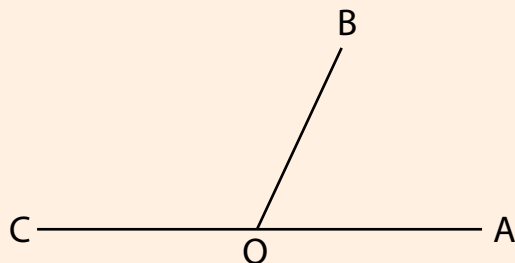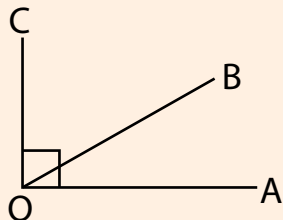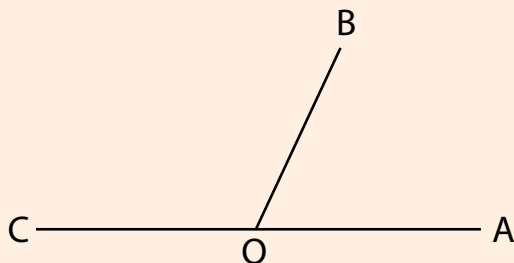
    m∠AOB + m∠BOC = 180°

    m∠AOB and m∠BOC are [   ] angles.

3.   Draw the given angles using a protractor.

a.   50º

b.   78º

c.   123º

d.   225º

4. Match the triangles with their correct names and describe them.

	Triangle name	Description with respect to sides
	Scalene	
	Isosceles	
	Equilateral	

5. Identify the triangles with respect to their angles.

a.

b.

c.

6. Write down the number of lines of symmetry and the order of rotational symmetry for the following shapes.

Square

Rhombus

Trapezium

Rectangle

Kite

Parallelogram

7. I am a quadrilateral, guess my name and draw me.
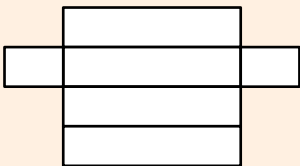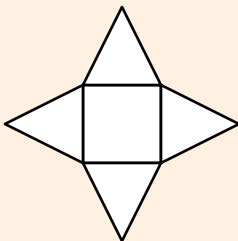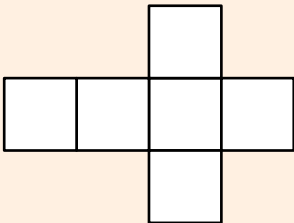
I have four right angles and all my sides are equal.	I have only one pair of parallel lines.
I have opposite sides equal and parallel. My opposite angles are equal but not 90°.	My two pairs of adjacent sides are equal. None of my angle is 90°.

8. Write the number of faces and vertices of the given 3D shapes.

3D shapes	Cube	Pyramid	Cuboid	Cylinder
Number of faces				
Number of vertices				

9. Look at the following nets of 3D objects. Draw the 3D shapes and write their names.

Net of the shape	Name of the shape

10. Construct the given triangles using a protractor and a ruler and find the unknown measurements.

a. $\triangle PQR$, where
   $m\overline{PQ} = 4.5$ cm
   $m\angle P = 70°$
   $m\angle Q = 35°$

$m\angle R = \boxed{}$

$m\overline{QR} = \boxed{}$

$m\overline{RP} = \boxed{}$

b. $\triangle KLM$, where
   $m\overline{KL} = 4.5$ cm
   $m\overline{LM} = 4$ cm
   $m\angle L = 53°$

$m\angle M = \boxed{}$

$m\angle N = \boxed{}$

$m\overline{MK} = \boxed{}$

11. Draw the following shapes.

Square	Rectangle
Length of each side = 3 cm	Length = 5 cm, Breadth = 3 cm

Geometry

1. Fill in the blanks.

   a. The standard unit for measuring an angle is $\boxed{\text{degrees}}$.

   b. An obtuse angle is greater than $\boxed{90°}$ and less than $\boxed{180°}$.

   c. A reflex angle is greater than $\boxed{180°}$ and less than $\boxed{360°}$.

   d. The measure of a straight angle is $\boxed{180°}$.

2. Complete the given statements.

   a.

   In $\angle AOB$ and $\angle BOC$

   O is the common $\boxed{}$.

   OB is the common $\boxed{}$.

   $\angle AOB$ and $\angle BOC$ are $\boxed{}$ angles.

   b.

   $m\angle AOB + m\angle BOC = \boxed{}$

   $m\angle AOB$ and $m\angle BOC$ are $\boxed{}$ angles.

   c.

   $m\angle AOB + m\angle BOC = 180°$

   $m\angle AOB$ and $m\angle BOC$ are $\boxed{}$ angles.

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3. Draw the given angles using a protractor.

    a.   50°

    b.   78°

    c.   123°

    d.   225°
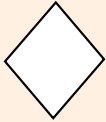
4. Match the triangles with their correct names and describe them.

	Triangle name	Description with respect to sides
	Scalene	Isosceles: opposite sides are equal
	Isosceles	Equilatreal: all three sides are equal
	Equilateral	Scalene: no two sides have the same length

5. Identify the triangles with respect to their angles.

a. 　　　　　　　b. 　　　　　　　c.

[　　　　　　]　[　　　　　　]　　[　　　　　　]

6. Write down the number of lines of symmetry and the order of rotational symmetry for the following shapes.

Square　　　　　　Rhombus　　　　　　Trapezium

[　][　]　　　　[　][　]　　　　[　][　]

Rectangle　　　　　Kite　　　　　　Parallelogram
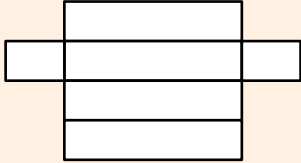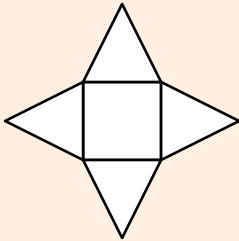
[　][　]　　　　[　][　]　　　　[　][　]

7. I am a quadrilateral, guess my name and draw me.

I have four right angles and all my sides are equal.	I have only one pair of parallel lines.
I have opposite sides equal and parallel. My opposite angles are equal but not 90º.	My two pairs of adjacent sides are equal. None of my angle is 90º.

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8. Write the number of faces and vertices of the given 3D shapes.

3D shapes	Cube	Pyramid	Cuboid	Cylinder
Number of faces	6	5	6	3
Number of vertices	8	5	8	0

9. Look at the following nets of 3D objects. Draw the 3D shapes and write their names.

Net of the shape	Name of the shape
	Cuboid
	Prism
	Cube

10. Construct the given triangles using a protractor and a ruler and find the unknown measurements.

a. ΔPQR, where
$m\overline{PQ} = 4.5$ cm
$m\angle P = 70°$
$m\angle Q = 35°$

$m\angle R = \boxed{}$

$m\overline{QR} = \boxed{}$

$m\overline{RP} = \boxed{}$

b. ΔKLM, where
$m\overline{KL} = 4.5$ cm
$m\overline{LM} = 4$ cm
$m\angle L = 53°$

$m\angle M = \boxed{}$

$m\angle N = \boxed{}$

$m\overline{MK} = \boxed{}$

11. Draw the following shapes.

Square	Rectangle
Length of each side = 3 cm	Length = 5 cm, Breadth = 3 cm

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(7) Measurement: Length, Mass, Capacity, and Time

Learning Framework

Pupils will learn to convert Km to m, m to cm, cm to mm and vice versa.

Pupils have already learnt in previous classes that

$$1 \text{ Km} = 1000 \text{ m}$$

To convert a given length in Km to m, multiply the number by 1000, like

5 km = 5 × 1000 m = 5000 m

To convert a given length in m to Km, divide the number by 1000, like

3000 m = $\dfrac{3000}{1000}$ Km = 3 Km

We know that

$$1 \text{ m} = 100 \text{ cm}$$

To convert a given length in m to cm, multiply the number by 100, like

5 m = 5 × 100 cm = 500 cm

To convert a given length in cm to m, divide the number by 100, like

300 cm = $\dfrac{300}{100}$ m = 3 m

We know that

$$1 \text{ cm} = 10 \text{ mm}$$

To convert a given length in cm to mm, multiply the number by 10, like

5 cm = 5 × 10 mm = 50 mm

To convert a given length in mm to cm, divide the number by 10, like

30 mm = $\dfrac{30}{10}$ cm = 3 cm

Classwork: Complete (Exercise 1 Q1).

Pupils will learn to add or subtract the given lengths with the same and different units and apply the same skill to solve the given real-life problems.

Pupils are already familiar with the addition and subtraction lengths with the same units. Use examples 1 and 2 given on page 52 to elaborate the process to add or subtract the lengths with different unit.

Classwork: Complete (Exercise 1 Q2 and 3).

Pupils will learn to convert minutes, hours, months, and years to their multiples and smaller units.

To convert a unit to its sub-unit, we just need to multiply by the relative number which relates to both units, as

> 1 hour = 60 minutes

9 hours = 9 × 60 minutes = 540 minutes

To convert a unit to its multiple units, we just need to multiply by the relative number which relates to both units, as

$$360 \text{ minutes} = \frac{360}{60} \text{ hours} = 6 \text{ hours}$$

> 1 minute = 60 seconds

To convert a unit to its multiple units, divide the given time by the relative number which relates to both units, as

4 minutes = 4 × 60 seconds = 240 seconds

To convert seconds to minutes, divide the given time by relative number which relates to both units, as

$$360 \text{ minutes} = \frac{360}{60} \text{ hours} = 6 \text{ hours}$$

> 1 year = 12 months

5 years = 5 × 12 months = 60 months

and

$$36 \text{ months} = \frac{36}{12} \text{ years} = 3 \text{ years}$$

> 1 month = 30 days

7 months = 7 × 30 days = 210 days

and

$$270 \text{ days} = \frac{270}{30} \text{ months} = 9 \text{ months}$$

> 1 week = 7 days

3 weeks = 3 × 7 days = 21 days

and

$$63 \text{ days} = \frac{63}{7} \text{ weeks} = 9 \text{ weeks}$$

Classwork: Work on examples on page 91. Use classroom board to write conversion questions and ask the students to solve them in their notebooks. Attempt (Exercise 5 Q3)

Pupils will learn to add and subtract the time mentioned with different units and use it to solve real-life related problems.

To add time mentioned with different units, we must ensure to simplify same units first and then convert smaller unit to bigger one and finally simplify them.

$$
\begin{array}{r}
5 \text{ hours } 33 \text{ minutes} \\
+ \ 2 \text{ hours } 45 \text{ minutes} \\
\hline
7 \text{ hours } 78 \text{ minutes}
\end{array}
$$

This is the result of the addition, normally we do not write 78 minutes as it is more than an hour, we will change to hour as

$$78 \text{ minutes} = 1 \text{ hours } 18 \text{ minutes } (1 \text{ hour} = 60 \text{ minutes})$$

Now, we will write 7 hours and 78 minutes as

$$
\begin{array}{r}
7 \text{ hours } \quad 78 \text{ minutes} \\
= 7 \text{ hours} + 1 \text{ hour} + 18 \text{ minutes} \\
\hline
= 8 \text{ hours } 18 \text{ minutes}
\end{array}
$$

To subtract the time mentioned with different units, we must ensure to simplify the same units first. If we need to subtract a bigger number from the smaller, we will borrow 1 from the bigger unit and then convert it smaller unit, as

$$
\begin{array}{r}
5 \text{ hours } 36 \text{ minutes} \\
- \ 2 \text{ hours } 45 \text{ minutes} \\
\hline
\end{array}
$$

45 minutes cannot be subtracted from 36 minutes, so we will borrow 1 hour from 5 hours and will add them to 33 minutes, a

$$
\begin{array}{r}
5 \text{ hours } 36 \text{ minutes} \\
- \ 4 \text{ hours} + 1 \text{ hour} + 36 \text{ minutes} \\
\hline
\end{array}
$$

As we know that 1 hour = 60 minutes so,

$$= 4 \text{ hours } \underline{60 \text{ minutes} + 36 \text{ minutes}}$$
$$= 2 \text{ hours } 96 \text{ minutes}$$

Now re-write the question and subtract time mentioned with the same unit, as

$$
\begin{array}{r}
4 \text{ hours } 96 \text{ minutes} \\
- \ 2 \text{ hours } 45 \text{ minutes} \\
\hline
2 \text{ hours } 51 \text{ minutes}
\end{array}
$$

Use examples (14, 15, 16, 17) given on pages 89 and 90 to further practice of the addition and subtraction of time.

Classwork: Attempt (Exercise 5 Q1, 2).

Solve real-life situations involving addition and subtraction of intervals of time.

Discuss daily life situations of intervals of time with them, like travelling schedules, school bell times, timetables, duration of an event, television programs etc.

Ask them to do Exercise 6 Q1 (a – g)

Lesson Plan

Objectives:

Recognise and use the standard units of length (Kilometre, metre, cenimetre, and millimetre including abbreviations) to measure and record the length of different objects.

Add and subtract length, given in the same units (without carrying and borrowing) to solve real-world word problems.

Concept Connector

Students have learnt and recognised different standard units of mass, length, and capacity in previous classes. While discussing *Math in Action on Page79,* encourage students to share more real-life examples of lengths.

Exploring the Objective

Using the explanation on *Page 79* of the textbook, describe what length is. Introduce the students to the various units used to measure length such as kilometres, metres, centimetres, and millimetres. Using the measurement table given in *Concept Connector on Page 79*, reinforce the concept of units' conversions. Explain the addition and subtract of units of length by discussing the *examples given on page 81*.

Activity

Comparing Lengths of Objects

What You Need:

A collection of everyday/classroom objects with varying lengths (e.g., pencil, eraser, paper clip, tabletop, book, board eraser, classroom wall, cupboard, etc.)

Length categories cards or labels (< 1 km, <1m, 1-3 m, < 1 cm, 1-10 cm, 50 – 80 cm etc.)

A length measuring tape

How to Play:

Review the concept of length and its units. Explain that students will be sorting objects into different length categories.

Gather the objects and display them on a table. Ensure that the objects have varying lengths.

Prepare the length category cards or labels. To make the activity creative ask students to design their own labels (< 1m, 1-10 cm...)

Divide the students into small groups of 3-4. Give each group a set of objects and length category

cards. Instruct them to sort the objects into the corresponding length categories.

To reinforce subtraction and addition of length, ask students to estimate the length of each object and then calculate the total length by combining the individual lengths.

Encourage students to use the measuring tape and scales to verify their answers.

At the end circulate around the groups and ask questions like:

How did you decide which category to put this object in?

How does the measuring tape or scale help you determine the length of an object?

Exercise

Before proceeding with the exercise, discuss and solve above given activity. Have students complete the exercise on **Page 82-83** as an in-class assignment to prepare them for the upcoming activity. The **QR activity worksheet** activity on **Page 80** can help students practice conversion, and addition and subtraction of units of length. To reinforce the learnings, have the students complete parts a ,c, and d of Questions 1 to 4 *Exercise 1* on **Page 85** as medium-hard level as classwork. Assign Question 6a, d, e, and f as classwork. Moreover, assist the students to complete the word problems. Have students complete remaining questions as individual homework.

Extension Activity

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

If you have three objects with masses of 25 m, 50 m, and 100 m, what is their total mass? Show your calculation.

Which of the following is equivalent to 1 kilometre?

100 metres

1000 metres

10,000 metres

100,000 metres

Activity Sheet
Angles and Triangles

Learning Objective:

- Classify triangles as acute, right or obtuse.
- Identify and describe triangles based on their angles. (Acute-angled triangle, Obtuse-angled triangle and right-angled triangles).
- Use protractor and ruler to construct a triangle when
  - two angles and their included side are given.
  - two sides and included angle are given.

Let's Talk Math:

- Ask students to bring pictures of different items or objects (easily available at home) on which they can identify and make angles.

Make Sure You Have:

- A4 Sheets

Activity: Angle and Triangle Challenge

Duration: 1 Lesson Whole Class Activity

Let's Try It:

- Pupils bring pictures of household items (e.g. clock, fork, table) with identifiable angles.
- They mark and identify the type of angles (right, acute, obtuse) in the pictures.
- Pupils present and share their findings with the class.
- Display their work in the classroom.

Triangle Challenge (In-Class Activity):

- Explain the properties of different triangles before the activity.
- Pupils work in pairs, each drawing triangles of various sizes and angles on an A4 sheet.
- Partners swap sheets and classify the triangles by sides (scalene, isosceles, equilateral) and angles (right, acute, obtuse).
- Pupils name and justify the classification of each triangle.

Assessment:

- Distribute a half sheet of A4 paper to each pupil. Ask them to write their name in capital letters using straight lines. Ask them to mark angles (as many as possible) on each alphabet of their name. Then name each angle according to its size.

Quadrilaterals and Symmetry

Learning Objective:

- Recognise the kinds of quadrilateral (square, rectangle, parallelogram, rhombus, trapezium, and kite).
- Identify and describe properties of quadrilaterals including square, rectangle, parallelogram, rhombus, trapezium, and kite, and classify those using parallel sides, equal sides and equal angles.
- Recognise different types of symmetry (reflective and rotational) in 2D figures.
- Find point of rotation and order of rotational symmetry of given 2D figures.

Let's Talk Math:

- Ask pupils if they see any similarities, or differences.
- Try to prompt them to be aware of the lines.
- Which ones are curved, and which ones are straight, even if the circle is the only shape on the board that does have a curved line.

Make Sure You Have:

- A4 sheet
- Chart Papers

Activity: Shape Sleuths

Duration: 1 Lesson   Group Activity

Let's Try It:

- Quadrilateral Classification (In-Class Activity):
  Pupils work in pairs and draw various quadrilaterals on A4 sheets.
  Partners swap sheets and classify the quadrilaterals based on their properties (sides, angles, symmetry).
  Pupils name each quadrilateral and provide reasons for the classification.
- Rotational Symmetry Exploration (Hands-On Activity):
  Pupils work in pairs and receive 3-4 cut-outs, tracing paper, and an activity sheet.
  They trace the shapes, place them on the cut-outs, and rotate them to find the order of rotational symmetry.
  Encourage pupils to discuss and share their findings with the class.

Assessment:

- Ask pupils to write the properties of the shapes on the cut-outs with respect to the sides and angles and hand it over to the teacher.

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Measurement: Length, Mass, Capacity, and Time

1. Complete the conversion table.

15 m = [   ] cm

3 m 35 cm = [   ] cm

1720 g = [   ] kg [   ] g

15 hr = [   ] min

15 years = [   ] month

5 weeks = [   ] days

192 cm = [   ] m [   ] cm

450 cm = [   ] m [   ] cm

5325 ml = [   ] l [   ] ml

180 min = [   ] hr

6 months = [   ] years

5 months = [   ] days

2. Solve the following real-life problems.

Problems	Working
a. Ahad lives 4 km 500 m away from Moosa's house in the east. Raheel lives 3 km 220 m away from Moosa's house in the west. What is the distance between Ahad's and Raheel's houses?	
Answer: [km m]	
b. The height of a bookshelf is 3 m. Express its height in millimetres?	
Answer: [ ] mm	
c. The famous peaks K2 and Nanga Parbat are in Gilgit-Baltistan, Pakistan. Their heights are 8611 m and 8126 m, respectively. Write their heights in kilometres and metres.	
Answer: [km m]	

Problems	Working
d. A bus travelled 105 km 335 m, then it travelled 35 km 970 m backwards. How far is the bus from its starting point?	

Answer: [km   m]

| e. Ahsan worked for 8 houra 20 minutea in a factory and 4 hours 45 minutes in a bookshop. How long did he work in total? | |

Answer: [hr   min]

| f. Ayan was 3 years 5 month old when he joined the school. Now he is 12 years old. For how many months has he been going to school? | |

Answer: [   ] months

| g. Bilal participated in a writing competition. He took 1200 seconds to complete the task. How many minutes did he take? | |

Answer: [   ] min

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Measurement: Length, Mass, Capacity, and Time

1. Complete the conversion table.

15 m = [1500] cm

3 m 35 cm = [335] cm

1720 g = [1] kg [720] g

15 hr = [900] min

15 years = [180] month

5 weeks = [35] days

192 cm = [1] m [92] cm

450 cm = [4] m [50] cm

5325 ml = [5] l [325] ml

180 min = [3] hr

6 months = [0.5] years

5 months = [152] days

2. Solve the following real-life problems.

Problems	Working
a. Ahad lives 4 km 500 m away from Moosa's house in the east. Raheel lives 3 km 220 m away from Moosa's house in the west. What is the distance between Ahad's and Raheel's houses?	4 km 500 m 3 km 220 m 7 km 720 m
Answer: [7 km 720 m]	
b. The height of a bookshelf is 3 m. Express its height in millimetres?	3 × 1000 = 3000
Answer: [300] mm	
c. The famous peaks K2 and Nanga Parbat are in Gilgit-Baltistan, Pakistan. Their heights are 8611 m and 8126 m, respectively. Write their heights in kilometres and metres.	K2 = 8 km 611 m Nauga Paebat = 8 km 126 m
Answer: [8 km 126 m]	

Problems	Working
d. A bus travelled 105 km 335 m, then it travelled 35 km 970 m backwards. How far is the bus from its starting point?	105 km 335 m − 35 km 970 m 69 km 365 m

Answer: [km   m]

| e. Ahsan worked for 8 houra 20 minutea in a factory and 4 hours 45 minutes in a bookshop. How long did he work in total? | 8 hr 20 min
+4 hr 45 min
13 hr 5 min |

Answer: [hr   min]

| f. Ayan was 3 years 5 month old when he joined the school. Now he is 12 years old. For how many months has he been going to school? | 12 years
− 3 years 5 months
8 years 5 months
8 × 12 + 7 = 103 |

Answer: [103] months

| g. Bilal participated in a writing competition. He took 1200 seconds to complete the task. How many minutes did he take? | $\dfrac{1200}{60}$ = 20 min |

Answer: [20] min

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Unit

8 Measurement: Perimeter and Area

Pupils will learn to find the perimeter of a shape. They will apply the skill of finding perimeter to real-life situations.

Share the information given on pages 96 and 97 to elaborate the method to calculate the perimeter of a rectangle and a square.

Pupils will learn to find the area of a rectangle, a square, parallelogram and triangle and will apply the skill of calculating area to real-life situations.

Share the information given on pages 88 and 89 to elaborate the method to calculate the area of a rectangle and a square.

Classwork: Complete Exercise on page 100.

Lesson Plan

Objective:

Find and apply formulas to find perimeter and area of a square and rectangular region.

Differentiate between perimeter and area of a square and rectangular region.

Calculate area and perimeter of square and rectangular regions.

Concept Connector

Recall that the perimeter of a 2D shape is the total length of its boundary, calculated by adding the lengths of all its sides. To reinforce this concept, revisit addition and apply it to finding perimeters. Area is closely related to length and width, as it's calculated by multiplying these two dimensions. It's also a characteristic of a shape that describes the amount of space inside it. Additionally, make students remember that when calculating perimeter and area, we use the same units of measurement for length that we learned earlier, such as centimeters (cm), meters (m), and kilometers (km).

Exploring the Objective

Using the explanation, example, and the *Concept Connector* on *Page 96* introduce the students to the calculation of perimeter and area of 2D shapes through multiplication and addition. To reinforce the concept, use the QR sheet on *Page 97* to develop an understanding of the difference between area and perimeter. Furthermore, use *Math in Action on Page 97* to relate area and perimeter to the real- life examples to facilitate higher-order thinking. As a preliminary exercise before attempting the activity go through the example on *Page 99 and 100* with the students to better equip them on how to handle real life application of the mathematical concept.

Activity

Perimeter and Area Puzzle

What You Need:

Blank paper

Coloured pencils

Worksheet

How to Play:

Distribute the blank papers and worksheets to the class

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The worksheet should contain a layout of a space (i.e. living room) that is divided into squares and rectangles.

Each shape should have corresponding values to make the calculation of their area and perimeter possible.

Using the blank paper ask students to work out the calculation and record the total area and perimeter of the space .

Encourage students to use various units of measurement (e.g., cm, m, km) to calculate the perimeter and area.

Have students compare their answers with a partner or in a small group.

Excericise

Encourage students to attempt the exercise on *Page 100 and 101* as well as *Math Lab Book 5* reference **Page 62** with guidance as individual class work. Furthermore, assign students *Math Lab book 5* reference **Page 63**, *Maths Quest* on **Page 100**, and *Beyond the Horizon* on **Page 102** of the textbook as individual assigned homework to further develop their understanding.

Extension Activity

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

A table has a length of 3 m, a width of 5.5 m, and a height of 2 m. Find its perimeter and area.

The perimeter of a rectangle is 230 cm. If the length of the rectangle is 70 cm, find its breadth and area.

A room has a length of 8 m and a width of 6 m. What is its area?

Activity Sheet
Perimeter and Area

Learning Objective:
- Find and apply formulas to find perimeter and area of a square and rectangular region.
- Solve real-life situations involving perimeter and area of square and rectangular regions.

Let's Talk Math:
- Discuss with pupils how geometry helps in daily life.

Make Sure You Have:
- A4 Sheets
- Tracing paper
- Paper Plates

Activity: Shape Shifter

Duration: 1 Lesson   Group Activity

Let's Try It:
- Explain properties of quadrilaterals (e.g., square, rectangle, rhombus, parallelogram).
- Pupils work in pairs to draw quadrilaterals on A4 sheets.
- Provide pupils with cut-outs of geometrical shapes, tracing paper, and paper plates.
- Pupils trace, rotate the shapes, and determine the order of rotational symmetry.
- Pupils design a dream house on chart paper using only squares and rectangles.
- Encourage realistic measurements and unit considerations.
- Solve some designs on the board, focusing on area and perimeter.
- Collect rules and ideas about area and perimeter from the pupils and note them on the board for everyone to copy.

Assessment:
- Ask pupils to form groups of up to 5. Each group may choose a room in the school, and using what they have learnt in this unit, they must collect data, like the dimensions of the room, and use it to calculate the area and perimeter.

Perimeter and Area

7 cm
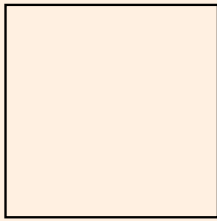
9 cm

12 cm

Perimeter =_____

Area = _____

Perimeter =_____

Area = _____

Perimeter =_____

Area = _____

Perimeter =_____

Area = _____

Perimeter =_____

Area = _____

Perimeter =_____

Area = _____

Let students work in pairs. Tell them to draw squares and rectangles of any measurements and exchange the sheet with their partner to solve.

Three dimensional objects

Note: Shapes not to scale.

Name: _____

Date : _____

Architect for a Day

CLASSROOM			
WIDTH	LENGTH	AREA	PERIMETER

BEDROOM			
WIDTH	LENGTH	AREA	PERIMETER
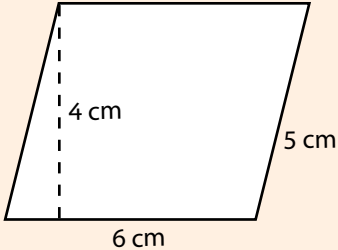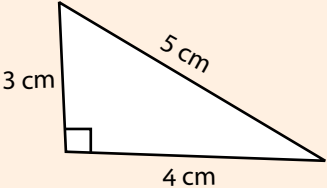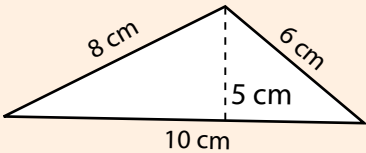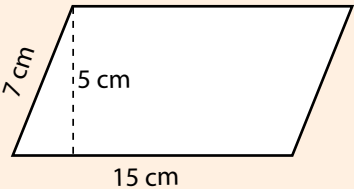
WIDTH	LENGTH	AREA	PERIMETER

Measure the dimensions of your classroom to fill the table. Then do the same at home with your bedroom and a room of your choice.	*Perimeter and area*

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Measurement: Perimeter and Area

1. Find the area and perimeter of the following. Write the correct unit with the answer.

	Perimeter	Area
a. 4 cm · 5 cm · 6 cm		
b. 3 cm · 5 cm · 4 cm		
c. 8 cm · 6 cm · 5 cm · 10 cm		
d. 7 cm · 5 cm · 15 cm		
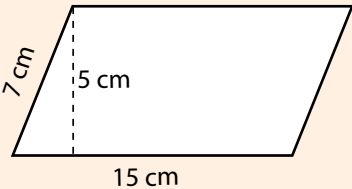
2. Solve the following real-life problems.

Problems	Working
a. Find the area of a square window with side length 43 cm.	
Answer: Rs [____] cm²	
b. Find the perimeter of a chocolate bar with length 8 cm and breadth 4 cm.	
Answer: [____] cm	
c. Find the area of the playground with length 60 m and breadth 27 m.	
Answer: [____] m²	
d. The length of a rectangular wooden board is thrice its width. If the width of the board is 120 cm, find the cost of framing it at the rate of Rs 20 per cm.	
Answer: Rs [____]	

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Measurement: Perimeter and Area

1. Find the area and perimeter of the following. Write the correct unit with the answer.

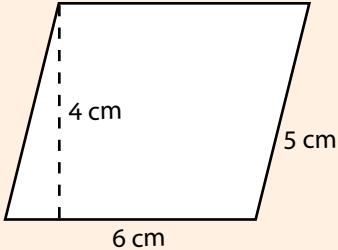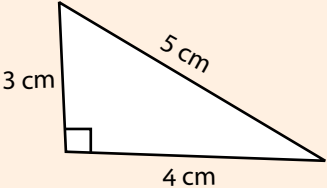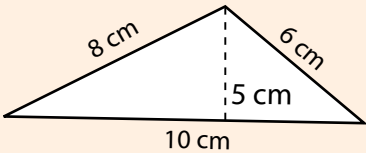|	Perimeter	Area
a. 4 cm, 5 cm, 6 cm	$2(6 + 5)$ $= 2 (11)$ $= 22$ cm	6×4 $= 24$ cm^2
b. 3 cm, 5 cm, 4 cm	$4 + 3 + 5$ $= 12$ cm	$\frac{1}{2} 4 \times 3$ $= 6$ cm^2
c. 8 cm, 6 cm, 5 cm, 10 cm	$10 + 8 + 6$ $= 24$ cm	$\frac{1}{2} 10 \times 5$ $= 25$ cm^2
d. 7 cm, 5 cm, 15 cm	$2(16 + 7)$ $2(22)$ $= 44$ cm	15×15 $= 75$ cm^2

2. Solve the following real-life problems.

Problems	Working
a. Find the area of a square window with side length 43 cm.	43×43 $= 1849 \ cm^2$
Answer: Rs [1849] cm²	
b. Find the perimeter of a chocolate bar with length 8 cm and breadth 4 cm.	$2(8 + 4)$ $= 2(12)$
Answer: [27] cm	
c. Find the area of the playground with length 60 m and breadth 27 m.	60×27 $= 1620$
Answer: [8] m²	
d. The length of a rectangular wooden board is thrice its width. If the width of the board is 120 cm, find the cost of framing it at the rate of Rs 20 per cm.	
Answer: Rs [ ]	

Unit

(9) Data Handling
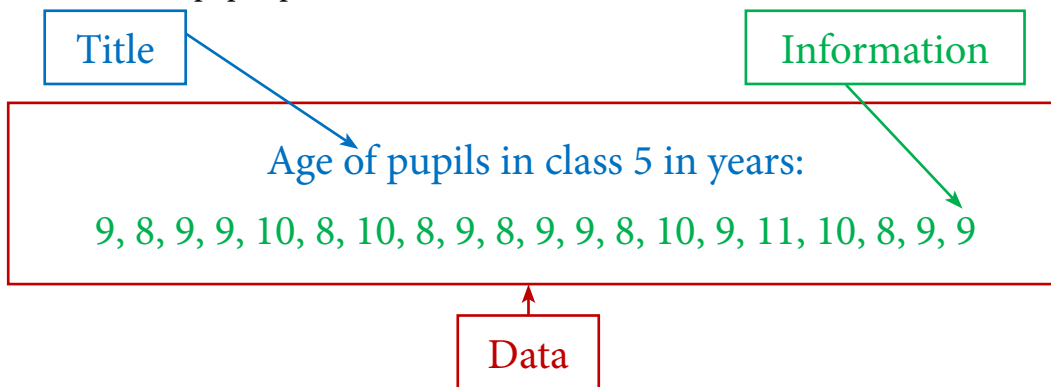
Learning Framework

Pupils will learn to calculate the average (mean) of the given data and apply the same skill on real-life problems.

Pupils have learnt the topic 'Data Handling' in previous class as well, but the word 'data' has not been elaborated so far.

Datum (singular): one bit of information

Data (plural): a set of information

Ask every pupil in your class to tell his/her age in years. Jot down all the numbers on the board as (Assumed there are 20 pupils present in the class)

Title → Information →

Age of pupils in class 5 in years:

9, 8, 9, 9, 10, 8, 10, 8, 9, 8, 9, 9, 8, 10, 9, 11, 10, 8, 9, 9

↑ Data

Data is composed of information as well as a title to it.

Now ask your pupils, what is that single number of years which could be considered the age of every pupil in the class? Without refusing any answer, just ask; how did you get it? Answers could be

- o   8 years as it is the smallest.
- o   9 years as it repeated the most.
- o   11 years as it is the highest.

The representative value of a data which could stand for every entry in the data is called the Average of the data.

$$\text{Average} = \frac{\text{Sum of all entries in the data}}{\text{Number of entries in the data}}$$

$$\text{Average age of class 5} = \frac{\text{Sum of all ages in the class}}{\text{Number of pupils in the class}}$$

$$\text{Average age of class 5} = \frac{9 + 8 + 9 + 9 + 10 + 8 + 10 + 8 + 9 + 9 + 9 + 9 + 8 + 10 + \dots}{20}$$

$$\text{Average age of class 5} = \frac{180}{20} = 9 \text{ years}$$

Elaborate on your pupils the explanations given on page 104, 105.

Classwork: Complete (Exercise1 Q1, Q2)

Pupils will learn to the given bar graphs and answer the questions following them and draw bar graphs based on the given information.

Tell the students that in a bar graph, rectangular bars are used to represent data, with the length of each bar corresponding to the data's quantity. Each bar signifies a different category.

Have the students conduct a survey in their class. Tell them to ask their classmates about their favourite ice cream flavour. Ask them to complete the given table and show the result using a bar graph.
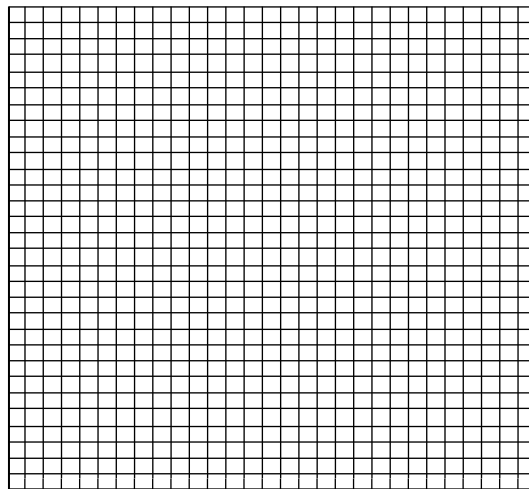
Elaborate the examples 1 given on pages 107 to your pupils.

Classwork: Attempt (Exercise 2 Q1 and 2).

Organise the given data using a line graph.

Tell them that a line graph plots data points on a graph and connects them with a line to illustrate trends or changes over time.

Use page 108 for explanation and elaborate on examples 5 and 6.

Classwork: Attempt some questions to have practice. (Exercise 2 Q 3, 4 and 5)

Read and interpret Pie charts

Explain to the students that a pie chart is a circular diagram split into segments to show numerical proportions.

Tell them that pie charts include the following key points.

Each segment of the pie corresponds to a data category, with the segment size reflecting the quantity it represents.

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Pie charts are ideal for illustrating parts of a whole, especially useful for displaying percentages or proportional data.

They offer a quick visual comparison between categories, making it easy to identify the largest or smallest segments.

Elaborate on the topic with the following activity

Instruct them to shade the figure to create their own pie chart.

Insert Pie chart worksheet from MLAHB 4 page 58. (upper half)

Classwork: Attempt some questions to have practice. (Exercise 2 Q 6 and 7)

Pupils will understand and explain experiments and outcomes and represent the probability that an event will occur in probability experiments.

Clearly state about the experiment. For example, flipping a coin, rolling a die, or drawing a card from a deck.

List all possible outcomes of the experiment. For a coin flip, the outcomes are heads or tails.

Carry out the experiment multiple times to gather data. For instance, flip a coin 50 times and record the results.

Keep a detailed record of each outcome. This can be done using a tally chart or a table.

Tally the number of times each outcome occurs. For example, count how many times heads and tails appear in your coin flips.

Determine the frequency of each outcome. This is the number of times an outcome occurs divided by the total number of trials.

Probability is calculated as the number of favorable outcomes divided by the total number of possible outcomes.

P(Event)=Number of favorable outcomes/Total number of possible outcomes.

The probability of getting heads in a coin flip is 1/2 or 0.5.

Lesson Plan

Objective:

Read and interpret line graphs

Organise data using line graphs

Concept Connector

Recall how the bar graphs are used to represent information. Discuss real-life applications of various graphs including line graphs. Line graphs can track changes over time and can be used to compare changes over the same period of time for different groups.

Exploring the Objective

Using *Concept connector given on Page 107* to reinforce the concept of bar graphs. Show the line graph for the same values and compare both the graphs to highlight the differences. Using the table of values given on *Page 108*, explain the steps to make a line graph for the given information. Go through the examples to explain how to interpret line graphs and how to represent the information using line graphs. Encourage students to provide feedback and take part while solving these examples on board.

Activity

Line Graph

What You Need:

Stopwatch

Graph paper

Pencils or markers

How to Play:

Have students find their pulse and practice counting heartbeats for 15 seconds. Explain that they will multiply this number by 4 to estimate their heart rate per minute.

Ask them to record their resting heart rate on a table.

Choose a physical activity, such as jumping, skipping, running in place, or doing push-ups. Have students perform the activity for 30 seconds. Immediately after the activity, have them measure their heart rate again and record it on the table.

Make them repeat the same and record the heartbeat

Provide students with graph paper and guide them in setting up the graph:

X-axis: Label it "Time" with intervals

Y-axis: Label it "Heart Rate (bpm)" with appropriate intervals.

Plot the three data points on the graph.

Connect the points with a line.

Ask students to discuss their graphs in pairs.

Excericise

Assign Exercise questions to reinforce the concept and practice drawing of graphs. Question 2 of Exercise can also be given to draw the line graph to analyse the difference between bar graphs and line graphs. *Beyond the Horizon* on **Page 116** of the textbook as individual assigned question. Take feedback from the class and discuss the answer.

Extension Activity

Provide line graphs that show the sales of two competing brands of ice cream over a year.

Have students compare the sales trends of the two brands.

During which months did one brand significantly outperform the other?

What factors might have influenced these differences in sales?

Name: _____

Date : _____

Classroom Data

A. Number of people with glasses _____

B. Number of people with braces _____

C. Number of people with siblings _____

D. Number of people who like cricket _____

E. Number of people with long hair _____

F. Number of people with pets _____

Classroom Data (vertical axis)

F

E

D

C

B

A

0   3   6   9   12   15   18   21   24   27   30

Number of People →
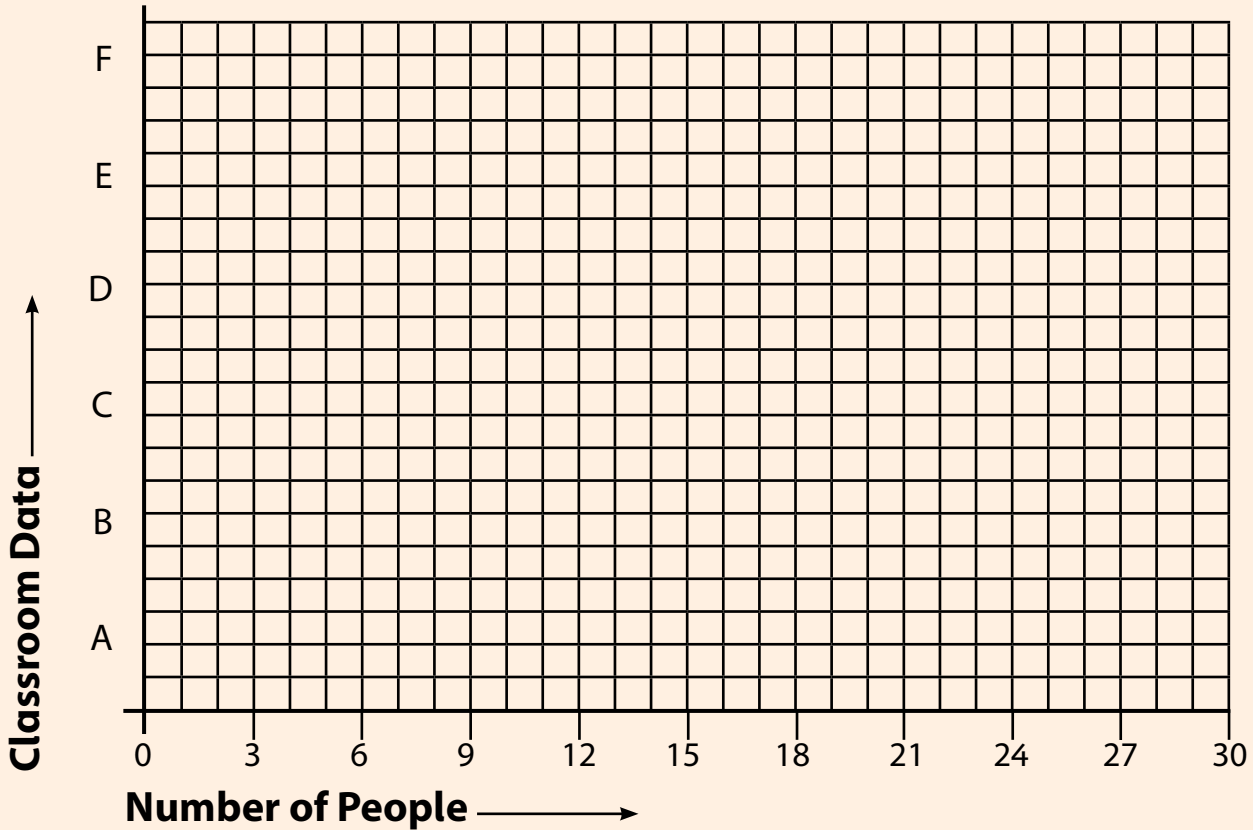
Go around the classroom and collect this information from everyone including the teacher. Then present the data on a horizontal **bar graph** in the space provided above.	*Bar graphs*

Favourite Ice Cream

Ice cream flavours	Chocolate	Vanilla	Strawberry	Mango
Number of students				

Ice Cream Flavours
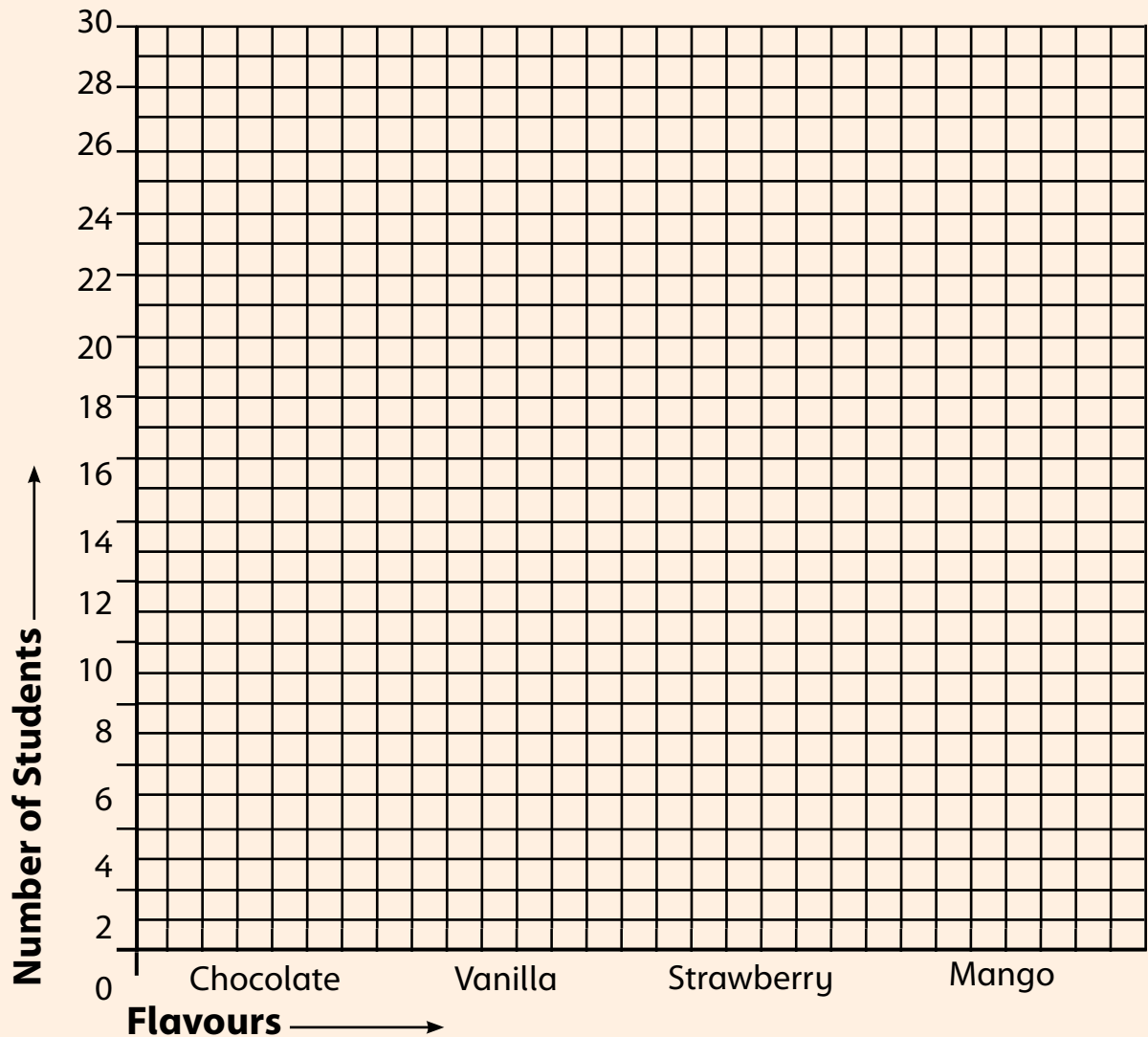
Number of Students

30
28
26
24
22
20
18
16
14
12
10
8
6
4
2
0

Chocolate   Vanilla   Strawberry   Mango

Flavours ⟶

Have the students conduct a survey in their class. Tell them to ask their classmates about their favourite ice cream flavour. Ask them to complete the given table and show the result using a bar graph.

Bar graphs

Data Handling and Probability

1. Find the average of the following.

Numbers	Average
a. 25, 35, 44, 52, and 38	
b. First 5 even numbers	

2. Solve the following real-life problem.

Problems	Working
a. The goals scored by a team in 6 matches are 1, 2, 5, 3, 4, 0. Find the average score of the team.	
Answer:	
b. Saif scored 75, 65, 55, 60, and 70 runs in 5 matches. What was the average score per match?	
Answer:	
c. The average height of a family of five members is 147 cm. If the height of 4 family members is 152 cm, 150 cm, 148 cm, and 156 cm, find the height of the fifth member.	
Answer:	

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3. The table given below shows the data of animals in a zoo. Draw a bar graph to represent this data.

Animal	Zebra	Lion	Deer	Leopard
Number	17	4	20	8

4. Bano made a graph to represent the number of customers visiting her shop during the day.

Use the graph to answer the questions.

a. What was the busiest hour?

b. How many customers were in the shop at 9:00 a.m.?

c. Estimate the number of customers in the shop at 12:30 p.m.

d. How many more people were in the shop at 4:00 p.m. compared to 5:00 p.m.?

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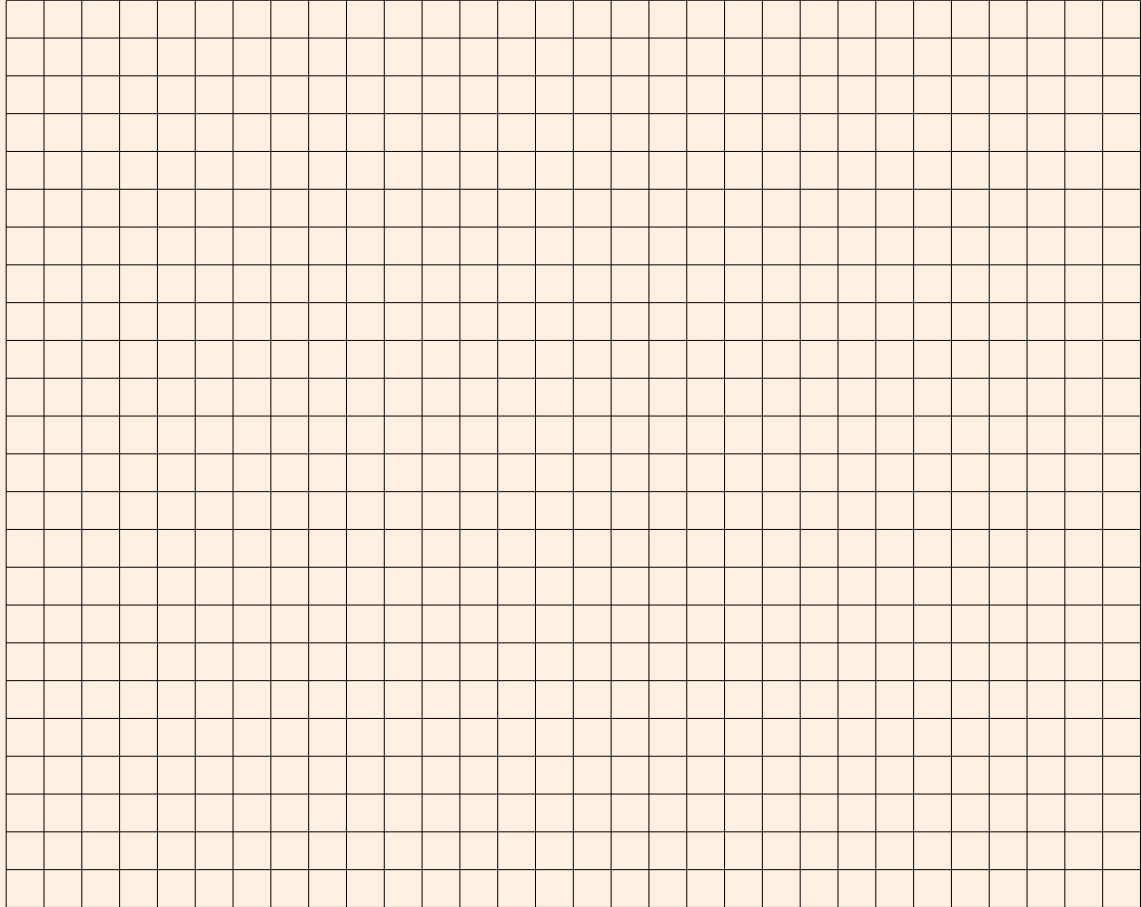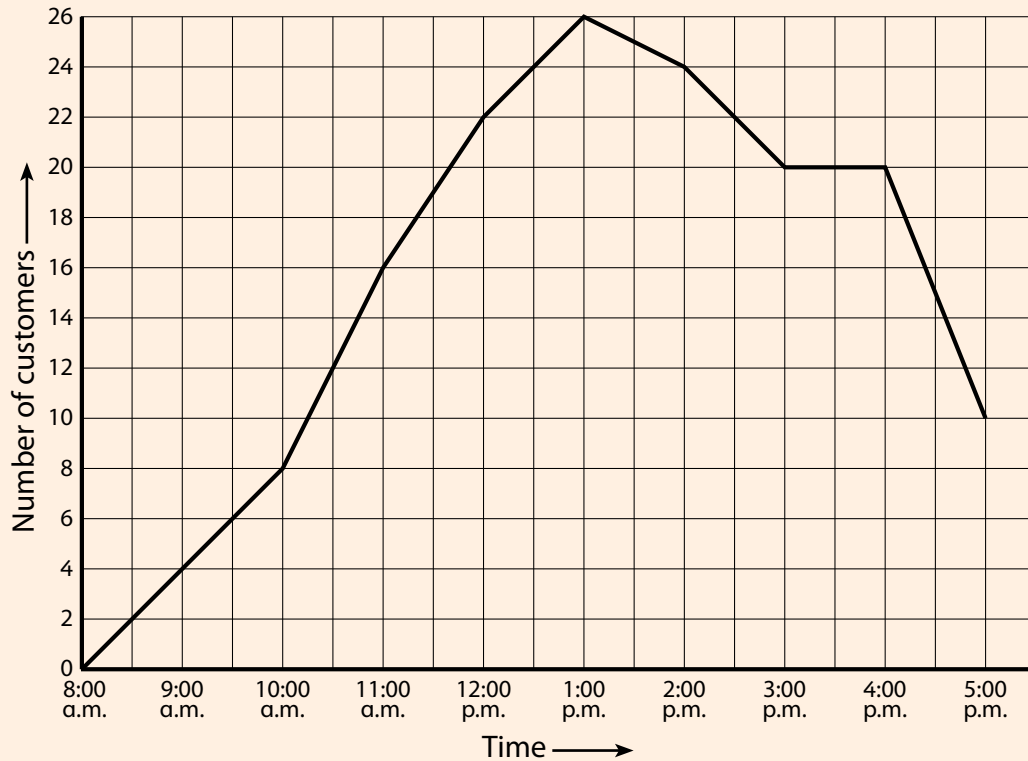| Problems	Working
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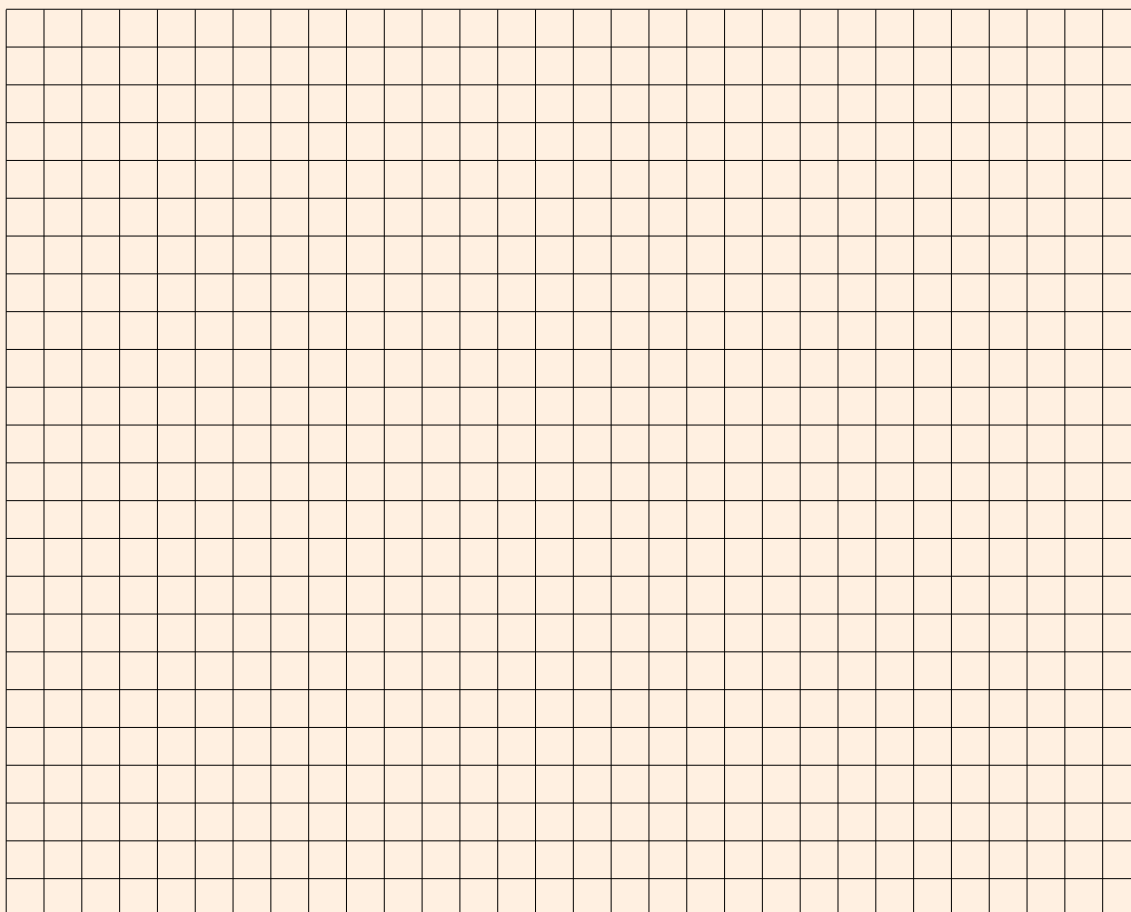
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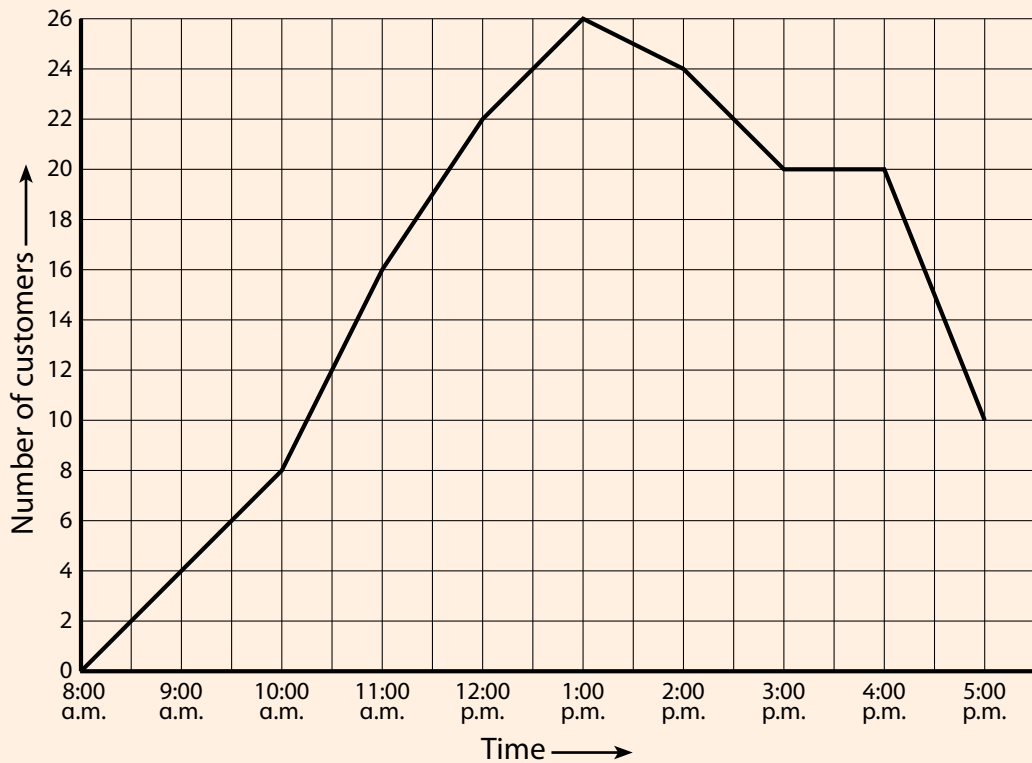
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Unlocking the Power of Math: The Essential Glossary

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

acute angle: an angle with measure less than 90 degrees.

acute triangle: a triangle with all angles measuring less than 90 degrees.

addition: a mathematical operation that combines two or more numbers to calculate a sum.

adjacent angle: two angles with a common arm

angle: a geometric figure formed by joining two rays that share a common endpoint (vertex).

area: the amount of space a shape or region covers.

bar graph: a representatn of data by using bars of equal width on a grid.

centimetre: unit of measurement of length.

complementary angles: two angles whose sum is 90 degrees.

composite number: a number with more than 2 factors.

cube: a 3D shape with 6 faces that are squares of same side lengths.

cubic centimetre: unit of measurement of capacity.

data: information collected from a survey.

decimal number: a way to express a fraction.

decimal point: a point that separates the whole number part and the fraction part in a decimal number.

denominator: the denominator is the number of equal parts into which the whole has been divided.

difference: the result of a subtraction.

dividend: the value to be divided in a division problem

divisibility: the ability to divide one whole number by another whole number without a remainder.

divisor: the number by which another number is divided.

equally like: two or more events, each of which is as likely to happen as the other.

equilateral triangle: a triangle with three equal sides.

estimate: an approximate reasonable value that is close to the exact value.

formula: a general mathematical equation that relates two or more terms or values.

gram: unit of measurement of mass

impossible event: an event that can never happen.

isosceles triangle: a triangle that has two equal sides.

kilogram: unit of measurement of mass.

kilometre: unit of measurement of length/distance.

kite: a quadrilateral with paris of equal adjacent sides.

line graph: a representation of data using line segments.

line of symmetry: a line that divides a shape into two equal parts that are mirror images of each other.

litre: unit of measurement of capacity.

metre: unit of measurement of length.

millilitre: unit of measurement of capacity.

millimetre: unit of measurement of length.

minute: a unit of time.

mixed number: a number represented by a whole number next to a fraction number and the fraction.

multiplication: the operation of repeated addition.

net: an arrangement that shows all the faces of an object, joined in one piece.

numerator: the number of equal parts of a total number of parts in a fraction. It is found above the fration bar.

obtuse angle: an angle whose measure is greater than 90 degrees.

order of operations: the sequence in which specific rules of mathematics are performed.

parallelogram: a quadrilateral in which both pairs of opposite sides are parallel.

percent: represents a fraction as parts out of hundred and uses symbol %.

perimeter: the sum of all the sides of a polygon.

place value: the value of a numeral based on the position of each digit in the number.

polygon: a closed 2D shape with three or more sides.

Glossary

prime number: a number that has exactly two different factors, one and itself.

prism: a 3D shape with identical bases.

probability: the measure of the likelihood of the occurrence of an event.

product: the result of a multiplication.

proper fraction: a fraction whose numerator is smaller than its denominator.

pyramid: a 3D shape with one base and all faces join at a vertex.

quadrilateral: a polygon with four sides.

rectangle: a quadrilateral with two pairs of equal parallel sides and four right angles.

rhombus: a quadrilateral with all equal sides, two pairs of sides are parallel.

right angle: an angle that is equal to 90 degrees.

right triangle: a triangle with a right angle.

round off: to approximate the value of a number to a specified place value.

scalene triangle: a triangle with no equal sides.

square: a quadrilateral with all equal sides and four right angles.

square unit: unit of area.

straight angle: an angle that is equal to 180 degrees.

subtraction: a mathematical operation that calculates the difference between numbers.

sum: the result of addition.

supplementary angles: two angles whose sum is 180 degrees.

triangle: a polygon with three sides.

vertex: a point where two or more sides of a shape meet.

vertices: plural form of vertex.