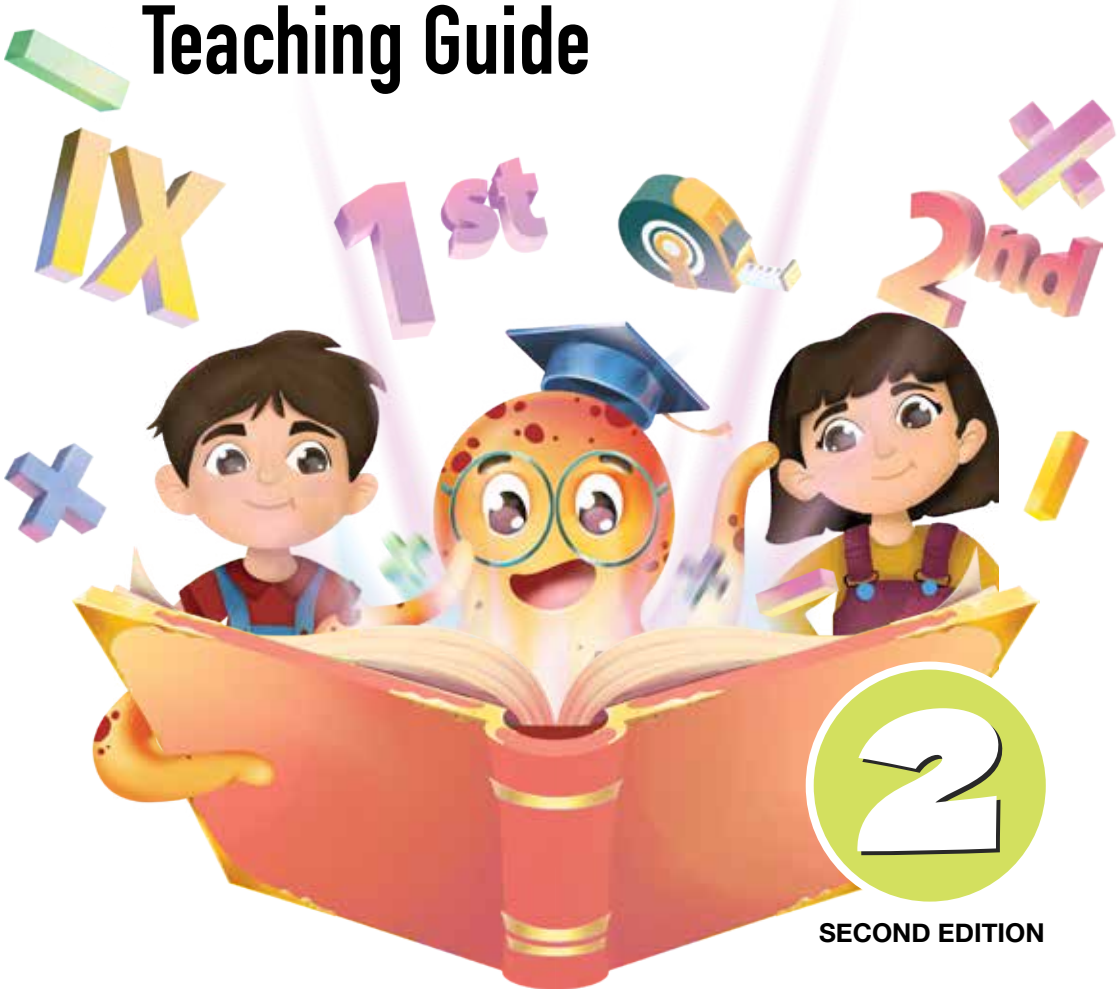
MATHS WISE

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.

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

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

Real-World Applications

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

Ongoing Assessment and Feedback

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

Teacher Reflection and Professional Development

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

Embracing Diversity and Inclusion

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

Fostering a Growth Mindset

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

Key Takeaways

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

Creating a Sustainable Learning Environment

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

Review and Assess Exercises

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

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

Table of Content

Unit 1 WHOLE NUMBERS

Learning Framework

Unit 1 Whole Numbers

Learn to identify, list, and write ordinal numbers.

Pupils have already learnt the ordinal numbers from 1–10 in class 1. The key to learning is the spellings of ordinal numbers. Show clearly the spellings of all ordinal numbers from 1–20 on board.

Classwork: Complete Exercise 1.

Identify the place value of a digit in the given number. Write the names of the numbers up to three digits using place values. Counting forward and backward in ones, tens, and hundreds.

The pupils are already familiar with counting from 1–100. A little recap of reading and writing the names of two digits numbers will provide a stimulus to start three digits numbers.

Pupils have used ice cream sticks to count with place value of 'tens' and 'ones.' Now use the base – 10 blocks of hundreds to count the place values of 'hundreds' as well.

Classwork: Elaborate on how to count on using base-10 blocks as ones, tens, and hundreds. Pupils will practice identifying the place value digits in the given numbers.(Exercise 3 Q5). In the remaining questions of the exercise, pupils will learn to list numbers while counting forward and backward in ones, tens and hundreds. They will also have practice writing numbers in words and numerals.

Identify the smaller and the larger number in a set of numbers

Identify the smaller and the larger number by comparing first the digits of place value 'hundred', then the digits of place value 'ten', and finally the digits of place value 'one.' Further to this, pupils will apply the same skill to write given numbers in 'ascending' or 'descending' order.

Elaborate to pupils that while comparing two numbers remember, the number with more digits is bigger. In the case of the same number of digits, the number with the larger digit at the place value 'hundred' is bigger. If the digits at the place value 'hundred' are the same, the number with the larger digit at the place value 'ten' is bigger. In case the digits at the place value 'ten' are also the same, the number with the larger digit at the place value 'one' is bigger.

Classwork: Pupils will practice identifying greater and smaller numbers (Exercise 4 Q1 and Q2).

Provide them with the opportunity to learn how to write given numbers in ascending and descending order (Exercise 4 Q3 and Q4).

Read and write Roman numerals up to 12.

Start with the basic Roman numerals: I (1), V (5), and X (10). Explain that these symbols are used to represent numbers. Create simple story problems that involve Roman numerals. For example, "If

you have III candies and you get II more, how many candies do you have in total?"

Use manipulatives like sticks or blocks to form the Roman numerals. This tactile approach can help them understand the concept better.

Classwork: Pupils will practice by counting objects and writing their answers in Roman numerals (Exercise 2 Q 1). They will recognise and match the Arabic numbers and Roman numerals (Exercise 2 Q, Q3).

Recognise even and odd numbers.

Start with the activity of doughnuts (Maths Wise 2 Page 11). Explaining that even numbers can be divided into two pairs without any leftovers, while odd numbers cannot. Use simple language and examples. Elaborate the concept using fingers. For example, if they count to 5 and have one finger left unpaired, 5 is odd. Point out odd and even numbers in their environment, like house numbers, page numbers in books, or numbers on a calendar.

Classwork: Ask them to identify odd and even numbers in a set of numbers (Exercise 5 Q1 and 2).

Acknowledge their progress with praise and small rewards to keep them motivated.

Identify and extend repeating, increasing and decreasing number patterns.

Start with simple repeating patterns using objects, colors, or shapes (e.g., red, blue, red, blue).

Show patterns using visual aids like colored blocks or beads.

Use pattern blocks to create and extend patterns.

Show increasing patterns on a number line. Explain that increasing patterns grow by adding a certain number each time, for example, 2, 4, 6, 8,…

Show decreasing patterns on a number line. Explain that decreasing patterns shrink by subtracting a certain number each time (e.g., 10, 8, 6, 4).

Tell them that repeating patterns have numbers repeated multiple times.

Classwork: Help them to identify repeating patterns, increasing patterns, and decreasing patterns (Exercise 7 Q1). Pupils will also complete the given patterns by adding more terms (Exercise 7 Q2).

Lesson Plan

Suggested Time: 2-3 periods

Objective:

To enable students to:

- Count numbers up to and across 999 (3- digit numbers) forwards and backwards, beginning from zero or one, or from any given number.
- Read and write numbers up to 999 in numerals and up to 999 in words.
- Recognise the place value of each digit in 3-digit numbers.

Concept Connector:

Students are familiar with counting numbers up to 100. They know that 100 is formed when 1 more is added to 99. Building up on the same concept, use the questions in **Page 4** of the textbook to bring students to the conclusion of numbers beyond 100.

Exploring the Objective:

Using the text and **Examples 1 and 2 on Page 5**, tell students that all numbers are made of digits 0-9 and each digit has a place value within the number. Remind them that to write numbers in words, the place value of each digit must be considered. Base-ten blocks, rods, and flats can also be used as manipulatives to help students understand the place value of each digit in a number. Understanding place value is important because it helps students understand the scale and size of number, as well as perform number operations accurately, and read and write numbers correctly.

Move onto counting in 10s and 100s using the **text on Page 6**. Explain the students that to count forward or backwards in 10s or 100s, the digit at tens or hundreds is either increased or decreased by 1.

Using **Page 8**, demonstrate how when 1 is added to 999, a 4-digit number, thousand, is formed.

Activity:

What you need:

- Place value charts
- Ten-base blocks
- Flashcard with different 2- and 3-digit numbers

How to play:

Divide the class into groups of twos and threes
Ask each group to pick a flashcard and have them use base-ten blocks to represent the number
Once the number is represented pictorially, ask the group to identify the place value of each digit in the number.

Reflection:

Students develop their understanding of 3-digit numbers and place value of each digit in a number.

Exercise:

Assign **Question 1 to 3** as individual practice within the classroom. Explain to them that skip counting is basically adding onto the previous number according to the place value. These questions will help the students to be able to count forward and backwards successfully. Move onto medium-hard **Question 4** as guided practice. Provide the students with place value charts to support them. This question will further help them with the next three questions. Once the students grasp the concept of place values, assign them **Question 5 and 6** as individual practice while giving them **Question 7** as homework.

Math Lab Pages 24 and 25 can further be used to practice the concept of place value and numbers.

Extension activity:

Use **QR code activity sheet on Page 8** to reinforce the concept. Furthermore, the following questions can be given as added practice, worksheet or as reinforcement of the topic.

1. Write 770 in expanded form.
2. What is the place value of the digit 3 in the following numbers?
    a. 123
    b. 534
    c. 389
    d. 103
3. Count forwards from 456-464.
4. Count backwards from 897-881.

Activity Sheet

Whole Numbers

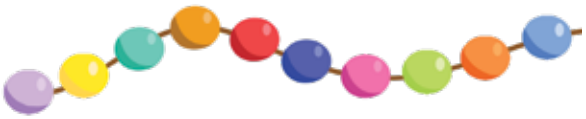
Learning Objective:

- Write ordinal numbers from first to twentieth.
- Write numbers 1 to 100 in words.

Let's Talk Math:

- Ask pupils what the biggest number is that they can think of.
- Ask pupils what the biggest number is that they have learned in class.

Ordinal Numbers	Ordinal Names
11th	eleventh
12th	twelfth
13th	thirteenth
14th	fourteenth



Activity: Number Bee

Duration: 1 Lesson **Whole Class Activity**

Let's Try It:

- Provide pupils with a word list of numbers 1 to 100 and ordinal numbers 1 to 20.
- Form them into groups and allow a day to revise the spellings at home.
- The next day, hold a class spelling bee for the numbers.
- Explain that you will say a number aloud, and groups can discuss the spelling among themselves.
- One member from each group will have 10 seconds to write the correct spelling on the board.
- If correct on the first attempt, the group earns 5 points; on the second attempt, they earn 3 points.
- If after three attempts no one spells it correctly, make a note to review later.
- Limit the activity to 20 minutes and go through as many numbers as possible.
- Award first, second, and third place titles at the end.

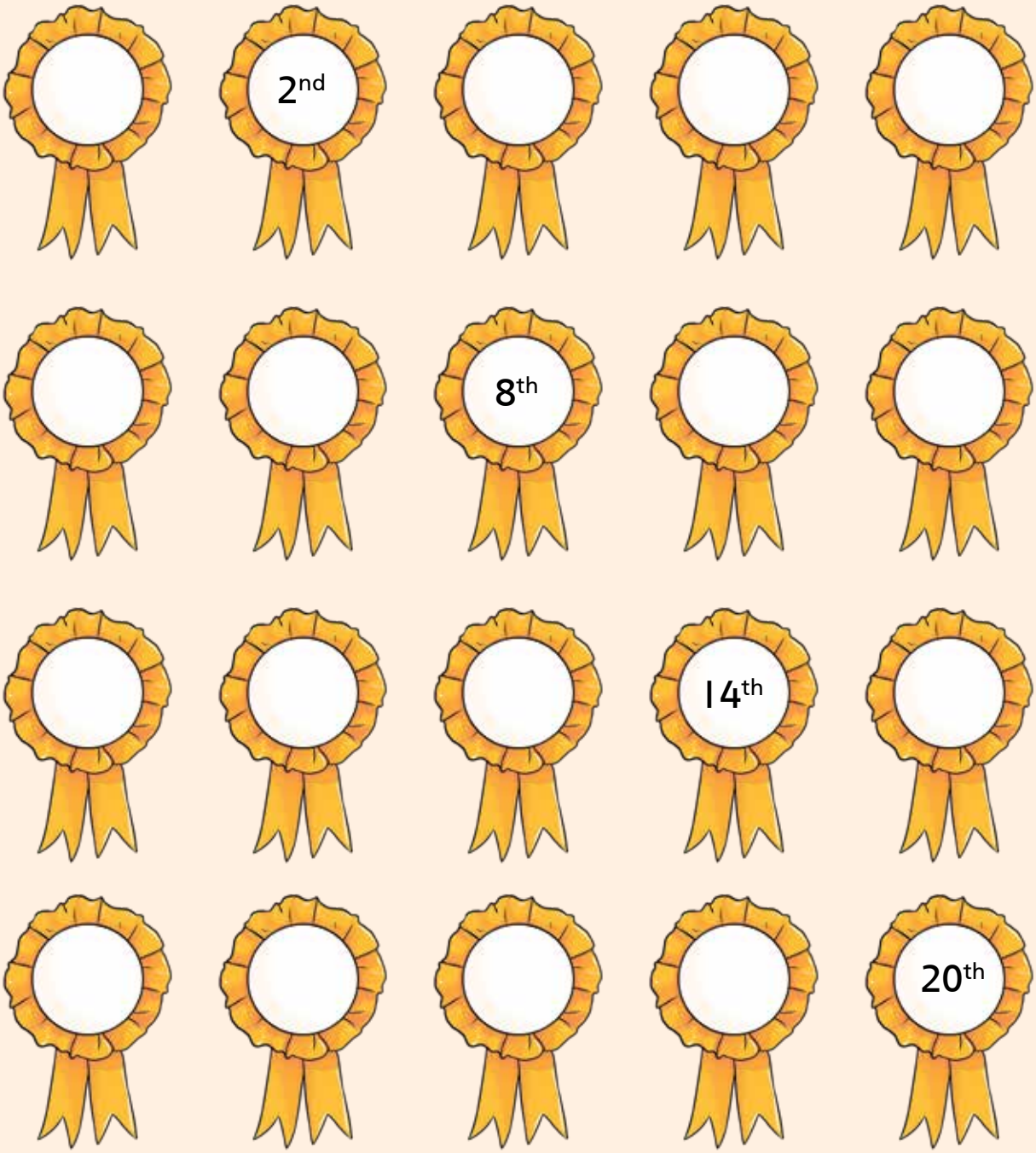
Assessment:

- Tell pupils that they should be prepared for random spelling tests throughout the next few weeks for the numbers 1 to 100.

Name: _____

Date : _____

Roll Call



Let the students fill in the **missing ordinal numbers** in the victory ribbons. Then have the students arrange themselves by their birth month, giving the youngest student first **position**, and so on. Change the attribute to make the activity more interesting.	*Ordinal numbers*

Name: _____

Date : _____

Base ten Blocks

Ones

Tens

Hundreds

Use these blocks to show that ten '**ones**' make up one '**ten**' and ten '**tens**' make one **hundred**. Ask the students to represent different numbers like 15 or 258 with colours, on this chart to visualise the concept. Use different colour for ones, tens, and hundreds.	*Numbers up to 100*

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Name: _____

Date : _____

Place Value Charts

Tens	Ones

Tens	Ones

Hundreds	Tens	Ones

Hundreds	Tens	Ones

Ask the students to use random numeral cards to write the place value of each number in this place value chart appropriately.	*Place Value*

Note: Base ten blocks can be used to fill the place value charts.

Review and Assess

Whole Numbers

1. Enlist the Roman numerals from 6 to 12.

2. Encircle the 1-digit numbers, tick (✔) the 2-digit numbers and cross (✗) the 3-digit numbers.

820	32	370	9	56	299
99	29	7	750	88	999

3. Write the place value of each coloured digit.

   a. 29**5** _____ b. 7**0**2 _____

   c. **3**84 _____ d. 69**5** _____

   e. 4**1**9 _____ f. **9**99 _____

4. Write the number that has:

   a. 6 ones, 7 hundreds, 2 tens _____

   b. 7 tens, 8 hundreds, 3 ones _____

   c. 8 ones, 6 tens, 1 hundreds _____

   d. 4 hundreds, 5 ones, 2 tens _____

5. The toucan's beak always points to the smaller number. Colour the number, from each pair, that the toucan should peck.

   a. 654 / 299 b. 712 / 698

   c. 514 / 208 d. 325 / 610

   e. 942 / 850 f. 610 / 795

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6. Write in ascending order.

a. 214 98 190 790 _____

b. 129 93 100 895 _____

c. 156 612 175 492 _____

d. 555 333 777 111 _____

7. Write in descending order.

a. 49 419 451 499 _____

b. 819 297 387 790 _____

c. 876 568 867 655 _____

d. 211 671 444 832 _____

8. Round off the following numbers to the nearest 10.

a. 63 ( )

b. 79 ( )

c. 25 ( )

d. 367 ( )

e. 809 ( )

f. 555 ( )

9. Identify whether the following number sequences are increasing, decreasing, or repeating number patterns.

a. 140, 141, 142, 143, 144 _____

b. 325, 326, 327, 328, 329 _____

c. 259, 258, 257, 256, 255 _____

d. 901, 901, 902, 901, 901 _____

e. 752, 750, 748, 746, 744 _____

Whole Numbers

1. Enlist the Roman numerals from 6 to 12.

VI, VII, VIII, IX, X, XI, XII

2. Encircle the 1-digit numbers, tick (✔) the 2-digit numbers and cross (✗) the 3-digit numbers.

820	32	370	9	56	299
99	29	7	750	88	999

3. Write the place value of each coloured digit.

a. 29**5** Ones

b. 7**0**2 Tens

c. **3**84 Hundreds

d. 69**5** One

e. 4**1**9 Tens

f. **9**99 Hundreds

4. Write the number that has:

a. 6 ones, 7 hundreds, 2 tens 726

b. 7 tens, 8 hundreds, 3 ones 873

c. 8 ones, 6 tens, 1 hundreds 168

d. 4 hundreds, 5 ones, 2 tens 425

5. The toucan's beak always points to the smaller number. Colour the number, from each pair, that the toucan should peck.

a. 654 / 299

b. 712 / 698

c. 514 / 208

d. 325 / 610

e. 942 / 850

f. 610 / 795

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6. Write in ascending order.

a. 214 98 190 790 — 98, 190, 214, 790

b. 129 93 100 895 — 93, 100, 129, 895

c. 156 612 175 492 — 156, 175, 492, 612

d. 555 333 777 111 — 111, 333, 555, 777

7. Write in descending order.

a. 49 419 451 499 — 499, 451, 419, 49

b. 819 297 387 790 — 819, 790, 387, 297

c. 876 568 867 655 — 876, 867, 655, 568

d. 211 671 444 832 — 832, 671, 444, 211

8. Round off the following numbers to the nearest 10.

a. 63 — 60

b. 79 — 80

c. 25 — 30

d. 367 — 370

e. 809 — 810

f. 555 — 560

9. Identify whether the following number sequences are increasing, decreasing, or repeating number patterns.

a. 140, 141, 142, 143, 144 — Increasing

b. 325, 326, 327, 328, 329 — Increasing

c. 259, 258, 257, 256, 255 — Decreasing

d. 901, 901, 902, 901, 901 — Repeating

e. 752, 750, 748, 746, 744 — Decreasing

Unit

2 Number Operations: Addition and Subtraction

Learning Framework

Pupils will learn to add two-digit numbers with carrying over and apply the same skill in real-life situations.

To enable the pupils to grasp the concept of addition with carrying as well, demonstrate a simple activity using some wooden stick and rubber band. For example, you need to add 18 and 26. To show 18, make one bundle of 10 sticks and separate 8 sticks. To show 26, make two bundles of 10 sticks and separate 6 sticks. To show the addition of digits at place value 'ones', combine the separate sticks which will give you 14 separate sticks. Out of these 14 sticks, make a bundle of 10 leaving 4 sticks separate. Now we have 4 bundles of 10 and four separate sticks. It means the sum of 18 and 26 is 44.

Classwork: Carry out questions and real-life problems.(Exercise 1 Q1, 2, 3).

Pupils will learn to add three-digit numbers without carrying and applying the same skill in real-life situations.

Pupils have already developed the skills to add two-digit numbers with and without carrying over. They are acquainted with numbers having digits at 'ones', tens', and 'hundreds.' Just elaborate on, that to add numbers vertically, we need to write digits with the same place value in the same column. With a few examples, pupils can conveniently start exercise.

Classwork: Complete the questions and word problems.(Exercise 2).

Pupils will learn to add three digits numbers with carrying and applying the same skill in real-life situations.

Pupils are acquainted with the addition of three-digits numbers, and they have also learnt how to add two-digits numbers with carrying so, you just need to recap both the skills to enable your class to add three-digits numbers with carrying.

Classwork: Complete the questions and word problems (Exercise 3).

Pupils will learn to subtract two-digit numbers with borrowing and apply the same skill in real-life situations.

By now, students have learnt how to subtract given two-digit numbers without borrowing. Now they need to learn that while doing subtraction, digit of tens is subtracted from the digit of tens, while digit of ones is subtracted from the digit of ones. While doing this, the digit being subtracted at a particular place value is bigger than the digit from which it has to be subtracted. To illustrate this situation, let us consider the example of 14 – 8 = ?

Take a bundle of 10 sticks and 4 separate sticks to show 14. Here we have 1 ten and 4 ones. We have to subtract 8 from 4 as both are ones which is not possible as 8 is larger than 4. You need to open the bundle of ten to make 10 ones. Now you have 14 ones. Remove 8 sticks and there will be 6 sticks left because of subtraction of 8 from 14.

Classwork: Use some examples of your own to elaborate on the process. Elaborate word problems of the exercise through smart questioning and support them to find the solution of each real-life problem independently. Ask them to practise the sums and real-life problems independently (Exercise 4 Q1 andQ2).

Pupils will learn to subtract three-digit numbers without borrowing and apply the same skill in real-life situations.

By now, students have learnt how to subtract given two digits numbers with and without borrowing. Recap the subtraction of two digits with some examples like 91 – 41, 39 – 23, 73 – 56, etc. Then use these examples to elaborate the subtraction of three digits numbers without borrowing: 555 – 345, 789 – 666, 751 – 550, etc.

Classwork: Let them understand the real-life problems of exercise and transform them into mathematical statements and solve themselves. Let the pupils practise the sums independently (Exercise 5Q1 and 2).

Pupils will learn to subtract three-digit numbers with borrowing and apply the same skill in real-life situations.

By now, students have learnt how to subtract given two-digit numbers with borrowing and subtraction of three-digit numbers without borrowing. Recap the subtraction of two digits with borrowing through some examples like 41 – 23, 91 – 47, 73 – 56, etc. Then use these examples to elaborate the subtraction of three digits numbers with borrowing: 674 – 555, 669 – 589, 741 –550, etc.

Classwork: Help them to understand the real-life problems of the exercise and transform them into mathematical statements and solve themselves (Exercise 6 Q 1, 2, and 3).

Pupils will comprehend the real-life problem based on addition and subtraction, extracting the

information, put it in mathematical statement, and simplify the statement to get a solution to the problem. In the comprehension of daily life problems, the key learning hindrance is the 'language'. Make sure the problem is elaborated clearly with simple words and their mathematical alternatives. While doing word problem, question must be displayed on board. Pupils should have a sight of the problem as well when the solution to that is presented.

Pupils will learn to estimate answers to an addition and subtraction question.

Teach students to round numbers to the nearest ten. For example, if the number is 23, they round it to 20, number 47 will be rounded off to 50 and after rounding them add them, 23 + 47 becomes 20 + 50,which equals 70. Similarly, after rounding, subtract the rounded numbers. For example, 47 - 23 becomes 50 - 20, which equals 30. Teach students to compare their estimated answers with the actual numbers to see if it makes sense. For example, if the actual sum of 23 + 47 is 70, the estimate of 70 is reasonable.

Classwork: Ask them to attempt (Exercise 7 Q1 and 2)

Lessons Plan

Suggested Time: 3-4 periods

Objective:

To enable students to:

- Add ones and ones
- Add ones and 2 - digit numbers with carrying.
- Add 2 - digit numbers and 2 - digit numbers with carrying.
- Add numbers mentally and in formal written form (with and without regrouping) including:
  - 3-digit number and a 1- digit number
  - 3-digit number and tens
  - 3-digit number and a 2-digit number
  - two 3-digit numbers

Concept Connector:

The students are familiar with the concept of addition which is combining two or more objects or numbers to get a bigger number or value. Using the **Concept Connector on Page 16,** recall with students how addition of 2-digit number with 1-digit and other 2-digit number is done (without carrying). Remind them that addition is done according to place value - ones add with ones and tens add with tens.

Exploring the Objective:

The students have previously studied addition of 1- and 2-digit numbers without carrying, they will now learn addition of numbers with carrying. Use **Example 1 to** introduce the concept of carrying over. It is essential to incorporate the importance of place value within the lesson. Explain to the students that once the sum of ones column is 10 or greater than 10, 1 ten is carried to the tens column and added alongside the tens. **Example 2** is the real-life application of addition with carrying over.

Continue with carrying over, move onto **Page 19** to use **Examples 5 and 6** to teach students how addition of 3-digit number with carrying over is the same as 1-digit and 2-digit number, except when the sum of tens columns is 10 or greater than 10, 1 hundred is carried over to the hundreds column.

Since the addition of 3-digit numbers without carrying on **Page 17** is the same as what the students have learnt previously with 1-digit and 2-digit numbers, therefore, it can be taught in the last. The only thing students should be careful with is adding ones with ones, tens with tens and hundreds with hundreds. **Math Quest on Page 20** can be done in the classroom as a brain teaser.

Number bonds can be introduced and taught to students as a support for mental calculation. Once the students are familiar with how number are formed, they can very easily carry out mental calculation. Use the **information box on Page 18** of the textbook as help.

Activity:

What you need:

- Different chits with 1-digit, 2-digit, and 3-digit numbers
- Two bowls

How to play:

- Pair the students in twos.
- Ask each pair to pick a chit from each bowl.
- Ask each pair to add the numbers on both chits. Carry over wherever required.

Reflection:

Students develop the skills to add different numbers with and without carrying.

Exercise:

Exercise 1, Question 2 can be done alongside the teacher in the classroom. This help students build a foundation of how numbers are added using carrying over method. Once the students can efficiently carry out addition sums, beginner-level **Question 1** can be given to them as homework. Later, medium-hard real-life word problems in **Question 3** can be done in the classroom.

For **Exercise 3, Question 2** can be done as individual practice within the classroom as the students must now be familiar with the concept of how carrying over is done. Move on, to **Question 3** as guided practice to be done within the classroom. Assign **Question 1** as homework.

Exercise 2 can be either given in class or as homework. Pair the lessons with **Math Lab Pages 29 and 31** as worksheet to reinforce solving real-life world word problems.

Extension Activity:

Use **QR code activity sheet on Page 25** to reinforce the concept of addition. Furthermore, the following questions can be given as added practice, worksheet or as reinforcement of the topic.

1. Add 345 + 543.
2. A farmer harvests 777 apples and 888 oranges. How many fruits does he harvest altogether?

Activity Sheet

Number Operations

Learning Objective:

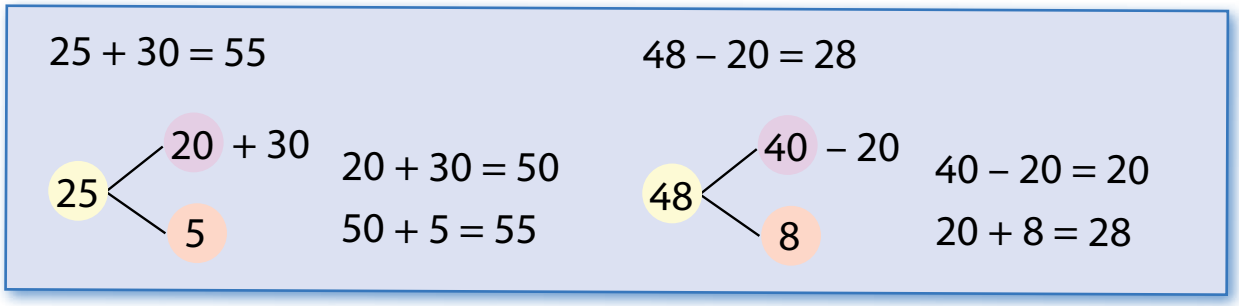
- Solve real life situations involving addition, subtraction, multiplication and division.

Let's Talk Math:

- Ask the class if they use number operations in real life.

Make Sure You Have:

- Different sticky notes.



Activity: Sticky Note Math Operation

Duration: 1 Lesson **Whole Class Activity**

Let's Try It:

- Hand out sticky notes in four different colours to each pupil, ensuring everyone gets one of each colour.
- Explain that each colour represents a different number operation:
  - Addition
  - Subtraction
  - Multiplication
  - Division
- Have pupils write the symbol for each operation on its corresponding sticky note.
- Ensure that all pupils follow the same colour system.
- You will read out real-life situations (number stories).
- Pupils will decide which number operation they need to solve the problem.
- Read each question twice, count to three, and pupils will vote by holding up the correct post it notes.

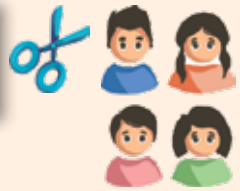
Assessment

- Read out a real-life story and let the students decide which operation to use.

Name: _____

Date : _____

Addition Equation Cards



$4 + 8 =$ ☐

$9 + 15 =$ ☐

$6 + 4 =$ ☐

$37 + 9 =$ ☐

Divide the class in four groups and give each group one page to **solve**. The group that finishes first will win. Ask the students to solve these. They may write them down vertically where carrying or borrowing may be required. Ask them to write their results in both **words and numerals**.	*Number Operations*

Note: Linking cubes can be used with colour codes.

Name: _____

Date : _____

Addition Equation Cards

$19 + 85 =$ ☐

$43 + 65 =$ ☐

$33 + 45 =$ ☐

$73 + 14 =$ ☐

	Number Operations

Note: Linking cubes or base ten blocks can be used to add bigger numbers.

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Name: _____

Date : _____

Subtraction Equation Cards

413 − 4 = ☐

413 − 40 = ☐

722 − 3 = ☐

722 − 30 = ☐

	Number Operations

Note: Linking cubes and base ten blocks can be used to subtract bigger numbers.

Name: _____

Date : _____

Subtraction Equation Cards

$500 - 328 =$ ☐

$456 - 368 =$ ☐

$800 - 553 =$ ☐

$302 - 237 =$ ☐

	Number Operations

Note: Linking cubes and base ten blocks can be used to subtract bigger numbers.

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Number Operation: Addition and Subtraction

1. Add the following.

a. 215 + 10 = _____

b. 320 + 16 = _____

c. 433 + 152 = _____

d. 356 + 310 = _____

e. 232 + 717 = _____

f. 362 + 425 = _____

g. 113 + 9 = _____

h. 250 + 70 = _____

i. 398 + 489 = _____

j. 247 + 368 = _____

k. 575 + 295 = _____

l. 471 + 171 = _____

2. Subtract the following.

a. 494 − 21 = _____

b. 798 − 37 = _____

c. 426 − 320 = _____

d. 685 − 152 = _____

e. 969 − 368 = _____

f. 786 − 414 = _____

g. 400 − 66 = _____

h. 615 − 70 = _____

i. 527 − 192 = _____

j. 434 − 297 = _____

k. 910 − 174 = _____

l. 900 − 199 = _____

3. Solve the following real-life problems.

   a. Ahmed spends Rs 555 at a toy shop, and then another Rs 60 on chocolates. How much does he spend in total?

   b. There are 112 silver cars, 123 grey cars, and 14 white cars parked in a parking lot. How many cars are there altogether?

   c. Arsalan had 125 fishes. He sold 75 fishes by lunch. How many fishes were left to be sold?

   d. Sohail has to send 336 invites to guests for the annual school function. He has sent 95 invites. How many invites are left?

   e. In a cricket game, Team A has scored 265 runs. Team B has scored 159 runs. How much more runs did Team A make than Team B?

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Number Operation: Addition and Subtraction

1. Add the following.

a. 215 + 10 = 225

b. 320 + 16 = 336

c. 433 + 152 = 585

d. 356 + 310 = 666

e. 232 + 717 = 949

f. 362 + 425 = 787

g. 113 + 9 = 122

h. 250 + 70 = 320

i. 398 + 489 = 887

j. 247 + 368 = 615

k. 575 + 295 = 870

l. 471 + 171 = 642

2. Subtract the following.

a. 494 − 21 = 473

b. 798 − 37 = 761

c. 426 − 320 = 106

d. 685 − 152 = 533

e. 969 − 368 = 601

f. 786 − 414 = 372

g. 400 − 66 = 334

h. 615 − 70 = 545

i. 527 − 192 = 335

j. 434 − 297 = 137

k. 910 − 174 = 736

l. 900 − 199 = 701

3. Solve the following real-life problems.

a. Ahmed spends Rs 555 at a toy shop, and then another Rs 60 on chocolates. How much does he spend in total?

555 + 60 = 615

b. There are 112 silver cars, 123 grey cars, and 14 white cars parked in a parking lot. How many cars are there altogether?

112 + 123 + 14 = 249

c. Arsalan had 125 fishes. He sold 75 fishes by lunch. How many fishes were left to be sold?

125 - 75 = 50

d. Sohail has to send 336 invites to guests for the annual school function. He has sent 95 invites. How many invites are left?

336 - 95 = 241

e. In a cricket game, Team A has scored 265 runs. Team B has scored 159 runs. How much more runs did Team A make than Team B?

265 - 159 = 106

Unit

3 Number Operations: Multiplication and Division

Learning Farmerwork

Unit 3 Number Operations: Multiplication and Division

Pupils will learn to add repeated similar numbers and the shortened form of repeated addition i.e., multiplication.

It requires a long jump to conceptually reach multiplication from addition. Make five bundles, each containing three sticks. Put these bundles on a table and ask your students to count them. This activity may take some time but do it patiently. When they have counted the total number of sticks, ask them how they got this result. Show them to add 3 five times as 3 + 3 + 3 +3 + 3 = 15. Now show them repeated addition can be simply written in the form of 'times' as 5 times 3 = 15. Then show them the sign of 'times' i.e., '×'. Now show them to write 5 × 3 = 15.

Classwork: Help the pupils, apply their learning to exercise questions (Exercise 1 Q1 and Q2), then let them complete the exercise themselves.

Pupils will learn to use the 'times tables' to carry out multiplication of two numbers from 1 – 10 and use the same skill to solve word problems.

Help them to understand the concept of times table and show them how to write times tables of 2, 3, 4, 5, and 10.

Classwork: Showing few multiplication sums on the board and ask them to solve independently in their notebooks. Then they will attempt (Exercise 2 q1, 2, 3, 4) independently. After this, carry out word problems of the same exercise with thorough explanation of each.

Pupils will learn successive subtraction means subtracted the same number as many times till the remainder is zero. In other words, they will learn how to put a given number of objects in groups of equal number of objects.

Division is a multifaceted function to interpret. Suppose you have a certain number of wooden sticks, and you want to group them. If you know the required number of groups, then by division you can find how many sticks will be there in each group. This activity may take some time but will make things crystal clear to students. Through this activity, meaning of division can be demonstrated. Take a pile of 24 sticks and put them in a corner on the table. Ask your class how many times successively 6 sticks can be subtracted from 24 sticks? Take 6 sticks from the pile and put them on the side. Repeat the process to make various piles of 6 sticks on the table. When the original pile is finished, count the piles of 6 sticks. There will be 4 piles of 6sticks. Now show this process on board as

24 – 6 = 18 (1st time)

18 – 6 = 12 (2nd time)

12 – 6 = 6 (3rd time)

6 – 6 = 0 (4th time)

In other words, we can make 4 groups of 6 sticks out of 24 sticks. Now introduce the sign of division as 24 sticks ÷ 6 sticks = 4 groups

Now restart the same activity with the question, 'How many groups will be formed if 3 sticks are put in each group?' Take out 3 sticks from the pile of 24 and put them on the side. Repeat the process till the pile of 24 sticks is completely consumed. Now count how many groups of 3 sticks are formed?

24 sticks ÷ 3 sticks = 8 groups

Now restart the same activity with the question, How many sticks will be there in each group if we make 6 groups of 24 sticks? Put 6 tables or chairs in front of the classroom. Put one stick on each table. Repeat the process till all 24 sticks are consumed. Now count sticks on each table separately, each table will have 4 sticks as

24 sticks ÷ 6 groups = 4 sticks in each group

Classwork: For practicing purpose attempt several questions (Exercise 3). Elaborate word problems through word meanings and mathematical equivalents.

Pupils will apply the concepts of addition, subtraction, multiplication, and division to daily-life problems to find their solution.

While solving word problems, make sure that pupils are not stuck at the barrier of language. Ask them to read the problem multiple times, ask them what they comprehended. Write the word problem on the board, show the mathematical alternative of each word and phrase. Let them identify the required process. Show them one sample solution on board and keep it there for guidance.

Classwork: Complete (Exercise 4) with thorough discussion of each word problem through smart questioning.

Lessons Plan

Suggested Time: 2-3 periods

Objectives:

To enable students to:

- Recognise multiplication as repeated addition and use multiplication symbol" x.
- Complete number sequences in steps of 2, 3, 4, 5 and 10 (e.g. in steps of 2 the sequence is expressed as 2, 4, 6…).
- Count and write in 3s, 4s, 5s, 10s and 100s.
- Recognise counting in 3s, 4s as multiplication tables of three and four.
- Recognise multiplication as repeated addition and develop multiplication tables (times tables) for 2, 3, 4, 5 and 10.
- Write multiplication statements or number sentences using concrete and pictorial representations.
- Recognise using concrete and pictorial representations that the multiplication of any two numbers can be done in any order.
- Multiply mentally and in written form using the multiplication tables:
  - 1-digit number by another 1-digit number
  - 2-digit number by a 1-digit number using a multiplication grid
- Multiply a number with 0 and 1.
- Solve real-life word problems involving multiplication.

Concept Connector:

Students are familiar with multiplication as repeated addition of equal groups. They will now further explore how skip counting lays the foundation of multiplication tables, and its use when multiplying two numbers.

Exploring the Objectives:

Revise the previously learnt objective of recognising multiplication as repeated addition using **Example 1 on Page 27** of the textbook. Following the pattern of the example, the teacher may use different objects as an example of repeated addition, for instance, 2 sets of three buttons, three sets of 6 candies, etc. Once the students grasp the concept of repeated addition, draw a number line on the board and skip count in 2s. Mention how skip counting is another form of repeated addition. This will lay the basis of multiplication tables.

Using the **table on Page 28** and **Exercise 1 on Page 27 and 28**, helps the students develop multiplication tables of 3 and 4. **Math Quest on Page 29** can also be used during the lesson as a brain teaser/brainstorming question. When developing the multiplication table of 4 on **Page 29**, use **Math in Action** on the same page to tell the students about how multiplication and addition are related.

Move onto **Page 30** to help students understand how multiplication of two numbers can be done using the hundred charts. The demonstration of two numbers multiplying in any order can also be

done using arrays shown on **Page 30**. Use the **Concept onnector on Page 31** to show the product of multiplying a number with 0 and 1.

Activity:

What you need:

- Counters
- Flash cards with multiplication sentences

How to Play:

Pair up students into groups of three or four.
Ask them to pick a flashcard with the multiplication sentence.
Provide them with counters and ask them to arrange them in such a way that it represents that multiplication can be done in any order. For example, 5 sets of 2 = 2 sets of 5 = 10.

Reflection:

Students develop the skill to pictorially represent that multiplication can be done in any order.

Exercise:

Start by assigning **Exercise 1 on Page 27 and 28** as individual practice to be done in class. The teacher may either provide the students with a number line or draw it on the board to help the students complete **Question 2**. This exercise will help the students develop the multiplication table of 3 and 4. Pair this with the **QR activity sheet on Page 30** before moving on to Exercise 2.

Question 1 of Exercise 2 is pictorial representation of how multiplication sentences can be written and solved. The teacher can also pair this question with the class activity involving arrays. **Question 2** is a medium-hard level of question that requires students to use arrays, therefore, it can be done in the classroom as guided practice**. Question 3 to 5** are medium-hard level questions that require students to recall the multiplication tables they have learnt so far. Question can be given as homework while **Question 3 and 5** can be done within the classroom. The teacher may, however, give certain parts (d and e) of **Question 5** as homework.

Extension Activity:

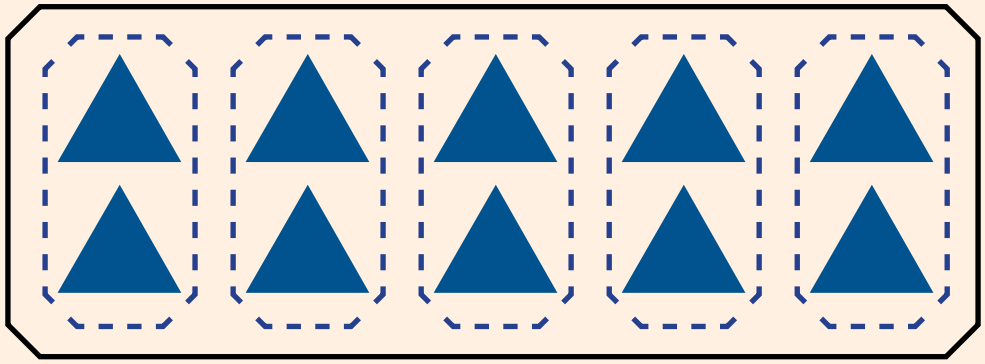
The following questions can be given as added practice, worksheet or as reinforcement of the topic.

1. Skip count in 5s and complete the sequence: 35, _____, _____, 50, _____, _____, 65.
2. Use the multiplication grid to find the product of the following numbers:
   a. 3 x 3 c. 4 x 9 e. 10 x 4
   b. 2 x 7 d. 5 x 6
3. If a crate of bottles contains 9 bottles, how many bottles will be in 5 crates?
4. A box of crayons has 6 crayons. How many crayons will be in 4 boxes?

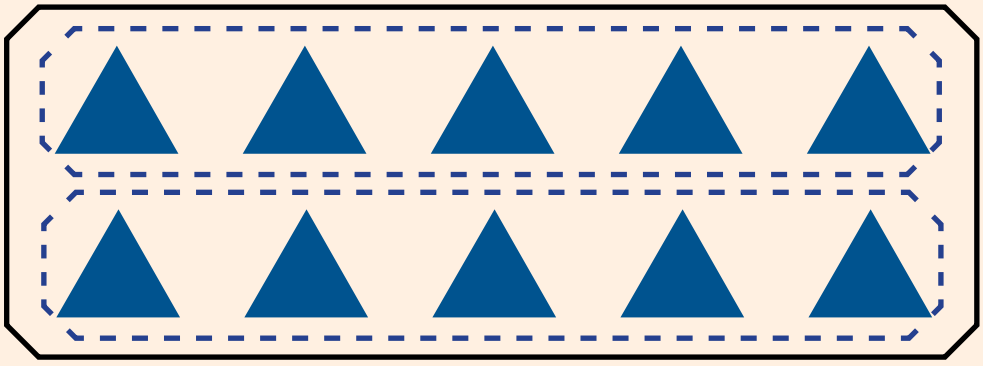
Name: _____

Date : _____

Array Cards



$5 \times 2 = 10$



$2 \times 5 = 10$

Say: 5 sets of 2 = 10 and 2 sets of 5 = 10. Using the grouping method as illustrated above, explain that the multiplication is a **quicker way to do addition**.	*Multiplication*

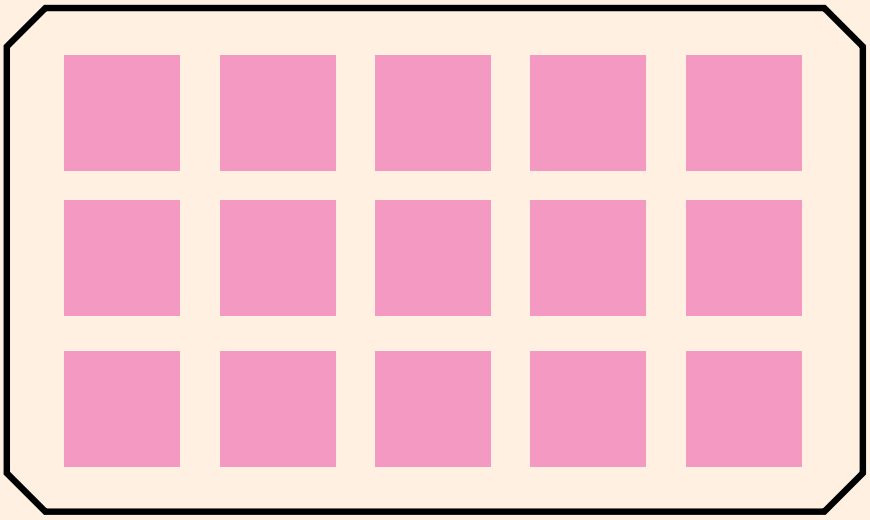
Note: Arrays can be used to develop understanding of the concept of multiplication.

Name: _____

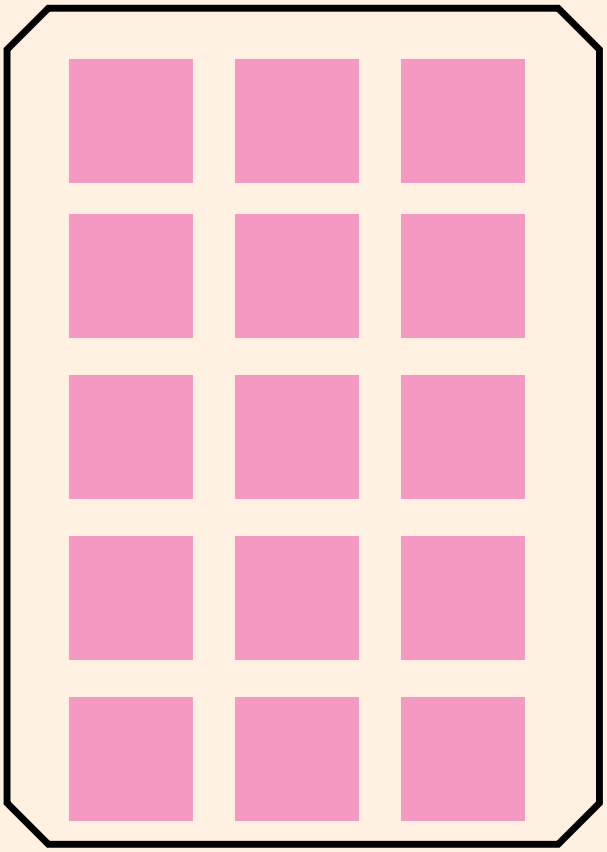
Date : _____

Array Cards

3 × 5



5 × 3



Explain the commutative operation of multiplication: a x b = b x a	*Multiplication*

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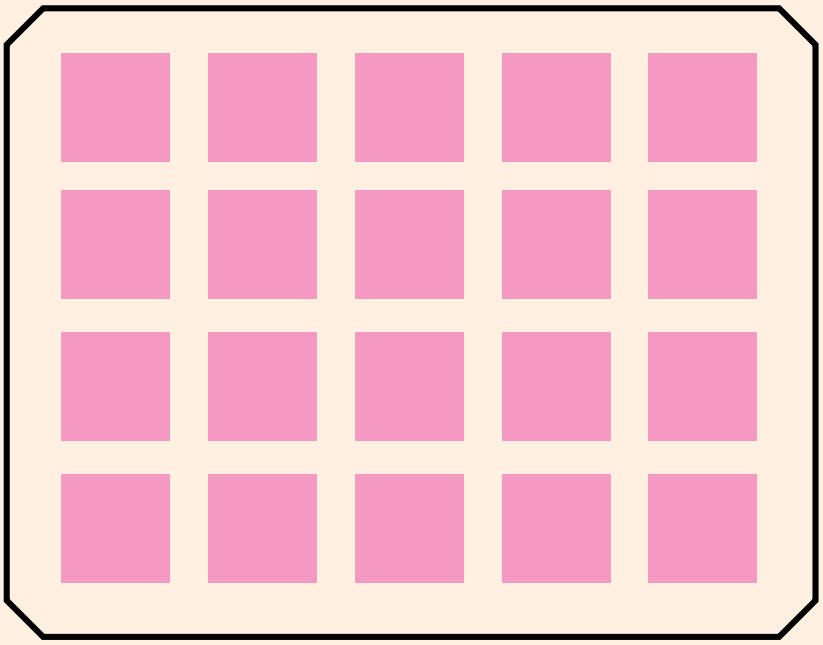
Name: _____

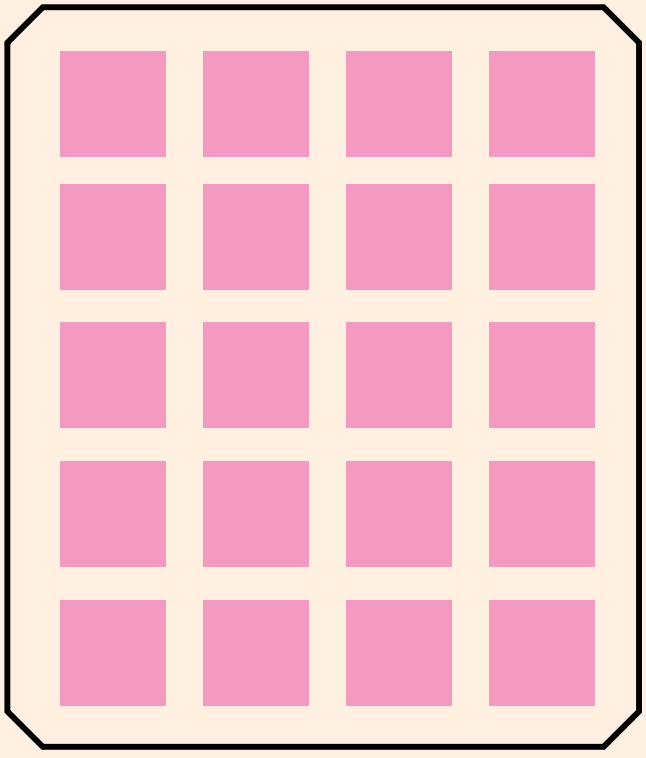
Date : _____

Array Cards

4×5



5×4



$4 \times 5 = 5 \times 4 = 20$

Explain the commutative operation of multiplication: a x b = b x a	*Multiplication*

Name: _____

Date : _____

Multiplication Cards

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

Ask students to find answers of all multiplication and division card. Then the teacher should call out random numbers like **5**. Have the students pick out every equation from these **division** and **multiplication** cards that give the answer 5.	*Multiplication* *Division*

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Name: _____

Date : _____

Multiplication Cards

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

Name: _____

Date : _____

Multiplication Cards

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

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Name: _____

Date : _____

Multiplication Cards

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

Name: _____

Date : _____

Multiplication Cards

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

	Division

Note: Cuisenaire rods can be used to find product of numbers 1 – 10.

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Name: _____

Date : _____

Division Cards

2 ÷ 2	4 ÷ 2
6 ÷ 2	8 ÷ 2
10 ÷ 2	12 ÷ 2
14 ÷ 2	16 ÷ 2
18 ÷ 2	20 ÷ 2

Note: Cuisenaire rods can be used to demonstrate the division of numbers.

Name: _____

Date : _____

Division Cards

3 ÷ 3	6 ÷ 3
9 ÷ 3	12 ÷ 3
15 ÷ 3	18 ÷ 3
21 ÷ 3	24 ÷ 3
27 ÷ 3	30 ÷ 3

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Name: _____

Date : _____

Division Cards

4 ÷ 4	8 ÷ 4
12 ÷ 4	16 ÷ 4
20 ÷ 4	24 ÷ 4
28 ÷ 4	32 ÷ 4
36 ÷ 4	40 ÷ 4

Name: _____

Date : _____

Division Cards

5 ÷ 5	10 ÷ 5
15 ÷ 5	20 ÷ 5
25 ÷ 5	30 ÷ 5
35 ÷ 5	40 ÷ 5
45 ÷ 5	50 ÷ 5

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Name: _____

Date : _____

Division Cards

10 ÷ 10	20 ÷ 10
30 ÷ 10	40 ÷ 10
50 ÷ 10	60 ÷ 10
70 ÷ 10	80 ÷ 10
90 ÷ 10	100 ÷ 10

Number Operation: Multiplication and Division

1. Multiply the following.

a. $\begin{array}{r} 2 \\ \times\ 3 \\ \hline \\ \hline \end{array}$

b. $\begin{array}{r} 7 \\ \times\ 4 \\ \hline \\ \hline \end{array}$

c. $\begin{array}{r} 2 \\ \times\ 5 \\ \hline \\ \hline \end{array}$

d. $\begin{array}{r} 1\ 0 \\ \times\ 5 \\ \hline \\ \hline \end{array}$

e. $\begin{array}{r} 1\ 0 \\ \times\ 3 \\ \hline \\ \hline \end{array}$

f. $\begin{array}{r} 1\ 2 \\ \times\ 4 \\ \hline \\ \hline \end{array}$

g. $\begin{array}{r} 1\ 0 \\ \times\ 2 \\ \hline \\ \hline \end{array}$

h. $\begin{array}{r} 1\ 1 \\ \times\ 5 \\ \hline \\ \hline \end{array}$

2. Divide the following.

a. $18 \div 3 =$ _____

b. $16 \div 4 =$ _____

c. $5 \div 5 =$ _____

d. $25 \div 5 =$ _____

e. $40 \div 4 =$ _____

f. $27 \div 3 =$ _____

3. Solve the following real-life problems.

a. Nida uses 3 cups of sugar to bake a cake. How many cups of sugar will she use if she has to bake 6 cakes?

b. There are 9 cars in the parking lot. Each car has 4 tyres. How many tyres are there in total?

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c. Moiz goes for his cricket training 4 days a week. If he plays cricket for 3 hours daily, how many hours does he spend training for cricket each week?

d. In a one-day international cricket match, Zahid hits 6 fours in a row. How many runs are those?

e. 10 children are invited to a birthday party. There are 30 gifts to be distributed amongst them. How many gifts does each child get?

f. There are 36 beads of 4 colours equally distributed among them. How many beads are there of each colour?

g. There were 28 tourists waiting to be taken to the museum in taxis that seated 4 persons each. How many taxis were used?

Number Operation: Multiplication and Division

1. Multiply the following.

a. $\begin{array}{r} 2 \\ \times\ 3 \\ \hline 6 \end{array}$ b. $\begin{array}{r} 7 \\ \times\ 4 \\ \hline 28 \end{array}$ c. $\begin{array}{r} 2 \\ \times\ 5 \\ \hline 10 \end{array}$ d. $\begin{array}{r} 10 \\ \times\ 5 \\ \hline 50 \end{array}$

e. $\begin{array}{r} 10 \\ \times\ 3 \\ \hline 30 \end{array}$ f. $\begin{array}{r} 12 \\ \times\ 4 \\ \hline 48 \end{array}$ g. $\begin{array}{r} 10 \\ \times\ 2 \\ \hline 20 \end{array}$ h. $\begin{array}{r} 11 \\ \times\ 5 \\ \hline 55 \end{array}$

2. Divide the following.

a. $18 \div 3 =$ 6 b. $16 \div 4 =$ 4

c. $5 \div 5 =$ 1 d. $25 \div 5 =$ 5

e. $40 \div 4 =$ 10 f. $27 \div 3 =$ 9

3. Solve the following real-life problems.

a. Nida uses 3 cups of sugar to bake a cake. How many cups of sugar will she use if she has to bake 6 cakes?

$6 \times 3 = 18$ cups

b. There are 9 cars in the parking lot. Each car has 4 tyres. How many tyres are there in total?

$9 \times 4 = 36$ tyres

c. Moiz goes for his cricket training 4 days a week. If he plays cricket for 3 hours daily, how many hours does he spend training for cricket each week?

3 x 4 = 12 Hours

d. In a one-day international cricket match, Zahid hits 6 fours in a row. How many runs are those?

6 x 4 = 24 Runs

e. 10 children are invited to a birthday party. There are 30 gifts to be distributed amongst them. How many gifts does each child get?

30 x 10 = 3 Gifts

f. There are 36 beads of 4 colours equally distributed among them. How many beads are there of each colour?

36 x 4 = 9 Beads

g. There were 28 tourists waiting to be taken to the museum in taxis that seated 4 persons each. How many taxis were used?

28 x 4 = 7 Taxis

Unit 4 Fractions

Learning Framework

Pupils will learn fraction as an equal part of the whole thing as well as read the given fraction as half, quarter, one-third, and whole.

Call five pupils in front of the class and distribute some A4 sheets in random bunches to the students and ask them to count the sheets in each bunch. Tell them to return all the sheets except one. Tell them to show the remaining sheet to the whole class. Now tell one pupil to return the last sheet and ask how many sheets are left with him/her? Answer should be 'zero'.

Now take the sheet from a child, roughly tear it into two parts, keep one part with you and ask the pupil to count the remaining part of sheets. If he says 'one', then show him the sheets with three students, what he has is not equal to one. If he says 'zero' then show the child without any sheet, he is having 'zero' sheet. What is the number of your sheet which is neither 'one' nor 'zero'? Now show that part of the sheet to the whole class and ask how much this is .They should not call it 'zero' as it means nothing. If they call it 'one' show them the whole sheet and tell this is one sheet.

This activity will give them an idea of the whole thing. If they call it half , show them the other part of the same sheet, and ask how much this is? If this is also half, then they should be equal. Put both parts together and show they are not equal; it means they are not halves.

Now take an A4 size sheet and cut it into two equal parts. Show them one part and ask how much is this? Repeat the same question for the other part. Now show them that both parts are equal and when they are joined together, they will give a whole sheet of paper.

Extend your work by tearing off one sheet in a way that one part is too small than the other part. Now show the pupils that when both the parts are joined, we get a whole sheet. Ask if these parts are two halves? Explain to them that these are not equal, so they are not halves.

Now describe that an equal part of a whole thing is a fraction making clear concept of a whole.

Use visual aids like diagrams or drawings to show the whole and its parts. This can help in understanding how the parts make up the whole.

Provide real-life examples to make the concept relatable. For instance, if you drink one glass of water from a jug full of water, the whole is the full jug, and the part is the amount you drank.

The value of a fraction is totally dependent on reference of whole and their equal parts. If reference is changed, the value of the same fraction will also change. Before making any introduction of a fraction, create a concept of something as whole which should remain unchanged during the initial explanation of the concept of fraction. While explaining equality, tell them clearly that two things can only be equal when they look alike and are of the same size.

Classwork: After the clear introduction of fractions, help them to apply their knowledge to solve the structured questions (Exercise 1 Q1). Ask whether the parts are equal in each question? If not, then these

are not fractions. Use paper sheet to fold and show equal parts and fractions in selected question.

Scan the QR code on page 41 for folding and shading activity.

Pupils will learn the position of 'numerator' and 'denominator' in a fraction and will be able to identify the fraction in the shaded portion with respect to the whole figure and write it in the form of 'numerator' and 'denominator'.

Before using the terms 'numerator' and 'denominator', better explain to your pupils how to read a fraction, like fraction of shaded portion in the following diagrams:

5 out of 6 or 56 Figures from TG

5 out of 8 or 58

Explain to them that there is a special way of writing a fraction.

Fraction = numerator/ denominator

Show them half, one-third , and one-fourth of fractions (Maths Wise 2 page 38).

Pupils will identify unit fraction (a fraction with unit numerator). They will also learn about like and unlike fractions.

Explain the unit fractions through pictorial representation (Maths Wise page 39).

Tell them that unit fraction is a fraction in which the numerator (the top number) is always 1, and the denominator (the bottom number) is a positive integer. Essentially, it represents one part of a whole that is divided into equal parts.

Classwork: Guide them to represent different fractions by shading the parts in a figure (Exercise 1 Q2).

Ask them to identify the unit fractions from a set of fractions (Exercise 2 Q1).

Introduce Like fractions by saying that these are the fractions that have same denominator. They represent parts of wholes that are divided into the same number of equal parts. Give them some examples.

2/5 and 3/5 are like fractions because they both have the denominator 5.

1/8, 3/8, and 5/8 are like fractions because they all have the denominator 8.

Introduce Unlike fractions by saying they have different denominators. This means they represent parts of wholes that are divided into different numbers of equal parts.

2/3 and 3/4 are unlike fractions because they have different denominators (3 and 4).

1/6 and 2/5 are unlike fractions because they have different denominators (6 and 5).

Show them pictorial representation of like and unlike fractions (Maths Wise 2 page 41 and 42)

Classwork: Ask them to attempt independently the questions on the above topics (Exercise 3 Q1).

Scan the QR code on page 41 for shading activity.

The pupils will compare and order the unit fractions and like fractions using symbols.

Explain to the pupils that unit fractions have a numerator of 1 and different denominators. To compare and order them, the following rule is applied:

The greater the denominator, the smaller the unit fraction. Explain the concept through the following examples.

Compare 1/3 and 1/5. Since 5 is greater than 3, 1/5 is smaller than 1/3.

Compare ¼ and 1/6. Since 6 is greater than 4, 1/6 is smaller than 1/4.

Now, tell them, like fractions have the same denominator. To compare and order them the following rule is applied:

Compare the numerators directly. The larger the numerator, the larger the fraction.

Compare 2/7 and 5/7. Since 5 is greater than 2, 5/7 is larger than 2/7.

Compare 3/8 and 6/8. Since 6 is greater than 3, 6/8 is larger than 3/8.

Provide like fractions cards and ask students to compare them by looking at the numerators.

Create a game where students draw fraction cards and place them in order from smallest to largest based on the numerators.

Classwork: Help them to attempt (Exercise 4 Q1 and 2)

The pupils will add and subtract like fractions.

Tell them that to add and subtract like fractions we add only numerators and keep the denominators same.

Create cards with different fractions. Have students draw two cards and either add or subtract the fractions. Refer to the examples in Maths wise 2 page 44.

Use fraction bars or circles to visually demonstrate the addition and subtraction of like fractions. This helps in understanding how the parts combine or separate.

Classwork: Ask pupils to do some questions independently (Exercise 5 Q1 and 2).

Lessons Plan

Suggested Time: 2 periods

Objectives:

To enable students to:

- Recognise fractions as equal parts of a whole.
- Identify half, one third and quarter with the help of objects and figures (without writing 1/2, 1/3, 1/4).
- Represent half, one third and quarter in numerical form (1/2, 1/3 and 1/4).
- Shade the equal parts of a given figure to match a given fraction.
- Recognise fractions like two thirds (2/3), three fourths (3/4), four fifths (4/5), up to nine tenths (9/10).
- Identify, name and write;
    - - unit fractions
    - - non-unit fractions

Concept Connector:

Fractions are an integral part of our daily lives. We use fractions in everything; all recipes require fractions, shopping discounts are in fractions of the actual price, etc. Students have previously learnt that fractions are equal parts of a whole. They are also familiar with what half and quarter are. Building on their previous concept, students will now learn how to read, write, and represent different fractions.

Exploring the Objectives:

Using **text on Page 38** and the support of **Math in Action on Page 41**, recall what fractions are and why they are important. The students will pictorially and textually recall how half and quarter is represented. Move onto the **Writing Fractions heading** and explain to the students that there is a way of writing fractions. Each fraction consists of three parts: a numerator, a denominator, and the fraction line. Explain to them what numerator and denominator are. Use the example of burger being cut into 3 equal parts to teach them how to write fractions.

Move onto explaining to the students what unit fractions are using the text and pictures on **Page 39 and 40**. Throughout the lesson, use the terms 'numerator' and 'denominator' to make them familiar with the concept. Explain to the students the concept of one-tenth. Move onto to further explaining them how unit and non-unit fractions are different – unit fractions always have 1 as its numerator, while non-unit fraction have any number but 1 as its numerator. The teacher may use **Example 1 on Page 41** to help the students differentiate between unit and non-unit fractions.

Activity:

What you need:

- Chart paper (various colors)
- Scissors
- Glue sticks
- Markers or crayons
- Fraction Pizza templates (circles divided into different fractions etc.)

How to play:

Give each student a circular template representing a pizza and ask them to color and decorate it.
Have students cut out their pizza into different fractions (halves, thirds, quarters, sixths, eighths etc).
Assign the students different fractions (including unit and non-unit fractions).
The students will glue the fraction pieces onto an empty pizza base. For example, they can glue 2 one-third pieces of pizza slice to show 2/3.
Once the pizzas are assembled, have students label each pizza with the correct fraction (e.g., 1/2, 2/3, ¼, 2/6, 5/8).

Reflection:

The students develop the skills of reading and writing different fractions.

Exercise:

Assign the students **Question 1 of Exercise 1** as individual practice in class. This question will help the write fractions symbolically or numerically. **Question 2** can be given as homework as it's an easy-level question and students only have to shade the given figures according to the fraction given. For support, worksheets from **Math Lab Pages 51-60** can also be used to test and reinforce students' knowledge about fractions.

To reinforce the students knowledge about unit fractions, assign them **Exercise 2**.

Extension activity:

Use **QR code activity sheet on Page 41** to reinforce the concept of shading figures according to fractions. Furthermore, the following question can be given as added practice, worksheet or as reinforcement of the topic.

1. Identify and encircle the non-unit fractions.
   1/3 2/5 ¾ 1/7 6/9 1/8 1/5 9/10

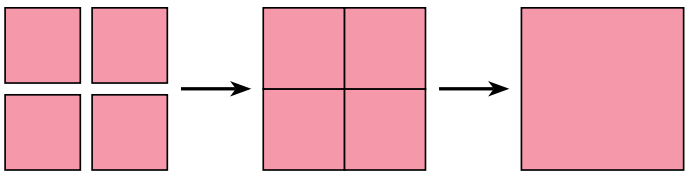
Fractions

Learning Objective:

- Recognise fractions as equal parts of a whole.
- Identify half, one third and quarter with the help of objects and figures. Let's Talk Math: Is a fraction a number? Ask pupils this question and discuss it. Represent half, one third and quarter in numerical form.

Make Sure You Have:

- Any object that can be easily cut into halves and quarters.



4 quarters = 1 whole

$\frac{1}{4} + \frac{1}{4} + \frac{1}{4} + \frac{1}{4} = 1$ whole

Activity: Slice and Solve

Duration: 1 Lesson **Whole Class Activity**

Let's Try It:

- Place 3 oranges in front of the class and ask them to count.
- Remove 2 oranges and ask them to count again.
- Cut the remaining orange in half, remove one half, and ask them to count. Some will say "half" or "one."
- Explain that "one" is incorrect because only half remains.
- Bring out 2 more oranges, cut one into thirds and the other into fourths.
- Ask them to identify the pieces (some may say "third" or "quarter").
- Clarify that both "quarter" and "fourth" are correct, as long as pieces are equal.
- Write "half" on the board and ask if they know what number represents half.
- Let them guess, then write "$\frac{1}{2}$" and explain fractions represent parts of a whole.
- Ask them to guess how to write a third or a fourth and have them try on the board.

Assessment:

- Give students a worksheet or have them copy from the board.
- Write $\frac{1}{2}$, $\frac{1}{3}$ and $\frac{1}{4}$ on one side and draw four circles on the other.
- Color the circles to represent fractions, with one fully colored.
- Ask pupils to match the numbers to the correct circles.

Fractions

Learning objective:

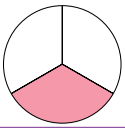
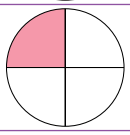
- Shade the equal parts of a given figure to match a given fraction.
- Recognise and name unit fractions up to 1 .
- 10
- Recognise fractions like two thirds, three fourths, four fifths, up to nine tenths.

Let's Talk Math:

- Ask pupils how they would know when to use a number and when to use a fraction.

Make Sure You Have:

- Circular piece of paper
- Chalk
- Blackboard/Whiteboard

$\frac{1}{3}$		1 out of 3 equal parts →	one-third
$\frac{1}{4}$		1 out of 4 equal parts →	one-fourth or quarter

Activity: Divide and Conquer

Duration: 1 Lesson **Whole class activity**

Let's Try It:

- Write fractions on the board; $\frac{1}{2}$, $\frac{1}{3}$, $\frac{1}{4}$ ... $\frac{1}{10}$
- Ask pupils to read them out as "one over six", "one sixth" or even "sixth."
- Then point out that $\frac{2}{3}$ rd is also a fraction. Invite a volunteer to the board to draw what they see as $\frac{2}{3}$ rd.
- This could be done by drawing a square or a circle and shading it.
- Ask pupils to think of as many fractions as possible with denominators 2,3,4,5,6,7,8,9,10 and give them 5 minutes to write them down.
- Reminding them that the numerator should not be bigger than, or equal to the denominator.
- They should have 45 in total.
- If they don't, have them do a peer review to try and figure out what they missed.

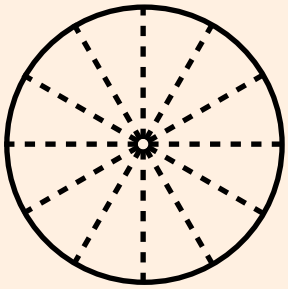
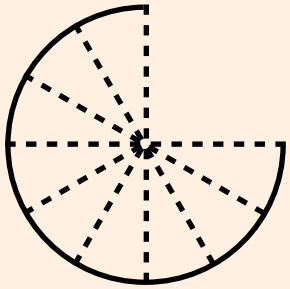
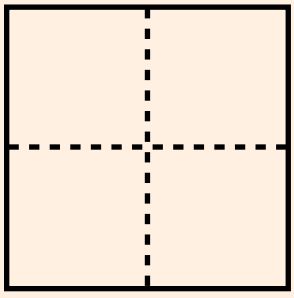
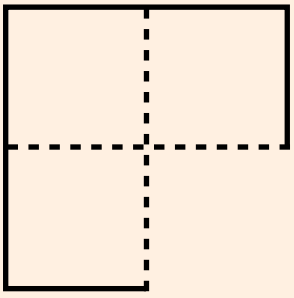
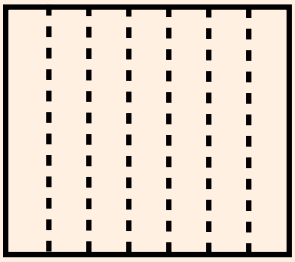
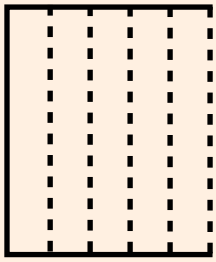
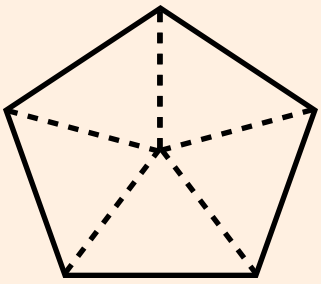
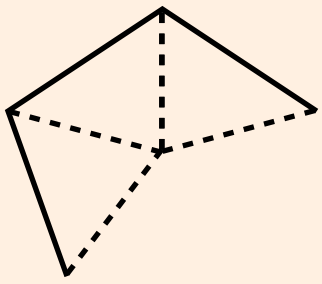
Assessment:

- Give each pupil a circular piece of paper. On the back write down a fraction and ask them to colour a part of the circle to represent the fraction.

Name: _____

Date : _____

Fraction Shapes

Whole	Missing Part	Fractions
		Missing Parts = Total Parts =
		
		
		

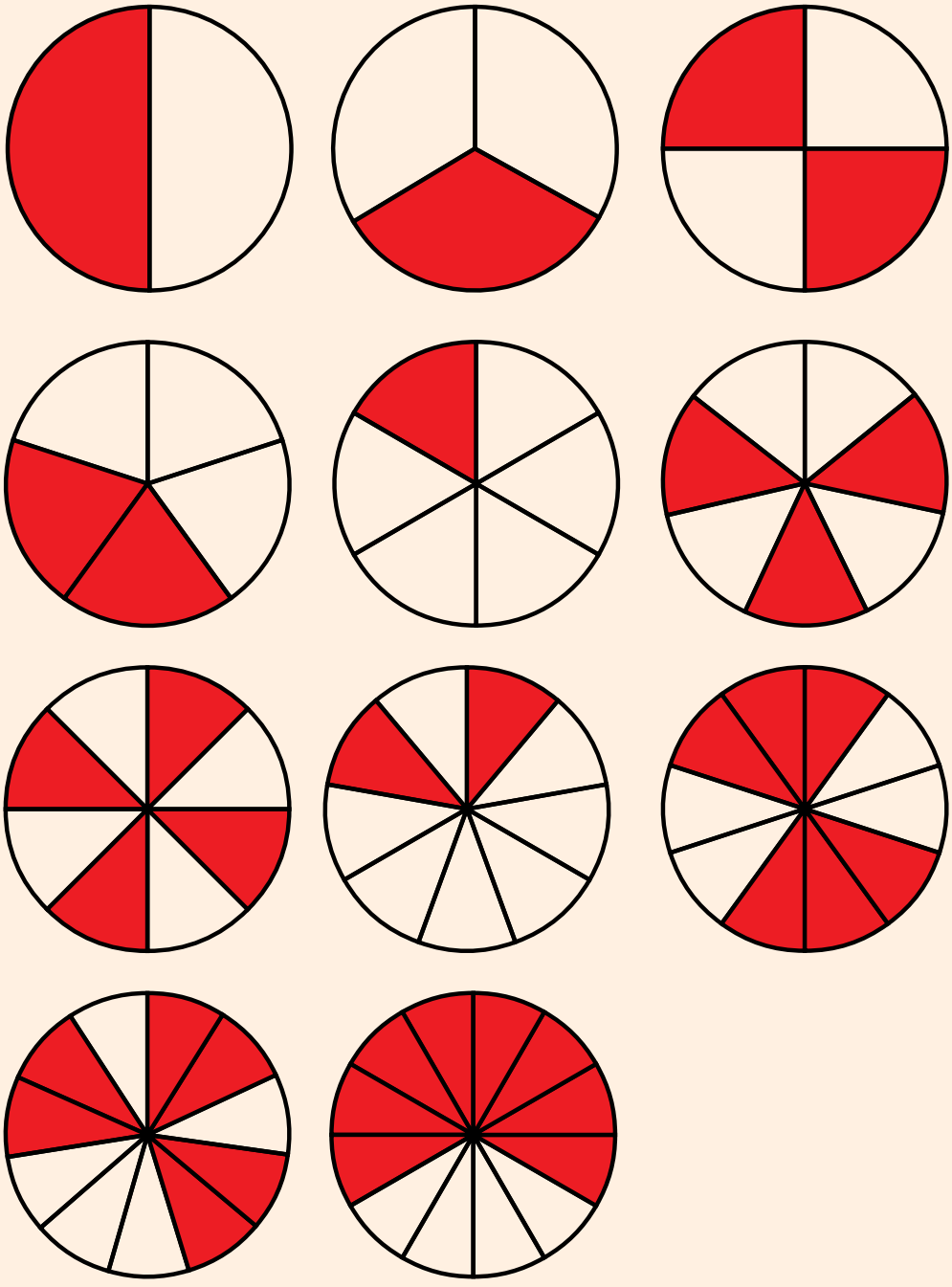
Explain that fractions are equal parts of a whole and ask the class to complete this table by **identifying,** and drawing the remaining parts to make every shape **whole** again. Write the fractions.	*Fractions*

Note: Fraction shapes can be used to explore fractions.

Name: _____

Date : _____

Fraction Discs



Give the students a scattered bunch of **fractions** that they must **match** to **represent** each of these appropriately.	*Fractions*

Note: Fraction circles can be used to develop the understanding of fractions.

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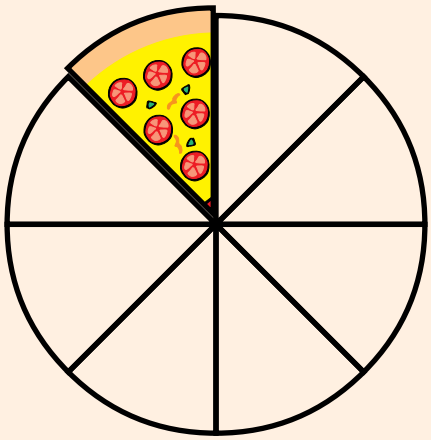
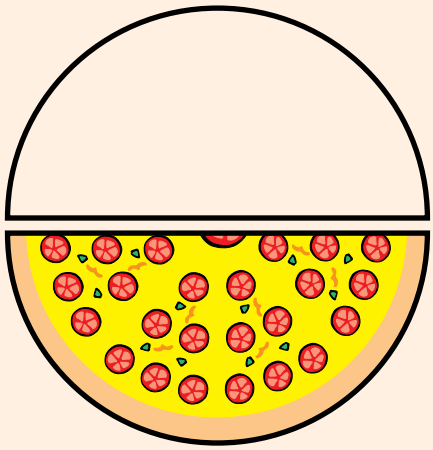
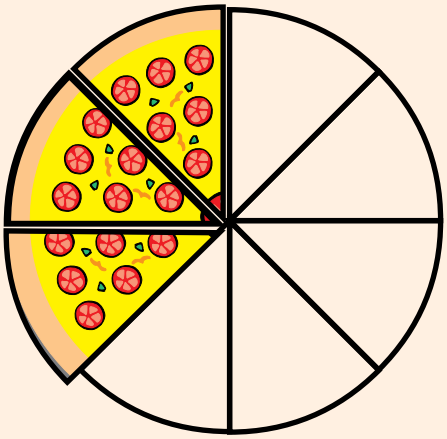
Name: _____

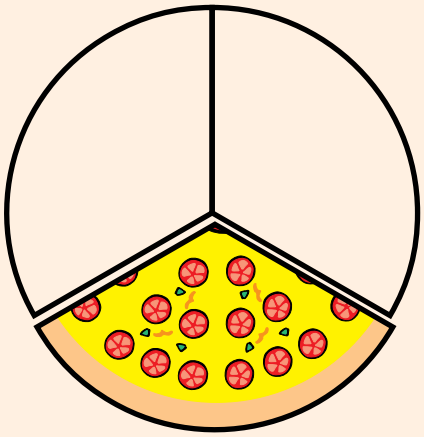
Date : _____

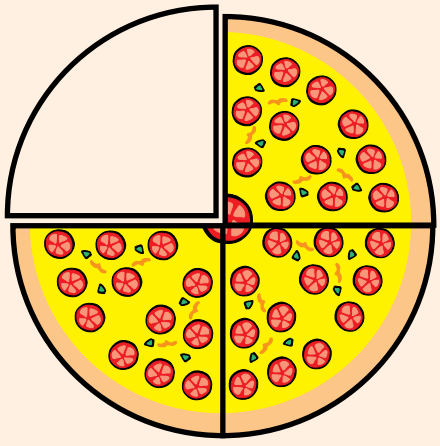
Pizza Party











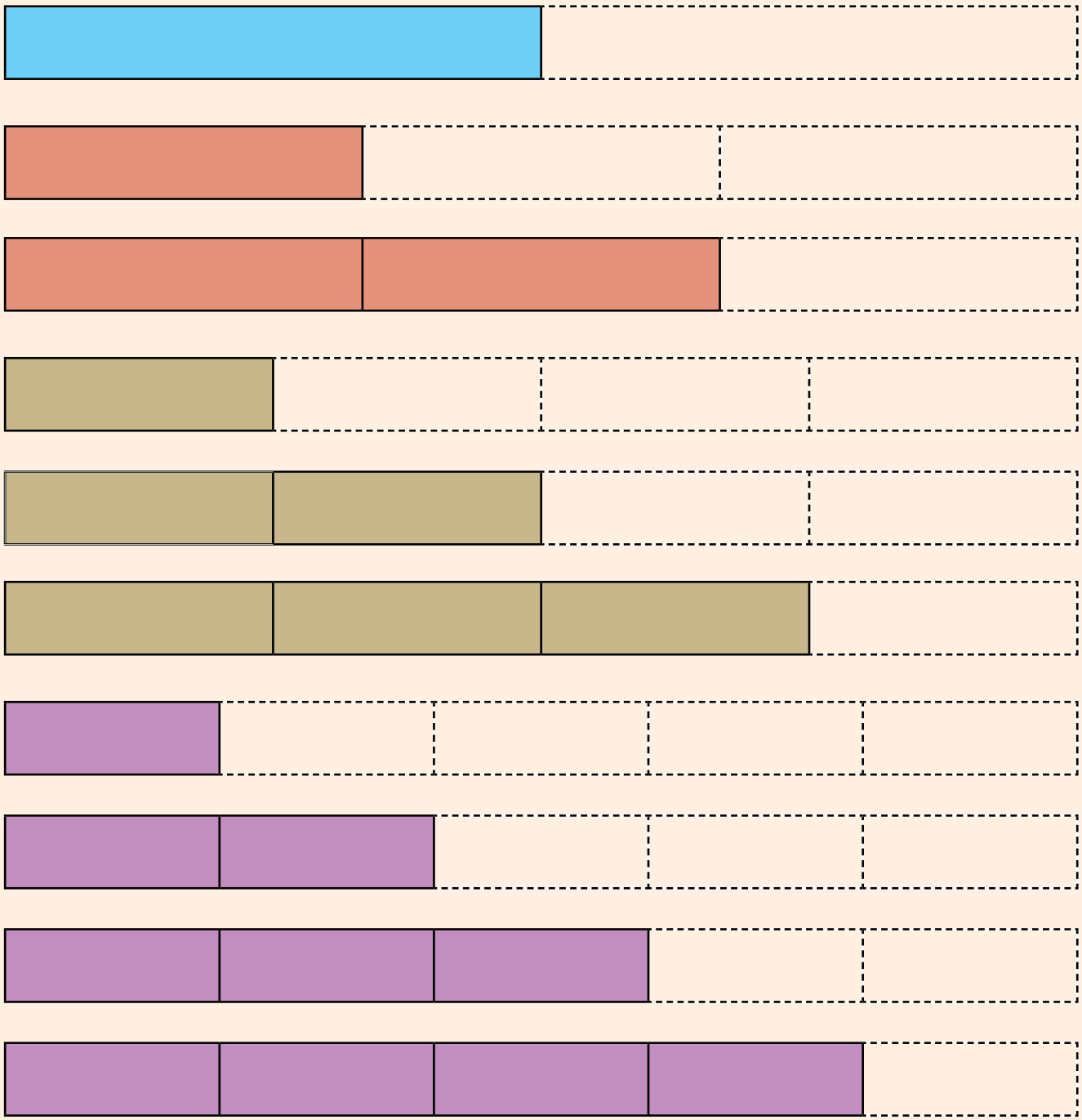
A pizza pie has 8 slices. Looking at the above figures guess how many slices each fraction represents.	*Fractions*

Note: Fraction circles can be used to explain $\frac{1}{2}$, $\frac{1}{4}$,...

Name: _____

Date : _____

Fractions Bars



Write a **fraction** next to each of the bar models so that it correctly **represents** the shaded part against the whole figure.	*Fractions*

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Name: _____

Date : _____

Fractions Bars

Name: _____

Date : _____

Fractions Bars

OXFORD UNIVERSITY PRESS

Name: _____

Date : _____

Fractions Bars

Name: _____

Date : _____

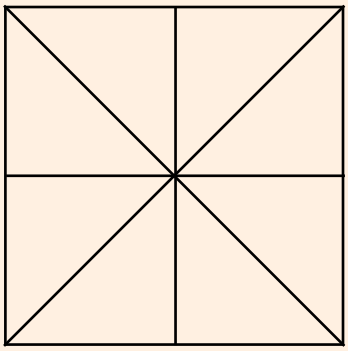
Fractions Bars

OXFORD UNIVERSITY PRESS

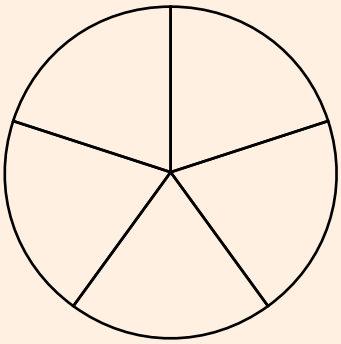
Name: _____

Date : _____

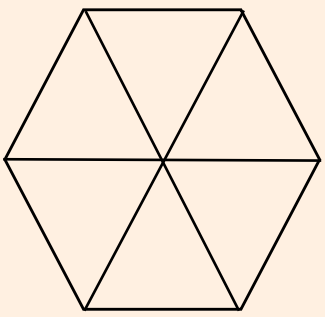
Shading Fractions



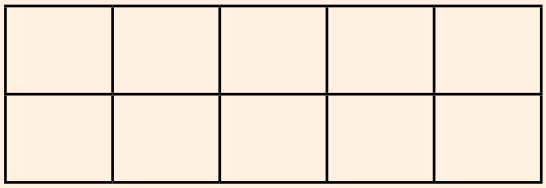
Shade: $\frac{5}{8}$



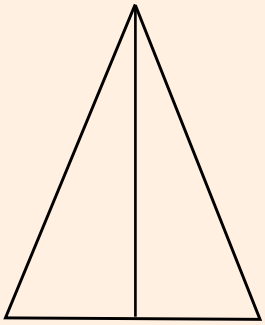
Shade: $\frac{3}{5}$



Shade: $\frac{2}{3}$



Shade: $\frac{7}{10}$



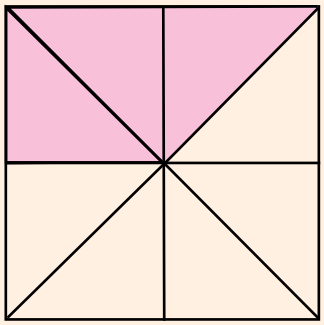
Shade: $\frac{1}{2}$

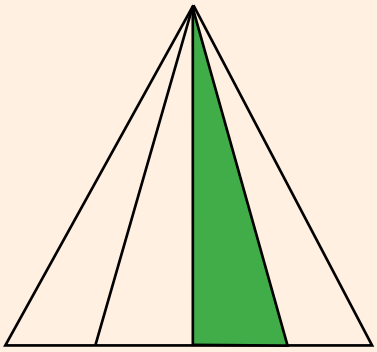
Ask the students to represent the given fractions by shading. Explain that $\frac{1}{2}$ is a unit fractions, and ask for more examples of unit fractions.	*Fractions*

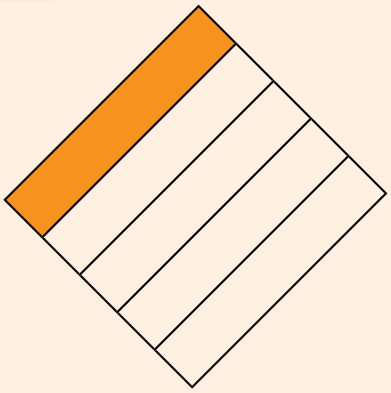
Name: _____

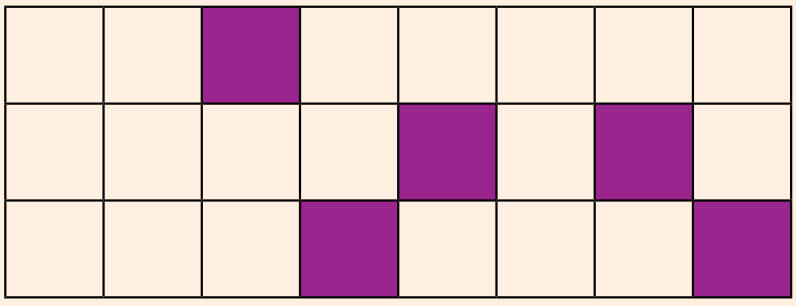
Date : _____

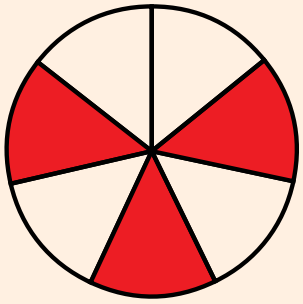
Fractions











Ask the students to write the fraction of shaded parts in each shape.	*Fractions*

Name: _____

Date : _____

Fractions Card

$\frac{1}{2}$	$\frac{1}{3}$	$\frac{2}{3}$	$\frac{1}{4}$
$\frac{2}{4}$	$\frac{3}{4}$	$\frac{1}{5}$	$\frac{2}{5}$
$\frac{3}{5}$	$\frac{4}{5}$	$\frac{1}{6}$	$\frac{2}{6}$

Mix the fraction cards. Have the students group these cards according to their **denominator**, or 'whole number of parts'. Ask them to pick out the **fraction** that represents half or $\frac{1}{3}$ or $\frac{1}{4}$ or $\frac{1}{5}$ or all from each group, and colour unit fractions blue.	*Fractions*

Note: Cuisenaire rods can be used to demonstrate fractions.

Name: _____

Date : _____

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Name: _____

Date : _____

Fractions Card

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

Name: _____

Date : _____

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Name: _____

Date : _____

Fractions Card

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

Name: _____

Date : _____

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Name: _____

Date : _____

Fractions Card

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

Name: _____

Date : _____

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Name: _____

Date : _____

Fractions Card

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

Name: _____

Date : _____

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Name: _____

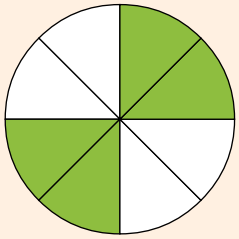
Date : _____

Fractions Card

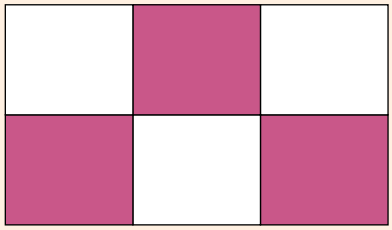
$\frac{6}{12}$	$\frac{7}{12}$	$\frac{8}{12}$	$\frac{9}{12}$
$\frac{10}{12}$	$\frac{11}{12}$		

Fractions

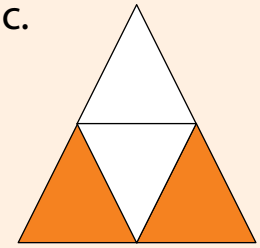
1. Write down the fraction that is unshaded in the following figures.

a. 

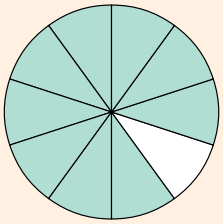
_____

b. 

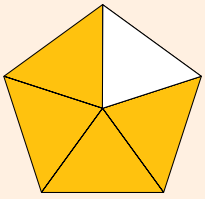
_____

c. 

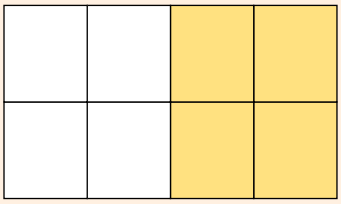
_____

d. 

_____

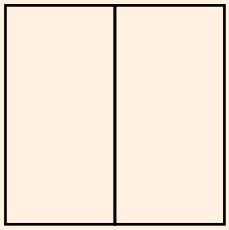
e. 

_____

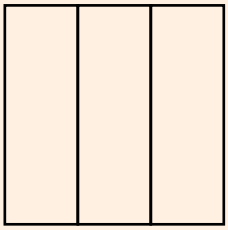
f. 

_____

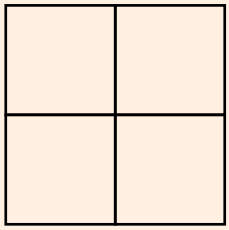
2. Colour to show the given fractions.

a. 

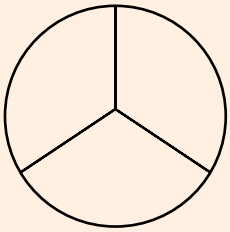
$\frac{1}{2}$

b. 

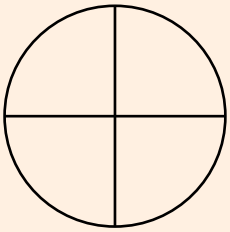
$\frac{2}{3}$

c. 

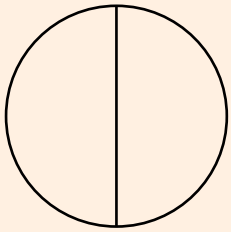
$\frac{1}{4}$

d. 

$\frac{3}{3}$

e. 

$\frac{2}{4}$

f. 

$\frac{1}{2}$

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3. Identify the following fractions as like or unlike fractions.

a. $\frac{3}{5}$ $\frac{1}{5}$ b. $\frac{2}{7}$ $\frac{8}{10}$ c. $\frac{2}{4}$ $\frac{1}{3}$

d. $\frac{3}{3}$ $\frac{1}{3}$ e. $\frac{2}{9}$ $\frac{6}{9}$ f. $\frac{3}{8}$ $\frac{3}{7}$

4. Compare the fractions and write < , > or = in the blanks.

a. $\frac{1}{3}$ _____ $\frac{2}{3}$ b. $\frac{6}{8}$ _____ $\frac{2}{8}$

c. $\frac{4}{10}$ _____ $\frac{7}{10}$ d. $\frac{10}{11}$ _____ $\frac{13}{11}$

e. $\frac{5}{5}$ _____ $\frac{5}{5}$ f. $\frac{15}{20}$ _____ $\frac{12}{20}$

5. Compare and order the fractions in ascending order.

a. $\frac{3}{9}$, $\frac{7}{9}$, $\frac{4}{9}$, $\frac{1}{9}$ _____

b. $\frac{2}{8}$, $\frac{4}{8}$, $\frac{1}{8}$, $\frac{6}{8}$ _____

c. $\frac{7}{15}$, $\frac{13}{15}$, $\frac{5}{15}$, $\frac{3}{15}$ _____

d. $\frac{11}{20}$, $\frac{4}{20}$, $\frac{17}{20}$, $\frac{1}{20}$ _____

6. Compare and order the fractions in descending order.

a. $\frac{3}{11}$, $\frac{6}{11}$, $\frac{10}{11}$, $\frac{8}{11}$ _____

b. $\frac{9}{14}$, $\frac{5}{14}$, $\frac{12}{14}$, $\frac{2}{14}$ _____

c. $\frac{1}{9}$, $\frac{7}{9}$, $\frac{9}{9}$, $\frac{4}{9}$ _____

d. $\frac{10}{20}$, $\frac{19}{20}$, $\frac{17}{20}$, $\frac{16}{20}$ _____

7. Solve.

a. $\frac{5}{7} + \frac{1}{7} =$ ☐

b. $\frac{4}{9} + \frac{5}{9} =$ ☐

c. $\frac{7}{11} + \frac{3}{11} =$ ☐

d. $\frac{8}{12} + \frac{1}{12} =$ ☐

e. $\frac{9}{16} + \frac{5}{16} =$ ☐

f. $\frac{6}{14} - \frac{3}{14} =$ ☐

g. $\frac{16}{17} - \frac{12}{17} =$ ☐

h. $\frac{8}{8} - \frac{2}{8} =$ ☐

i. $\frac{19}{20} - \frac{11}{20} =$ ☐

j. $\frac{12}{12} - \frac{10}{12} =$ ☐

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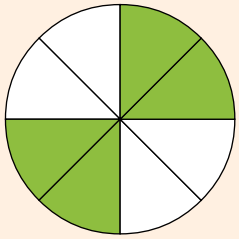
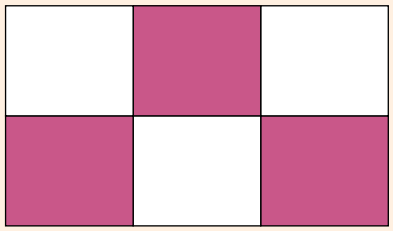
Fractions

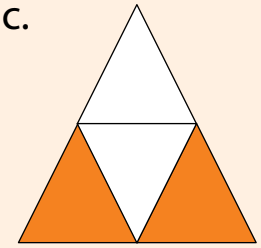
1. Write down the fraction that is unshaded in the following figures.

a. 

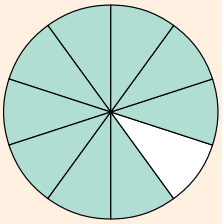
$\frac{2}{8}$

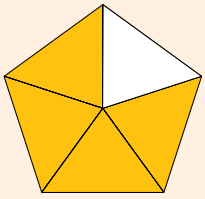
b. 

$\frac{3}{6}$

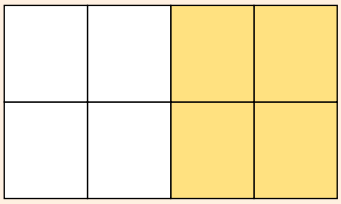
c. 

$\frac{2}{4}$

d. 

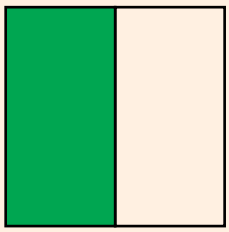
e. 

$\frac{4}{5}$

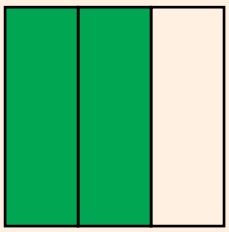
f. 

$\frac{4}{8}$

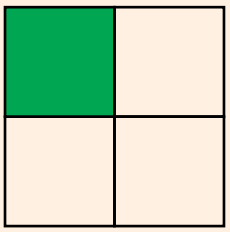
2. Colour to show the given fractions.

a. 

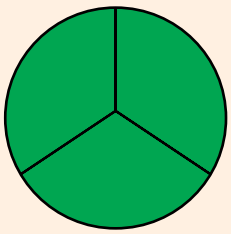
$\frac{1}{2}$

b. 

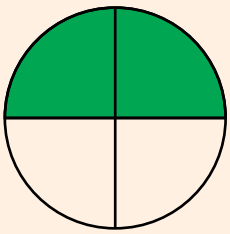
$\frac{2}{3}$

c. 

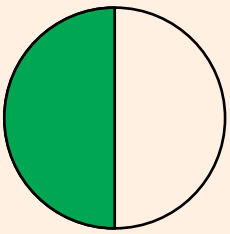
$\frac{1}{4}$

d. 

$\frac{3}{3}$

e. 

$\frac{2}{4}$

f. 

$\frac{1}{2}$

3. Identify the following fractions as like or unlike fractions.

a. $\frac{3}{5}$ $\frac{1}{5}$ — Like fractions

b. $\frac{2}{7}$ $\frac{8}{10}$ — unLike fractions

c. $\frac{2}{4}$ $\frac{1}{3}$ — unLike fractions

d. $\frac{3}{3}$ $\frac{1}{3}$ — Like fractions

e. $\frac{2}{9}$ $\frac{6}{9}$ — Like fractions

f. $\frac{3}{8}$ $\frac{3}{7}$ — unLike fractions

4. Compare the fractions and write < , > or = in the blanks.

a. $\frac{1}{3}$ ___<___ $\frac{2}{3}$

b. $\frac{6}{8}$ ___>___ $\frac{2}{8}$

c. $\frac{4}{10}$ ___<___ $\frac{7}{10}$

d. $\frac{10}{11}$ ___<___ $\frac{13}{11}$

e. $\frac{5}{5}$ ___=___ $\frac{5}{5}$

f. $\frac{15}{20}$ ___>___ $\frac{12}{20}$

5. Compare and order the fractions in ascending order.

a. $\frac{3}{9}$, $\frac{7}{9}$, $\frac{4}{9}$, $\frac{1}{9}$ — $\frac{1}{9}$, $\frac{3}{9}$, $\frac{4}{9}$, $\frac{7}{9}$

b. $\frac{2}{8}$, $\frac{4}{8}$, $\frac{1}{8}$, $\frac{6}{8}$ — $\frac{1}{8}$, $\frac{2}{8}$, $\frac{4}{8}$, $\frac{6}{8}$

c. $\frac{7}{15}$, $\frac{13}{15}$, $\frac{5}{15}$, $\frac{3}{15}$ — $\frac{3}{15}$, $\frac{5}{15}$, $\frac{7}{15}$, $\frac{13}{15}$

d. $\frac{11}{20}$, $\frac{4}{20}$, $\frac{17}{20}$, $\frac{1}{20}$ — $\frac{1}{20}$, $\frac{4}{20}$, $\frac{11}{20}$, $\frac{17}{20}$

6. Compare and order the fractions in descending order.

a. $\frac{3}{11}, \frac{6}{11}, \frac{10}{11}, \frac{8}{11}$ → $\frac{10}{11}, \frac{8}{11}, \frac{6}{11}, \frac{3}{11}$

b. $\frac{9}{14}, \frac{5}{14}, \frac{12}{14}, \frac{2}{14}$ → $\frac{12}{14}, \frac{9}{14}, \frac{5}{14}, \frac{2}{14}$

c. $\frac{1}{9}, \frac{7}{9}, \frac{9}{9}, \frac{4}{9}$ → $\frac{9}{9}, \frac{7}{9}, \frac{4}{9}, \frac{1}{9}$

d. $\frac{10}{20}, \frac{19}{20}, \frac{17}{20}, \frac{16}{20}$ → $\frac{1}{20}, \frac{4}{20}, \frac{11}{20}, \frac{17}{20}$

7. Solve.

a. $\frac{5}{7} + \frac{1}{7} =$ $\frac{6}{7}$

b. $\frac{4}{9} + \frac{5}{9} =$ $\frac{9}{9}$

c. $\frac{7}{11} + \frac{3}{11} =$ $\frac{10}{11}$

d. $\frac{8}{12} + \frac{1}{12} =$ $\frac{9}{12}$

e. $\frac{9}{16} + \frac{5}{16} =$ $\frac{15}{16}$

f. $\frac{6}{14} - \frac{3}{14} =$ $\frac{3}{14}$

g. $\frac{16}{17} - \frac{12}{17} =$ $\frac{4}{17}$

h. $\frac{8}{8} - \frac{2}{8} =$ $\frac{6}{8}$

i. $\frac{19}{20} - \frac{11}{20} =$ $\frac{8}{20}$

j. $\frac{12}{12} - \frac{10}{12} =$ $\frac{2}{12}$

Unit 5 Money

Learning Framework

Unit 5 Money

The pupils will identify international currency and their denominations. They will also solve money problems involving addition and subtraction of Pakistani currency and few international curren

Explain that money is used to purchase items we need and want. Show examples of different types of currency, such as coins and bills, used in Pakistan.

Display real coins and bills and explain their values. For instance, in Pakistan, you might show a 1-rupee coin, a 5-rupee coin, and a 10-rupee coin, Also, you can show 50-rupee, 100 -rupee, 500-rupee, 1000 -rupee, and 5000-rupee banknotes.

Use visual aids to show international currency like pounds and dollars.

Use pictures or actual money to help students identify and differentiate between various denominations.

Teach students how to count money by adding the values of different coins and bills.

Practice counting with various combinations of coins and bills to reinforce the concept.

Classwork: To enhance their learning ask them to try focused questions (Exercise 1 Q 1 and 2).

To solve word problems involving money provide worksheets with word problems that involve counting money, making change, and comparing amounts. Include pictures of coins and bills to make it more engaging (Maths Wise 2 page 48).

Classwork: Attempt the word problems. (Exercise 1 Q3).

Lesson Plan

Suggested Time: 2 periods

Objectives:

To enable students to:

- Identify international currency and denominations.
- Solve money problems involving addition and subtraction of Pakistani money and a few selected international currency notes.

Concept Connector:

Money is very important in our daily life. It is used for all transactions. Before starting the topic, ask the students why money is important. Use **Concept Connector Page 47** to recall with students the currency coins and banknotes used in Pakistan.

Exploring the Objectives:

Using **pictures and text on Page 47**, introduce the two bigger banknotes of Rs 1000 and Rs 5000 to the students. Move onwards towards currency being different in different parts of the world, for example GBP used in the UK, USD used in the United States of America, Yen used in Japan, etc. The teacher may also bring real/dummy money to show the currency used. Explain and recall with the students that there are different denominations for a particular amount of money, and those denominations can also be added or subtracted.

Using **Examples 1 to 3 on Page 48**, explain that addition and subtraction of money is done the same way as whole numbers. **Examples 1 and 2** exhibit real-life applications to see if enough money is available to make a purchase, while **Example 3** shows subtraction of money.

Activity:

Shopping

What you need:

- Different objects (toys, candies, stationary, etc)
- Dummy money

How to Play:

Provide a certain amount of dummy money to the students (for example, Rs 500).
Lay out the objects with different price tags.

Ask the students to buy two or three different objects. The students will carry out addition or subtraction to determine if they have enough money to make a purchase.

Reflection:

Students develop financial literacy and understand the value and responsibility of managing money.

Students enhance the skills of using number operation involving money.

Exercise:

Recognition of money or different currencies can be reinforced using **Question 1 of Exercise 1 on Page 49**. **Question 2** is about the denomination or combination of banknotes or coins for a particular amount of money. This will help the students understand and develop financial literacy. It can be given as homework.

Question 3 of the exercise is a medium to hard level question that addresses the real-life applications of money. This question can be done in the classroom through guided practice.

Extension Activity:

Use **Math Quest on Page 51** as a reinforcement of using number operations on money. Furthermore, the following questions can be given as added practice, worksheet or as reinforcement of the topic.

1. How many denominations of Rs 500 can you make?
2. Ahmed has Rs 750. He buys candies for Rs 183. How much money is left with him?
3. If Saad gets Rs 1000 as pocket money for a month, how much pocket money would he get for 2 weeks? (hint: 1 month = 4 weeks)

Name: _____

Date : _____

Using My Allowance

Item	Can buy	Price	Money in Hand	Require
Glasses	No	Rs 68	Rs 50	Rs (68 – 50) = Rs 18

For each item decide if you have enough allowance. If not, then decide how much more you need and if yes then decide the combination of **notes** and **coins** needed. Assume that you have Rs 50.	*Comparing money*

Money

1. Solve the following real-life problems.

   a. Sarah has three 100-rupee banknotes and four 2-rupee coins. How much money does she have?

   b. Ali had three 50-rupee banknotes. He gave one 50-rupee banknote to the shopkeeper. How much money is left with him?

   c. Faisal had Rs 937. He bought a crate of mangoes for Rs 659. How much money is left?

   d. Aleena got $460 as her birthday gift. Her mother gave her $350 more. How much money does she have?

   e. A large pizza costs Rs 800 and a small pizza costs Rs 400. How much money would be required to buy both pizzas?

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Money

1. Solve the following real-life problems.

   a. Sarah has three 100-rupee banknotes and four 2-rupee coins. How much money does she have?

   100 + 100 + 100 + 2 +2 + 2 + 2 = Rs 308

   b. Ali had three 50-rupee banknotes. He gave one 50-rupee banknote to the shopkeeper. How much money is left with him?

   50 + 50 = Rs 100
   100 - 50 = Rs 50

   c. Faisal had Rs 937. He bought a crate of mangoes for Rs 659. How much money is left?

   937 - 659 = Rs 278

   d. Aleena got Rs 460 as her birthday gift. Her mother gave her Rs 350 more. How much money does she have?

   460 + 350 = Rs 810

   e. A large pizza costs Rs 800 and a small pizza costs Rs 400. How much money would be required to buy both pizzas?

   800 + 400 = Rs 1200

Unit

6 Measurement: Length, Mass, Capacity, and Temperature

Learning Framework

Unit 6 Measurement: Length, Mass, Capacity

Pupils will learn to compare different objects based on their lengths. They will get acquainted with the different units of length and will use a centimeter scale to measure the length of given lines or objects.

Before introducing any unit of length, it is necessary to emphasis upon the need of standard units. Draw on board two lines side by side of approximately equal length. Name them as Line-A and Line-B. Now ask a pupil which line is larger? If he says line-A, tell the class that from your position line-B seems larger. Change your position and repeat the same question with another pupil and oppose his reply with the same argument. After some time, ask the class, are these lines equal? What ever be the reply, ask them how can we confirm this? In the end use a measuring tape or ruler to measure the length of each line and write it on the board. Now ask the same question and see how whole class will come to the same conclusion. Now ask how we could finally decide about the length of lines? Tell them it is because of standard unit of length and measuring device. Better show them a metre scale to physically see how long one metre is. Then show them 100 equal divisions on the meter scale to let them compare the standard length of a metre and a centimetre. Show them what is the suitable unit to measure the length of a pencil or length of a board.

Better show them a metre scale to physically see how long one metre is. Then show them 100 equal divisions on the metre scale to let them compare the standard length of a metre and a centimetre. Show them what is the suitable unit to measure the length of a pencil or length of a board. Also explain to them to measure the length of an object, we start counting from the 'zero' of ruler or measuring tape.

Classwork: Complete Exercise 1 with a clear demonstration to use a ruler to measure the length of the given objects.

Pupils will learn to add and subtract different lengths expressed with the same unit.

Better show them when you add 5 bananas to 8 bananas, you get 13 bananas. In the same way when you add 5 cm to 8 cm you will get 13 cm. While having real-life problems, let them first read and understand the language of the problem then introduce mathematical equivalents in the scenario.

Classwork: Complete (Exercise 2 Q1, 2, and 3) with clear explanation of real-life problems.

Pupils will learn to compare different objects based on their weights. They will get acquainted with the different devices used to measure the mass and with the different units of mass.

Bring a book or anything safer for young pupils of approximately 1kg. Introducing it to class as an object of 1kg. Put a few more safe objects there. Let the students pick the 1kg object and other objects and decide which object is heavier or lighter than 1kg. Show them some cotton and let them hold it to guess its mass. It is so smaller than 1kg. Smaller masses are measured in grams.

Classwork: To give them more practice ask them to do more questions from (Exercise 3 Q1, 2, 3, and 4).

Pupils will learn to add and subtract different masses expressed with the same unit.

Pupils have already learnt the addition and subtraction of different lengths expressed with the same unit. With explanation, they can easily understand that 'kg' will be simplified with 'kg' and 'g' will be added or subtracted to 'g'. Real-life problems should be elaborated with the meaning of each word and its mathematical equivalent.

Classwork: Complete Exercise 4 with clear explanation of real-life problems.

Pupils will learn to compare different objects based on their capacities to hold liquids. They will get acquainted with the different units of capacity as well.

Show them a smallused bottle of perfume and ask which can hold more water, this small bottle or your water bottle. An object with small capacity can hold less water while objects with larger capacity can hold more water. The smaller capacity is measured in milliliters (ml) and the larger capacity is measured with liters (l).

Classwork: Complete Exercise 5 with your pupils in class.

Pupils will learn to add and subtract different capacities expressed with the same unit.

Pupils have already learnt the addition and subtraction of different lengths masses expressed with the same unit. With explanation, they can easily understand that 'l' will be simplified with 'l' and 'ml' will be added or subtracted to 'ml'. Real-life problems should be elaborated with the meaning of each word and its mathematical equivalent.

Complete Exercise 6 with a clear explanation of real-life problems.

Lesson: 2 periods

Objectives:

To enable students to:

- Recognise and use the standard units of capacity (litre and millilitre) to measure and record the capacity of different objects.
- Compare capacity of different objects using standard units of capacity (litre and millilitre) using <, > and = signs.
- Add and subtract capacities given in the same units to solve real-life word problems.

Concept Connector:

Using **Math Quest on Page 62** as a starter activity, explain to the students what capacity is. Ask them how they think capacity is measured and then introduce them to the standard units of measuring capacity – litres. In this unit, they will learn how capacity is measured and the use of number operations on capacity.

Exploring the Objectives:

Start the lesson, using the **text on Page 62**, by recalling the definition of capacity to the students and the units related to it. Move onto explaining that, like all other measurements, capacity can also be measured using a measuring cylinder. The teach may bring an actual measuring cylinder and a beaker to show the students. **Page 74 of Math Lab** can also be used as support when explaining this concept.

The **QR code activity given on Page 62** can also be done in conjunction with the explanation to further strengthen the concepts.

Using **Examples 5 and 6 given on Pages 64 and 65**, explain to them that addition and subtraction of same units of capacity is done the same way as that of whole numbers.

Activity:

Measuring Capacities

What you need:

- Different containers with water
- Measuring cylinder or a measuring beaker

How to Play:

Pair the students into groups.
Assign them a container.
Provide them with a measuring cylinder or a measuring beaker and ask them to measure the capacity of it (in ml or l – according to the measuring instrument).

Reflection:

Students develop the skills of measuring capacity of different containers.

Exercise:

Question 1 of Exercise 5 is a reinforcement of previously learnt concepts where the students are tested for their knowledge of estimating the unit of measurement. This can either be done in the class as individual practice or as homework. Question 2 can be done as guided practice as the students are still learning how to read the scale on the measuring instruments.

When assigning Question 3, let the students know that comparison of capacities in the same unit is done the same way as comparison of numbers. The teacher may guide the students through it.

Question 4 and 5 are to be done the same way as Question 2 and 3, except that comparison and measurement is in litres. Assign the students these questions as homework.

Moving onto Exercise 6, recall that number operations applied on same units of capacity is applied the same way as that on whole numbers. Question 3 can be assigned in the classroom under the guidance of the teacher, whereas Question 1 and 2 can be given as homework.

Extension Activity:

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

1. Ahmed has a 1 l bottle of juice. He pours 300 ml into one glass and 450 ml into another glass. How much juice is left in the bottle? (Hint: 1 l = 1000 ml)

Activity Sheet

Capacity

Learning objective:

- Recognise and use the standard metric units.
- Use addition and subtraction within 100 to solve real life situations involving capacity in same units.

Let's Talk Math:

- Ask the pupils if there are any situations where inaccurate measurement could lead to mistakes.

Make Sure You Have:

- Measuring Cup

Activity: Measure and Pour Challenge

Duration: 1 Lesson **Whole Class Activity**

Let's Try It:

- Ask pupils what the standard units for measuring liquids are. Write their suggestions on the board.
- Introduce "ml" (millilitre) and "l" (litre), writing out the full terms under their abbreviations.
- Explain these are the units for measuring liquids, then ask how they think capacity is measured.
- Discuss tools for measuring liquids, like a measuring cup, referencing experiences in the kitchen.
- Establish that liquids are measured using a container with marked measurements.
- Show them a measuring cup and other containers from the science lab.
- Divide the class into groups and give each group a measuring cup with ml markings.
- Ask them to fill the cup to the highest mark and then reduce it by 10 ml increments, checking the level on a flat surface for accuracy.
- Encourage them to pour out small amounts into nearby plants, tracking how much they pour and how much remains in number sentences.

Assessment:

- Explain to the students that these units are meant only for liquids but explain that some substances like butter and cheese are measured in millilitres depending on the texture.

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Length

Learning objective:

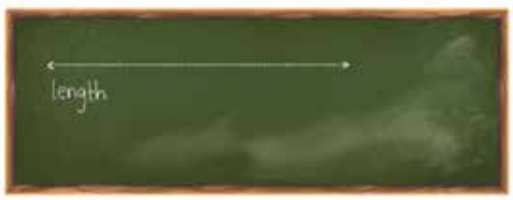
- Recognise the units of length (metres and centimetres).
- Use standard metric units of length (metres and centimetres) and their abbreviations to measure and record lengths of variety of objects.

Let's Talk Math:

- Ask pupils how they determine the length of an object.

Make Sure You Have:

- Various objects around class.
- Metre Ruler



Activity: Ruler Reality Check!

Duration: 1 Lesson **Whole Class Activity**

Let's Try It:

- Show the class a metre ruler and ask them to vote if it's long or short.
- Ask for examples of what they could measure with a ruler this size.
- Ask the class what they understand by the word "measure" and let them attempt to answer.
- Ask how they have measured things in the past (e.g., body parts like hand spans).
- Explain the inconsistency of using non-standard units like hands for accurate measurement.
- Give a real-life example, such as telling a carpenter to build something "three hands wide," and how different people would get different results.
- Introduce metres and centimetres, passing around the metre ruler for familiarity.
- Ask questions like, "Can you guess how many centimetres are in a metre?

Assessment:

- Ask pupils to trace their hand on a piece of paper and measure it in centimetres.

Activity Sheet

Mass

Learning objective:

- Recognise the units of mass i.e. kilogram, gram.
- Use standard metric units of mass (kilograms and grams) and their abbreviation to measure and record mass of variety of objects.

Let's Talk Math:

- Ask pupils if they incorporate any units of measurement in their daily lives.

Make Sure You Have:

- Digital Scales

Activity: Weight it Right

Duration: 1 Lesson Whole class activity

Let's Try It:

- Collect 5 textbooks/workbooks with varying masses (1kg, 500g, 1g).
- Pass around the weights while explaining the terms "kilogram" and "mass."
- Ask pupils why knowing the exact mass is important and how it can be used.
- Guide them to understand that standard weights help compare object mass with fixed units.
- Explain that balance scales show if objects are heavier or lighter than a certain weight.
- Use balance scales to weigh the books, with the class assisting to find the mass of each.
- Highlight the difficulty of using balance scales with limited weights.
- Introduce a modern digital scale that shows the exact mass to the gram.
- Weigh all 5 books and write the mass of each on the board.
- Have pupils arrange the books in ascending order and explain how to write units like "kg" and "g."

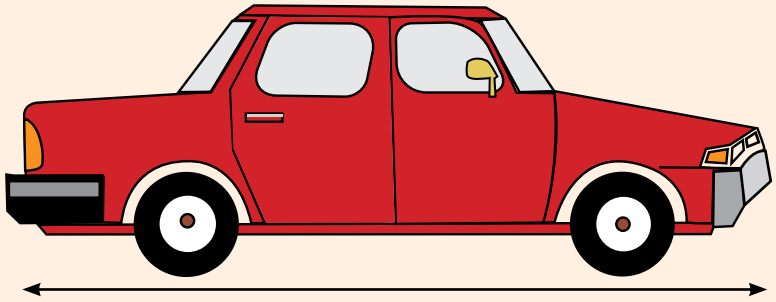
Assessment:

- Assign measurement-based questions to the class.

Name: _____

Date : _____

Guessing Length



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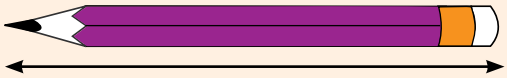
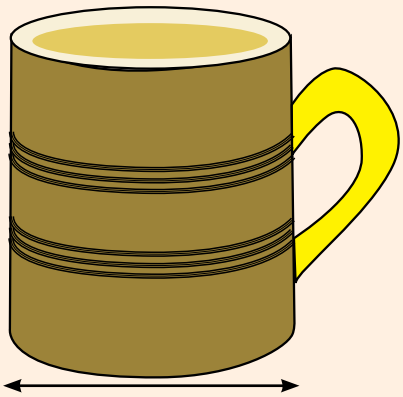
_____





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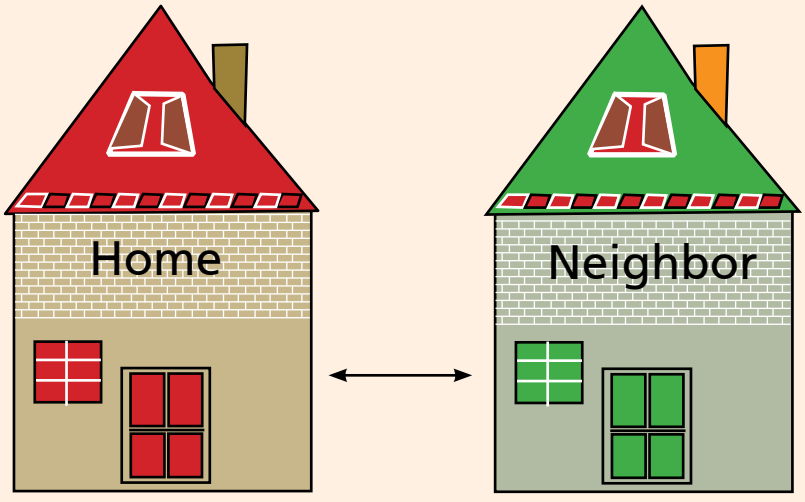

_____

Guess the appropriate **unit of measure** for each of the above. Also make an **estimate** of what you think the length might be.	*Length*

Name: _____

Date : _____

Estimate & Measure

Container	My guess (more than, less than, or about 1 l)	Measured capacity

Arrange differently sized containers on the teacher's desk; for example water bottles, coffee mug, pencil holder, etc. Ask the students to guess if the container can **hold more than, less than, or about 1 l of water**. Then pour water from each container into a measuring cup to verify each guess.	*Capacity*

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Measurement: Length, Mass, Capacity and Temperature

1. Choose the correct unit to measure the following objects.

   a. Length of a pencil (cm / m)

   b. Length of a room (m / cm)

   c. Height of a tree (cm / m)

   d. Length of a laptop screen (m / cm)

2. Measure the lengths of the following lines (in cm).

   a. _____

   b. _____

   c. _____

   d. _____

3. Solve the following.

   a. 451 cm + 329 cm = _____

   b. 765 m + 217 m = _____

   c. 690 cm + 204 cm = _____

   d. 309 m + 491 m = _____

   e. 706 cm − 184 cm = _____

   f. 300 m − 257 m = _____

   g. 604 cm − 298 cm = _____

   h. 835 m − 343 m = _____

4. Solve the following real-life problems.

   a. The length of Ayesha's shirt is 115 cm and the length of Sarah's shirt is 90 cm. What is the difference between the lengths of their shirts?

   b. The height of a mountain is 357 m and the height of the mountain next to it is 723 m. What is the total height of both mountains?

   c. The length of the park is 600 m. Hassan walked 390 m. How much more does he need to walk?

5. Read and write the mass on the given scales.

_____ g

_____ g

_____ g

☐ kg

☐ kg

☐ kg

6. Compare the masses using <, >, and = .

a. 75 g ______ 80 g b. 100 g ______ 100 g

c. 38 kg ______ 35 kg d. 273 g ______ 283 g

e. 940 kg ______ 950 g f. 300 g ______ 300 kg

7. Solve the following.

a. 567 g + 142 g = ______

b. 290 kg + 680 kg = ______

c. 728 g + 144 g = ______

d. 604 kg + 267 kg = ______

e. 521 g − 333 g = ______

f. 494 kg − 406 kg = ______

g. 900 g − 75 g = ______

h. 700 kg − 420 kg = ______

8. How many grams of each item are needed to make 1 kg mass? (1 kg = 1000 g)

a. Coffee bottle 250 g ☐

b. Packet of rice 725 g ☐

c. Can of mushrooms 100 g ☐

d. Packet of sweets 500 g ☐

9. Solve the following real-life problems.

   a. Ali weighs 25 kg and Saad weighs 27 kg. What is their total mass?

   b. A shopkeeper has 975 g of mangoes. He sells 559 g of mangoes. What is the mass of mangoes left?

   c. A car weighs 900 kg and a rickshaw weighs 672 kg. How much more does the car weighs than the rickshaw?

10. Number the objects in order of capacity — smallest to biggest.

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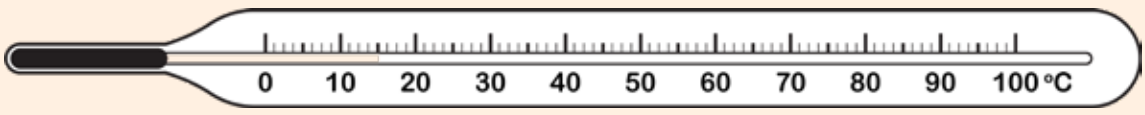
11. Solve the following real-life problems.

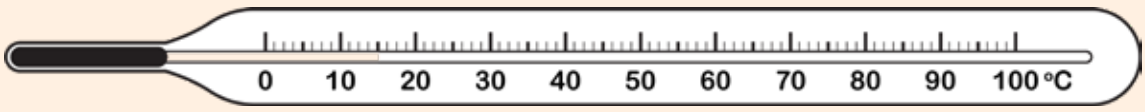
a. A water tanker has a capacity of 990 l. After watering the park, 500 l was left. How much water was used to water the park?

b. A larger swimming pool has a capacity of 500 l of water and a smaller swimming pool has a capacity of 415 l of water. What is the total capacity of both pools?

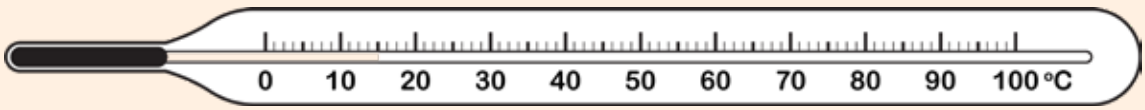
12. Colour the scale of thermometers to show the given temperatures.

a. 

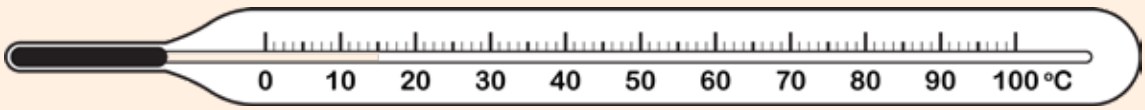
40 °C

b. 

55 °C

c. 

10 °C

d. 

75 °C

Measurement: Length, Mass, Capacity and Temperature

1. Choose the correct unit to measure the following objects.

   a. Length of a pencil — ✔cm / m

   b. Length of a room — ✔m / cm

   c. Height of a tree — cm / ✔m

   d. Length of a laptop screen — m / ✔cm

2. Measure the lengths of the following lines (in cm).

   a. _____ ☐

   b. _____ ☐

   c. _____ ☐

   d. _____ ☐

3. Solve the following.

   a. 451 cm + 329 cm = 780 cm

   b. 765 m + 217 m = 982 cm

   c. 690 cm + 204 cm = 894 cm

   d. 309 m + 491 m = 800 m

   e. 706 cm − 184 cm = 522 cm

   f. 300 m − 257 m = 43 m

   g. 604 cm − 298 cm = 306 cm

   h. 835 m − 343 m = 492 m

4. Solve the following real-life problems.

   a. The length of Ayesha's shirt is 115 cm and the length of Sarah's shirt is 90 cm. What is the difference between the lengths of their shirts?

   115 - 90 = 25 cm

   b. The height of a mountain is 357 m and the height of the mountain next to it is 723 m. What is the total height of both mountains?

   723 + 357 = 1080 m

   c. The length of the park is 600 m. Hassan walked 390 m. How much more does he need to walk?

   600 - 390 = 210 m

5. Read and write the mass on the given scales.

250 g

700 g

550 g

2 kg

5 kg

18 kg

6. Compare the masses using <, >, and = .

a. 75 g ___<___ 80 g

b. 100 g ___=___ 100 g

c. 38 kg ___>___ 35 kg

d. 273 g ___<___ 283 g

e. 940 kg ___>___ 950 g

f. 300 g ___<___ 300 kg

7. Solve the following.

a. 567 g + 142 g = 709 g

b. 290 kg + 680 kg = 970 kg

c. 728 g + 144 g = 872 g

d. 604 kg + 267 kg = 871 kg

e. 521 g − 333 g = 188 g

f. 494 kg − 406 kg = 88 kg

g. 900 g − 75 g = 825 g

h. 700 kg − 420 kg = 280 kg

8. How many grams of each item are needed to make 1 kg mass? (1 kg = 1000 g)

a. Coffee bottle 250 g — 750 g

b. Packet of rice 725 g — 275 g

c. Can of mushrooms 100 g — 900 g

d. Packet of sweets 500 g — 500 g

9. Solve the following real-life problems.

   a. Ali weighs 25 kg and Saad weighs 27 kg. What is their total mass?

   27 + 25 = 52 kg

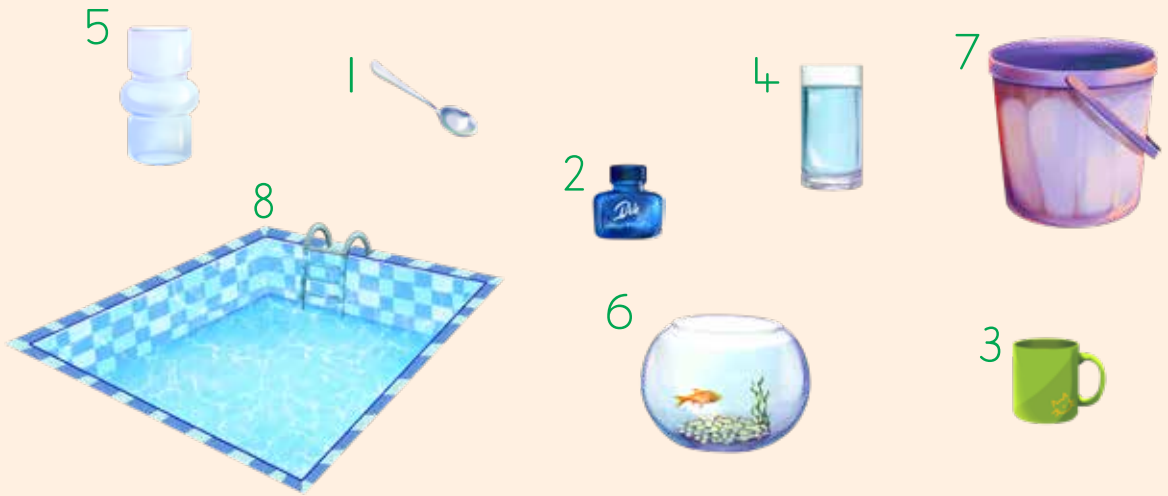
   b. A shopkeeper has 975 g of mangoes. He sells 559 g of mangoes. What is the mass of mangoes left?

   975 - 559 = 416 kg

   c. A car weighs 900 kg and a rickshaw weighs 672 kg. How much more does the car weighs than the rickshaw?

   900 - 672 228 kg

10. Number the objects in order of capacity — smallest to biggest.



11. Solve the following real-life problems.

a. A water tanker has a capacity of 990 l. After watering the park, 500 l was left. How much water was used to water the park?

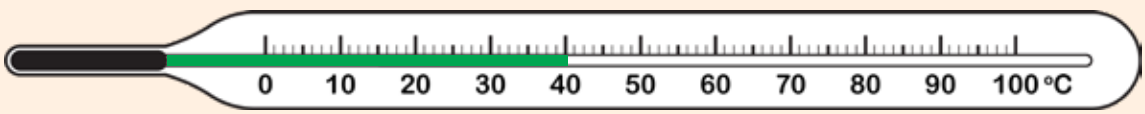
490 l

b. A larger swimming pool has a capacity of 500 l of water and a smaller swimming pool has a capacity of 415 l of water. What is the total capacity of both pools?

915 l

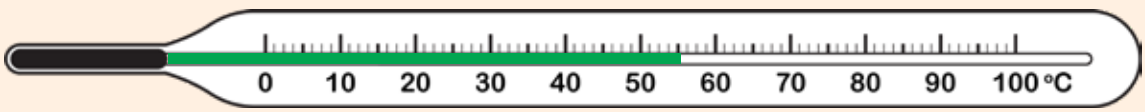
12. Colour the scale of thermometers to show the given temperatures.

a.



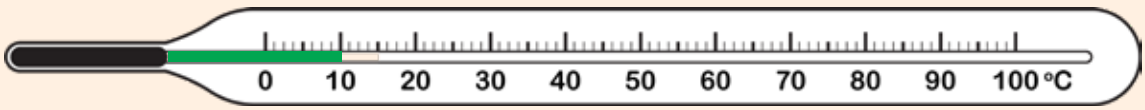
40 °C

b.



55 °C

c.



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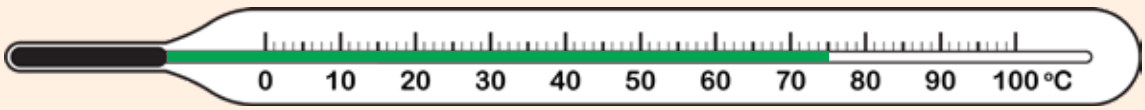
d.



75 °C

Unit 7 Time

Learning Framework

Unit7 Measurement: Time

With the help of the position of minute and hour hand on the dial of an analogue clock, pupils will learn to read the time in half past the hour, quarter past the hour, and quarter to the hour.

For demonstration, use a large size actual analogue wall clock with numerals on the dial, and prominent hour and minute hands. Better not to have second hand as it will do no good except distract pupils. Begin your lesson with the display of the wall clock. Ask your pupils 'How will you know that the clock is working and is not dead?' Let everybody answer one by one in the classroom. You will realise that pupils are aware of the movement of hands on the dial of the clock. Now you have to ask the key question, 'Everybody knows that the hands of the clock moves although nobody can notice the movement of them with naked eye. Can you guess which hand moves faster?' Listen to your pupils very patiently, you may get some very logical responses. Now set the time of the clock to exactly one hour. While showing the clock to the class, change the time of the clock to exactly two hours. Explain that, for an hour, the minute hand moved one complete rotation from 12 to 12,

while the hour hand moved from 1 to 2 only. Show them that in five minutes, the minute hand moves from one number to the next one. This demonstration clearly shows that the minute hand moves 12 times faster than the hour hand. Explain to them that there are 60 minutes in an hour. Demonstrate some examples of half past, quarter past, and quarter to the hour on the wall clock. Refer to Maths wise 2 page 69 -70.

Now, explain that each number on the clock represents 5-minute intervals.

Count by fives as you point to each number: 1 (5 minutes), 2 (10 minutes), 3 (15 minutes), and so on, up to 12 (60 minutes) Show different times and ask students to identify the minute intervals. For example, if the minute hand is on 3, it's 15 minutes past the hour.

Show a digital clock and explain that it displays time in hours and minutes. Point out the two digits for hours and the two digits for minutes, separated by a colon (e.g., 11:18).

Explain that the minutes increase by 5s: 00, 05, 10, 15, 20, and so on.

Practice reading the digital clock by showing different times and asking students to identify the minutes.

Classwork: They attempt Exercise 1. In Q2, they show them how to use a ruler to draw hands of the clock. Rest can be completed by the pupils with a little guidance.

Pupils will learn that there are 24 hours in a day. The day is divided in two equal parts of 12 hours referred as a.m. and p.m. They will identify which part of the day is a.m. and which one is p.m.

Demonstrate the distribution of time in a day with the help of diagram. Explain that a day is divided into 24 hours. These 24 hours are split into two 12-hour periods: a.m. and p.m.

A.m. stands for "Ante Meridiem". It covers the time from midnight (12:00 a.m.) to just before noon (11:59 a.m.).

P.M. stands for "Post Meridiem". It covers the time from noon (12:00 p.m.) to just before midnight (11:59 p.m.).

Explain that a.m. times are in the morning, like when they wake up and have breakfast, p.m. times are in the afternoon and evening, like when they have lunch, play in the afternoon, and go to bed at night.

Classwork: Explore Math Lab Activity Handbook 2 page 76.

Pupils will learn to read the given Solar and Lunar calendars by identifying the day on a specified date.

Better find old Solar and Lunar calendars showing all 12 months on one page.

Demonstrate how to use a calendar to find the day on a specific date.

Classwork: Use the specimen calendars given in the book to answer the questions given in Exercise 1 and Exercise 2.

Lesson Plan

Suggested Time: 1 period

Objective:

To enable students to:

- Read and write time in hours and minutes (with five minute intervals, half past, quarter past and quarter to) from analogue and digital clocks.

Concept Connector:

Start the lesson by asking students the importance of time in their lives. Prompt them to tell what they think and why they think time is a precious entity. Recall with them the different types of clocks (analogue and digital) and ask them how both are different from one another.

Exploring the Objectives:

Use the **text on Page 69** to recall the hands of the clock and how it is read. It is advised to bring a clock with moveable hands to the classroom for an easy demonstration. The teacher should use **Math in Action of Page 69** to explain them what a day is and then explain them how a day has 24 hours and is divided into two intervals of 12 hours.

Using the clock, explain to the students what half part, quarter past, and quarter to an hour means. Once they have grasped the concept, recall with them the multiplication table of 5. Explain to them that the minute hand takes 5 minutes to move from one number to the other how time is read at 5-minute intervals.

Activity:

Time Relay Race

What you need:

- Different time printed on clock face and digital displays.
- Blank printed on clock face and digital displays.

How to Play:

Take the students to the playground.
Group them into teams.
At the start line, the student will be given either an analogue clock face or a digital display with random time written on it.
They will have to race to the finish line to convert it into the other format. For example, if a student is given 5:45 on an analogue clock face at the start line, they will have to convert it to digital clock display on the finish line.
Once they are done, they must race back an+d tag the next team player to do their turn.
The team that finishes converting five different times correctly wins.

Reflection:

Students develop to read and tell time shown on analogue and digital clocks.

Exercise:

Question 1 of Exercise 1 can be done as guided practice with the teacher in class as it is a new concept for students. Once the students are familiar with reading and writing different times on the analogue clock. **Question 2** can be given as individual exercise where ***parts a, b, and d*** can be done in the classroom while ***parts c, e and f*** can be given as homework. The question can also be paired up with Math Lab on Page 75 for further practice.

Question 3 is a medium-hard question as it requires students to tell time in 5-minutes interval, therefore it needs to be done in the classroom under the guidance of the teacher. Once the students are familiar with reading time, use **Question 4** as a reinforcement of the concept they have learnt so far.

Question 5 can be done as a fun activity where the students estimate time take to complete certain activities.

Extension Activity:

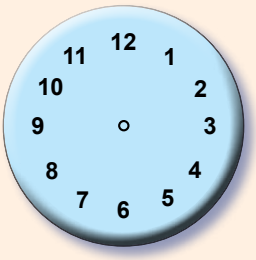
The following question can be given as added practice, worksheet or as reinforcement of the topic.

1. Use a clock to answer the following questions.
   a. If a class starts at 11 o'clock and ends at 11:45, how long was the class?
   b. If you start doing your homework at 7:15 and finish it at 7:45, how long did you spend doing your homework?
   c. Sarah starts watering her plants at 12:10. She finishes at 12:30. How long did she spend watering her plants?

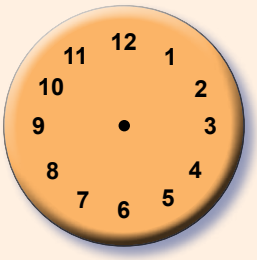
Name: _____

Date : _____

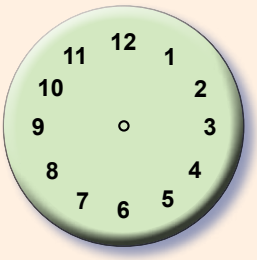
Telling Time



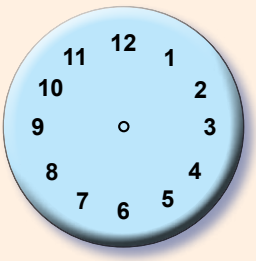
25 minutes past 2
2:25



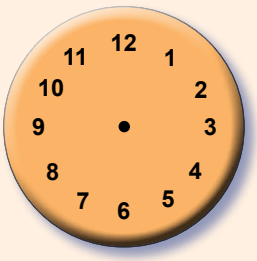
15 minutes past 12
12:15



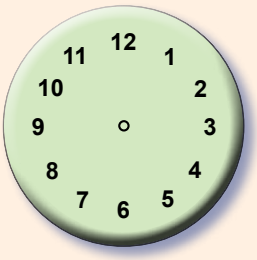
35 minutes past 4
4:35



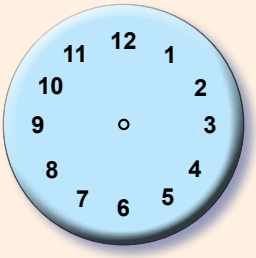
10 minutes past 8
8:10



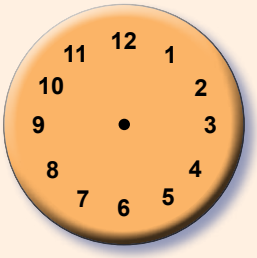
30 minutes past 10
10:30



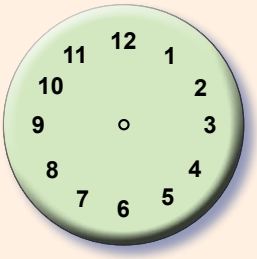
20 minutes past 3
3:20



5 minutes past 1
1:05



45 minutes past 9
9:45



55 minutes past 7
7:55

Explain that there are 24 hours in a day, and 60 minutes in an hour. Draw the hands of the clocks to show the **time in hours and minutes (with five minute intervals)**. One can use more specific examples like "what time do you wake up for school?" and "15 minutes before break time would be?"	*Time*

Name: _____

Date : _____

Activities Table

Time	Activity
7:00 a.m.	Brush my teeth

Fill this table with 3 activities that a student does before noon, and 3 activities after noon. Remember to be careful with the **a.m.** and **p.m.** time.	*Time*

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Name: _____

Date : _____

Islamic Calendar

Ramadan 2021

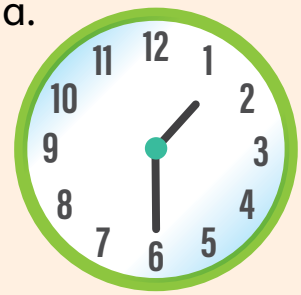
Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
					1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30

Use the above given calendar to practice finding particular days and dates. Construct your own Islamic and solar calendar to show your birth month.	*Reading Calendar*

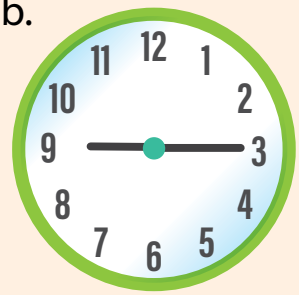
Measurement: Time

1. Read and write the time on the given clocks in numbers and words.

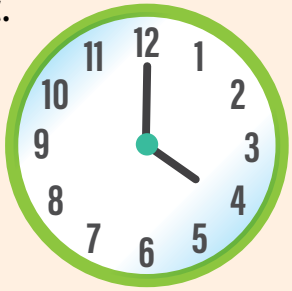
a.



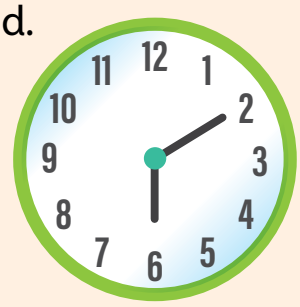
b.



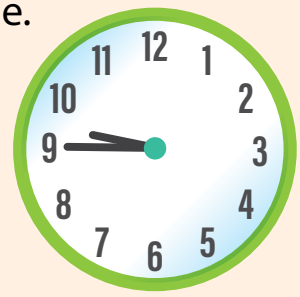
c.



d.

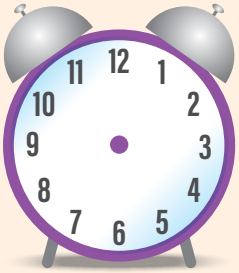


e.

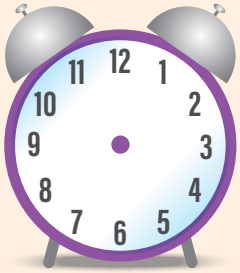


f.

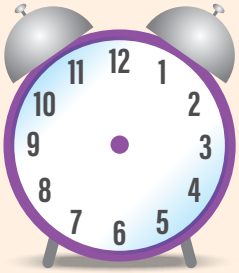
2. Draw the hands on the clocks according to the time written under each.



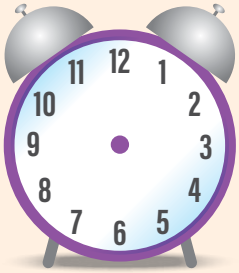
2 o'clock



quarter past 4



quarter to 7



35 minutes past 9

3. Look at the calendar and answer the questions.

February

Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
		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					

a. What is the last day of February?

_____

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

_____

c. What day of the week is on 15th of February?

_____

d. How many Tuesdays are in the month?

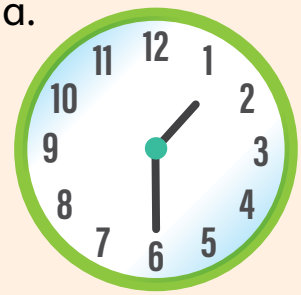
_____

e. Write the dates of all the Sundays.

_____

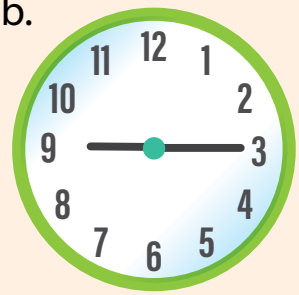
Measurement: Time

1. Read and write the time on the given clocks in numbers and words.

a. 

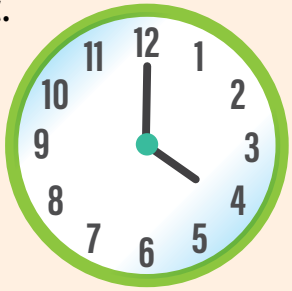
1.30

One-thirty

b. 

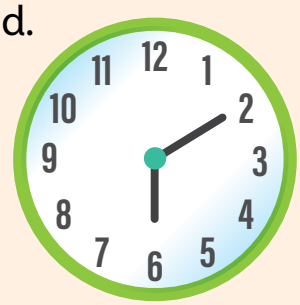
9.15

Nine-Fifteen

c. 

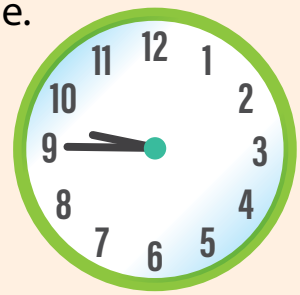
4.00

Four o'clock

d. 

6.10

Ten past Six

e. 

9.45

Nine-Forty Five

f. 

9.25

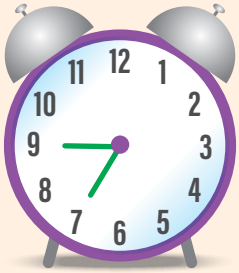
Nine-twenty Five

2. Draw the hands on the clocks according to the time written under each.

2 o'clock

quarter past 4

quarter to 7



35 minutes past 9

3. Look at the calendar and answer the questions.

February

Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
		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					

a. What is the last day of February?

Tuesday

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

4th

c. What day of the week is on 15th of February?

Wednesday

d. How many Tuesdays are in the month?

4/Four

e. Write the dates of all the Sundays.

5th, 12th, 19th and 26th.

Unit 8 Geometry

Learning Framework

Unit 8 Geometry

Pupils will learn to draw a straight line using a ruler and identify straight and curved lines in a given compound figure.

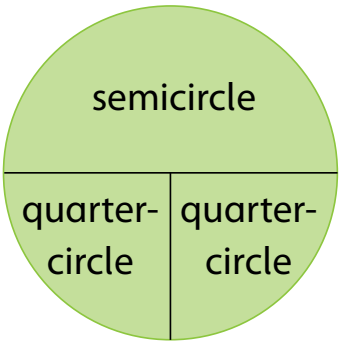
Take a metre scale to your class. Show it and ask about its uses. Listen to the feedback of your pupils patiently and then demonstrate for them that one of the most important uses of the ruler is to draw a straight line with it. Draw a straight line on board. Draw a soft curved line as well on the board as shown below: Copy the line from TG.

Now ask your pupils to differentiate between the two lines. Encourage them to think and then answer. This is the investment of time in constructive learning. They will be able to conclude that the line drawn with a ruler is a straight line while the other is not straight. Tell them that the line which is not straight is called a curved line. Draw different types of curves on the board.

Classwork: Carry out (Exercise 1 Q).

With the help of the described properties, pupils will learn to identify 2D geometrical shapes like square, rectangle, triangle, circle, semi-circle, or quadrant.

To recap the topic, use large size cut-out of square, rectangle, triangle, and square to begin the topic. Show one cut-out at a time and let your class identify the shape of it. Irrespective of the answer, ask each one of the pupils to describe how did he identify the shape. To answer this question, they will re-imagine the basic shape hidden in the cut-out and will recall the properties of the shape in their minds. To develop the concept of basic types of sectors, cut a circle into two semicircles and another circle into four quadrants as shown below.



First show these pieces as a complete circle then separate them into semicircles or quadrants and let the pupils see semicircle or quadrant as individual basic geometrical shape. Elaborate properties of each.

Classwork: Carry out (Exercise 2 Q1), (Exercise 3 Q1, 2, and3).

Pupils will learn to identify the pattern in the given shapes and will draw the next members in the given pattern.

Pupils will primarily rely upon their skills to identify the shape, size, and orientation of the objects in the given pattern. Elaborate the explanation given on page 94 thoroughly to enable pupils to identify the pattern of the given objects and draw the next coming objects.

Classwork: Support your class in carrying out the activities given in Exercise 3 Q4 and 5.

Pupils will learn to identify the basic 3D shapes i.e., cube, sphere, cylinder, cone, and cuboid in the given objects.

The concept of 3D cannot be grasped without seeing and touching the objects. 3D objects exist as individual identity while 2D objects are not existent, they are drawn on paper or flat surfaces. They have only length and width, and no height. 3D objects have all three dimensions i.e., length, width, and height. There is no other conceptual way to explain 3D shapes to young pupils except to show them models. Arrange models, made up of wood, clay or cardboard of five basic 3D shapes to let the pupils have clear visualization of the objects.

Lesson Plan

Suggested Time: 2 periods

Objective:

To enable students to:

- Identify and differentiate between a straight and curved line.
- Identify horizontal and vertical lines.
- Identify straight lines and curves from the given drawings.
- Identify pairs of perpendicular and parallel lines.

Concept Connector:

Students are taught how to draw lines from a very early age. Hand a small piece of paper and pencil to every student. Ask them to draw a line and wait for them to finish the task. Some students may have drawn a straight line while some may have drawn a line with slight curve or so. Prompt them to discuss why they drew that certain kind of line. In this chapter, they will relate and recognise the different kinds of lines to the shapes that they have learnt so far.

Exploring the Objectives:

Use a piece of thread and pull it tightly. The thread turns into a straight line. Now bring hands a little closer to one another. The straight, tight thread now turns into a slight curve. Use this example to explain the students the difference between straight and curved lines. Now using the tightly pulled string, demonstrate horizontal, vertical, and oblique lines. **Math in Action on Page 78** can also be used as a fun fact and an example of a straight object.

Using **text on Page 79** and practical examples, explain the difference between pairs of parallel and perpendicular lines. Have the students open their lined-pages notebook and ask them if they think the lines of the notebook will ever meet each other? Their answer is most likely going to be a 'no'. Explain them that two or more lines that run alongside each other but never meet are called parallel lines. Now ask the students to close their notebooks and use their index finger to run along the spine and the bottom edge of their notebook. Explain to them that the spine and the top or bottom edge of the notebook are perpendicular to each other. You may use other examples from the **text on Page 79**to further help the students distinguish between both the sets of lines.

Activity:

Scavenger hunt

How to Play:

Take the students to the playground or let them move around in their classroom.
Have them look for examples of straight, curved, horizontal, vertical, oblique, parallel and perpendicular lines.

Reflection:

Students develop the skills to recognise and identify different types of lines.

Exercise:

The exercises of the chapter are mostly activity based and require recognition skills. **Question 1** can be done in the classroom as individual activity to differentiate between straight and curved lines. This can be followed by classification of vertical and horizontal lines in **Question 2**.

Provide students in with a square grid paper and ask them to copy the shapes of **Questions 3** on it. Help them differentiate the horizontal and vertical lines. You may also further ask the students if **part c** has another kind of line (oblique). **Question 4** can be given as homework where the students relate common 2D shapes to the different kinds of lines.

Question 5 can be done as a group activity within the classroom under the guidance of the teacher. Whereas **Question 6** requires identification of sets of parallel and perpendicular lines.

Extension Activity:

Use the **QR code activity on Page 82** as an extension activity that can either be done as a worksheet, added practice or reinforcement of the topic.

Activity Sheet

Straight Lines and Curves

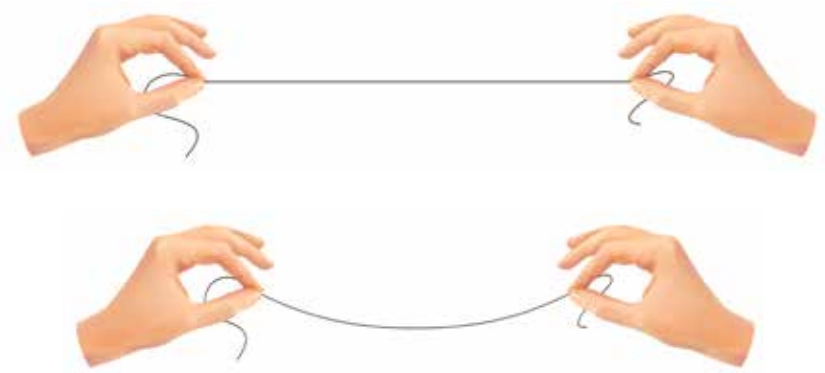
Learning objective:

- Differentiate between a straight line and a curve
- Identify straight lines and curves from the given drawings

Let's Talk Math:

- Present each pupil with a picture, possibly from a coloring book that includes straight lines and curved lines.

Make Sure You Have:



Activity: Fun with Shapes

Duration: 1 Lesson Whole Class Activity

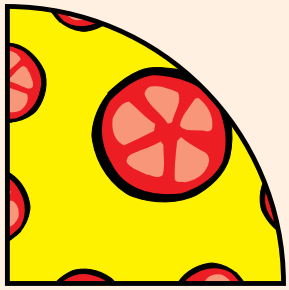
Let's Try It:

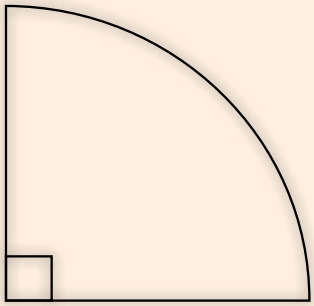
- Ask a volunteer to come and draw all six shapes on the board
- Ask the difference between the straight-line shapes and the curved shape
- Establish the fact that while all the lines in the first three shapes are straight, one of the lines in the last three shapes is curved.
- Ask pupils to come on the board and draw an example of a curved line and a straight line
- Then tell them to look around the classroom and point out where they see curved lines and straight lines.

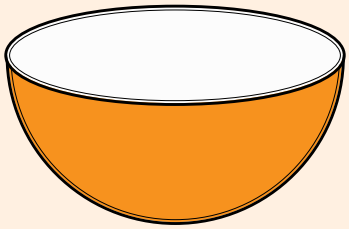
Name: _____

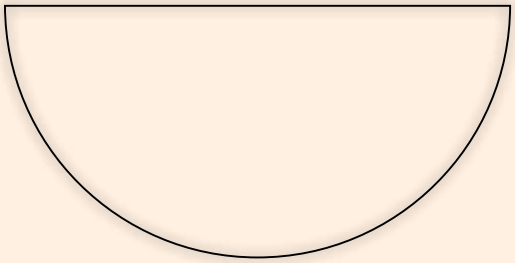
Date : _____

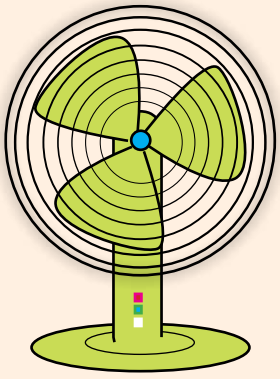
Circle, Semicircle, & Quarter Circle

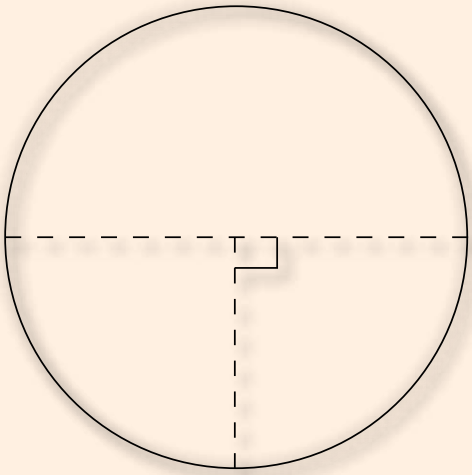












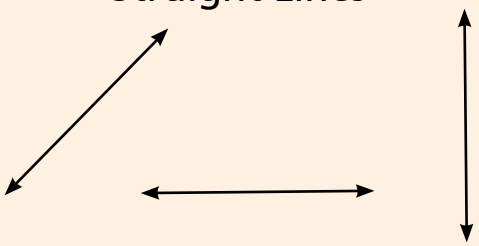
Have the students identify **real-life examples** of a **semi-circle** and a **quarter-circle**.	*Two dimensional figures*

Name: _____

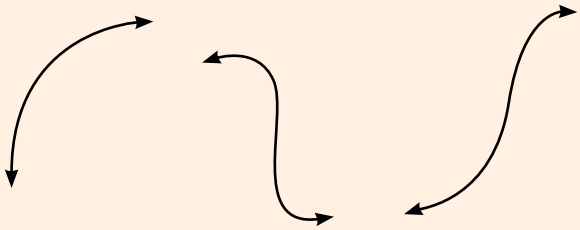
Date : _____

Straight and Curved Lines

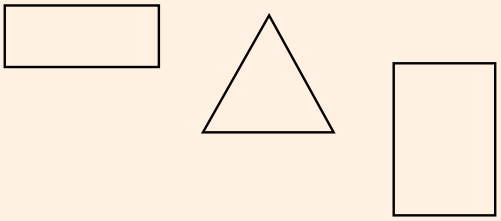
Straight Lines



Curved Lines



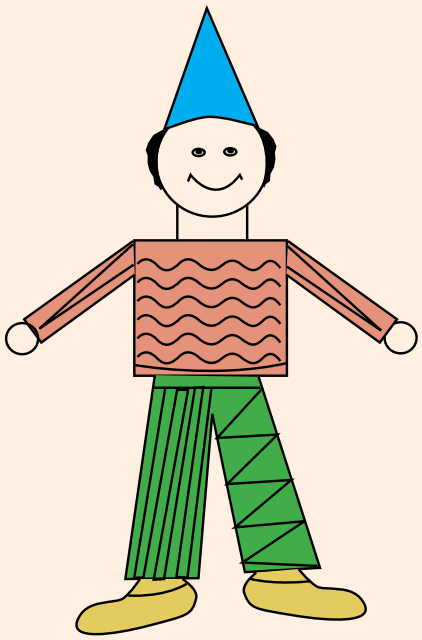
Shapes with straight lines



Shapes with curved lines

Put a tick (✓) on the straight lines with blue.

Put a tick (✓) on the curved lines with green.



Ask the students to draw their own shapes with straight lines and curved lines. Ask them to start by using a ruler to draw straight lines of given lengths to create a square.	*Straight lines and curved lines*

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Name: _____

Date : _____

3D Shapes Table

Shapes	Faces	Edges	Vertices
Cube			
Sphere			
Cuboid			
Cone			
Triangular Prism			

Fill in the table above with the **correct attributes** written in front of the **matching shape**. Students may use real-life examples for help.	*Three dimensional figures*

Note: Geometric solids can be used to identify the attributes of solids.

Name: _____

Date : _____

2D & 3D Shapes in Real-life

Shapes	Objects
2D	
3D	
Shapes in real-life: (Home, playground, or on the road etc.)	

Ask the students to identify 2D and 3D shapes/objects in the classroom and list in the table above. The students who identify the most real-life objects win.	*Three dimensional figures*

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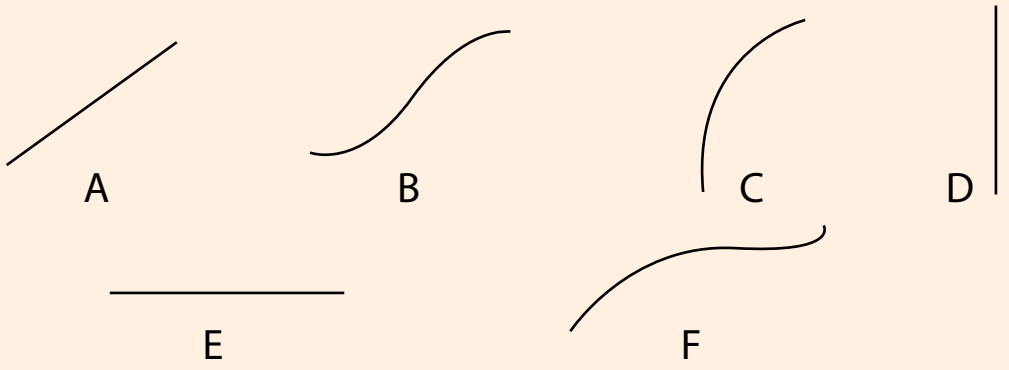
Geometry

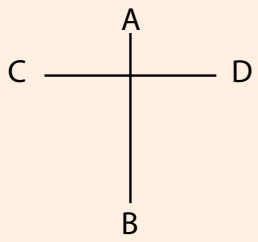
1. Classify each of the following lines as straight or curved.



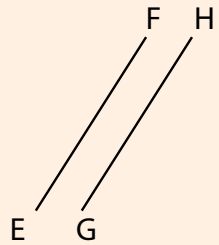
straight	curved

2. Identify and write perpendicular or parallel under each set of lines.

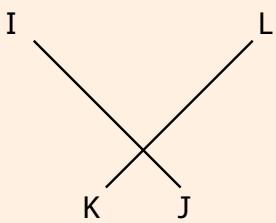
a.



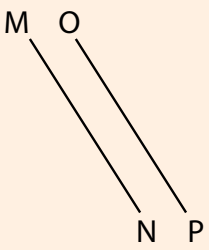
b.



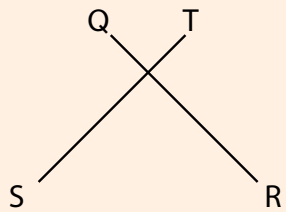
c.



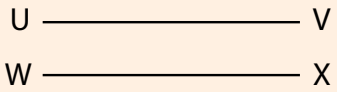
d.



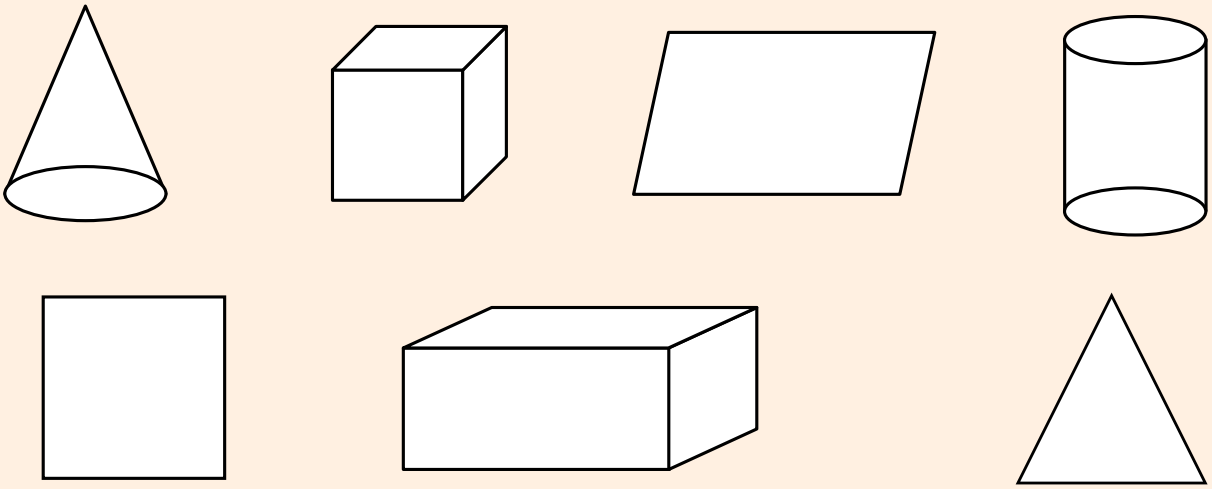
e.



f.



3. Identify and colour the 3D shapes.

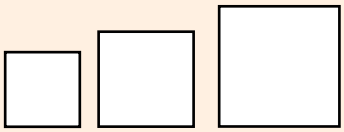


4. Complete and colour the patterns:

a. according to shape.

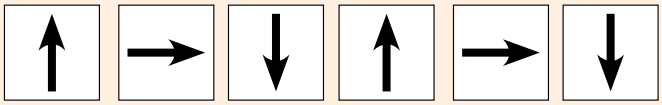
_____

b. according to size.



_____

c. according to orientation.



_____

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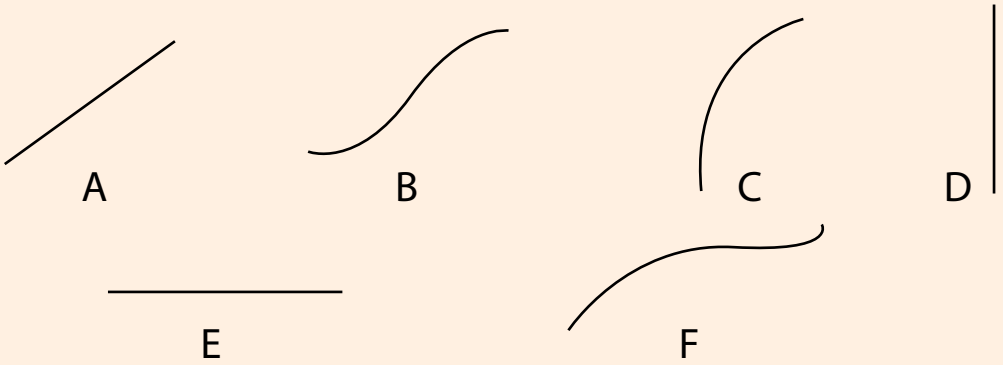
Geometry

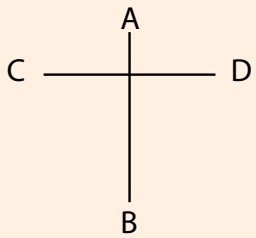
1. Classify each of the following lines as straight or curved.



straight	curved
A	B
D	C
E	F

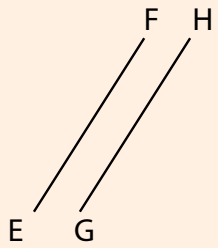
2. Identify and write perpendicular or parallel under each set of lines.

a.



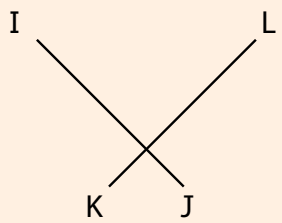
Peependicular

b.



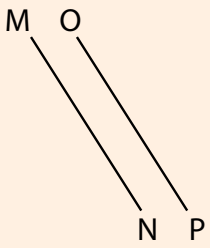
Parallel

c.



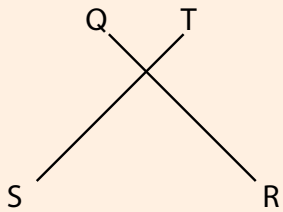
Peependic

d.



Parallel

e.

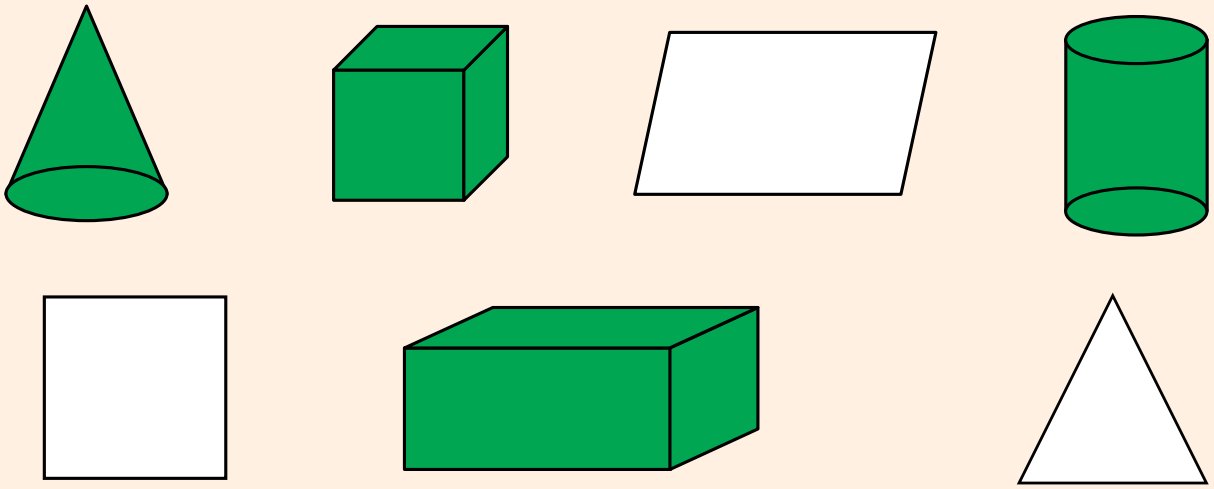


Peependicular

f.

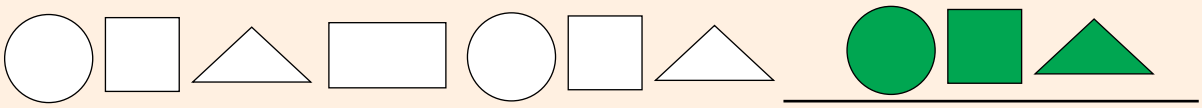
Parallel

3. Identify and colour the 3D shapes.

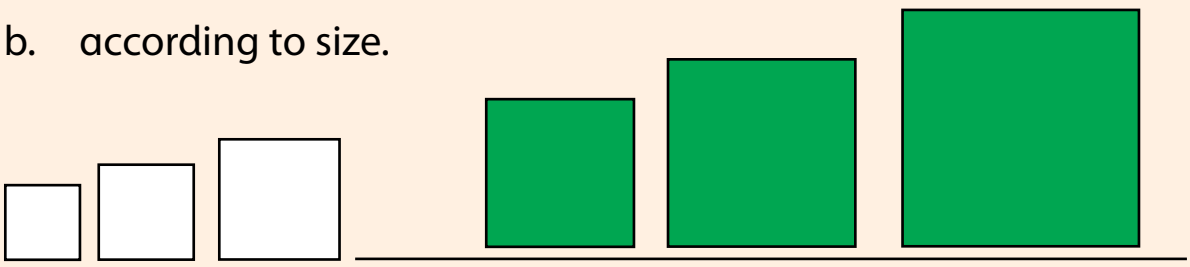


4. Complete and colour the patterns:

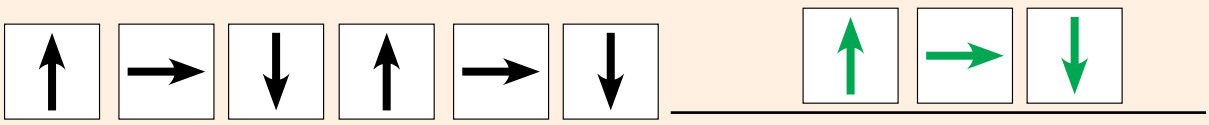
a. according to shape.



b. according to size.



c. according to orientation.



Unit 9 Data Handling

Learning Framework

Unit 9 Data handling and Probability

Pupils will learn to interpret given pictographs, count objects shown in each group of pictures, and count the objects shown in them.

Use the example given on page 92 to elaborate pictographs and how number of different objects are shown in a pictograph.

Classwork: Complete Q1 and Q2 of Exercise 1.

Pupils will learn to display given data in the form of tally marks.

Tally marks are not only a tool to count but they can display the quantitative aspect of given quantities as well. Use the example given on page 93 to elaborate the use of tally marks.

Classwork: Complete Q3 and Q4 of Exercise 1.

Pupils will learn to interpret vertical and horizontal bar graphs and read the value represented by each bar using the given scale.

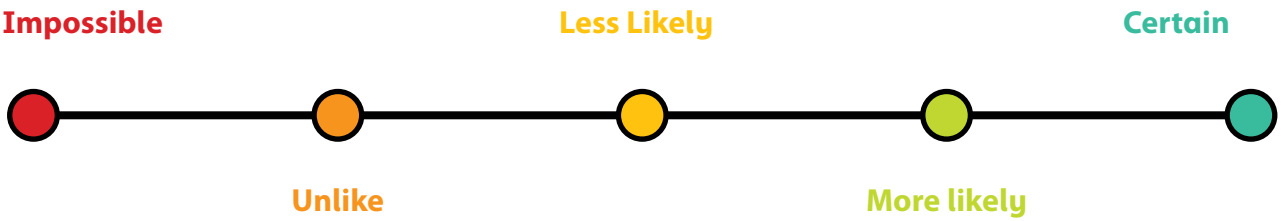
Use the information and example given on page 94 to elaborate the nitty-gritty of bar graphs.

Classwork: Complete Q5 of Exercise 1.

Pupils will learn to describe the probability of an event using the terms: impossible, unlikely, less likely, more likely, or certain.

Ask your students what does it mean by 'impossible'? Elaborate which events are impossible. Repeat the same with 'certain' and certain events' Then make a list of 'impossible' and 'certain' events. Then use the following diagram to elaborate 'less likely' and 'more likely' events.

Classwork: Complete Q1 and Q2 of Exercise 2.



Lesson Plan

Suggested Time: 2 periods

Objective:

To enable students to:

- Read and interpret data using pictographs, bar graphs and tally charts and; represent data using tally charts.

Concept Connector:

The ability to read and interpret different charts and graph Is very important o develop data literacy within students. It helps them ask questions, make observations, and thereon draw conclusions. Furthermore, such graphs and charts help students, who are visual learners, easier to understand. In this chapter the students will be able to read and interpret different charts and graphs of higher order thinking skills.

Exploring the Objectives:

Using the **text on Page 92**, recall the definition of pictographs with the students. Using **Example 1 on Page 92**, mention the different components of a pictograph such as the title, key, and symbols. It is important to mention that fractional symbols represent fractional quantities while teaching this topic – that is, if the entire symbol represents a certain amount, half of it would represent half the amount and so on.

Move onto explaining tally charts and bar graphs. In this topic, tally charts have been used to also represent data as a bar graph. Start by explaining to the students what tally marks are and how a tally chart uses tally marks to represent data. Practice making tally marks for different numbers so the students familiarise themselves with it. Use **Example 2 on Page 93** to help students with the concept. Move onto explaining them that a bar graph uses vertical or horizontal bars to represent data in quantity. The length of the bar graph represents a certain value and the longer the bar graph, the greater the value. Relate the **tally chart on Page 93** to the **bar graph on Page 94** while explaining them the different components of a bar graph such as the title and axis of the graph. Use **Math in Action on Page 94** as a fun fact to let the students know the real-life applications of graphs and charts.

The teacher may also use **Math Quest on Page 93** as a fun activity to do in the classroom as a way of reinforcing skill to organise and represent data in a clear manner.

Activity:

Making Pictograph

What you need:

Counters

Square grid (1-cm) paper

How to Play:

Pair the students into groups of two.

Provide the students with a scenario, such as 'time spent (in hours) doing homework', ' favourite candy of students', 'favourite animal' etc.

Ask the students to collect data from each of their classmates regarding the selected topic.

Use counters for symbols and have the group assign a particular value to each counter.

Use the square grid page to make the graph and use counters to represent the data on it.

Reflection:

Students develop the skill of collecting data and organising it in the form of pictographs.

Exercise:

Use **Question 1 of Exercise 1** as a guided practice with the teacher to be done in the classroom. It is essential to mention that fractional symbols represent fractional quantities. Point out that the key symbolises an entire picture of ice cream scoop as 10 scoops and half a picture of ice cream scoop as 5 scoops. It is essential to mention that fractional symbols represent fractional quantities. Help the students answers the questions related to the pictograph. **Question 2** also reinforces the interpretation of pictograph and serves as an easy-medium difficulty question. It can be given as individual classwork

Question 3 can be explained in the classroom and **parts b, c, and d** can be done under the guidance of the teacher**. Parts e-h** can be given as homework once the students are familiarized by the concept. **Question 4** serves as a medium-hard difficulty that requires students to make their own tally chart using the information given. This is to be done as guided practice or individual practice within the classroom.

Question 5 reinforces the interpretation of bar graph where the students are required to read the bar chart and answer the question. Let the **parts 1-d** students do as individual practice or homework. **Parts e-g** would require the help of the teacher and can be done under the teacher's guidance.

Extension Activity:

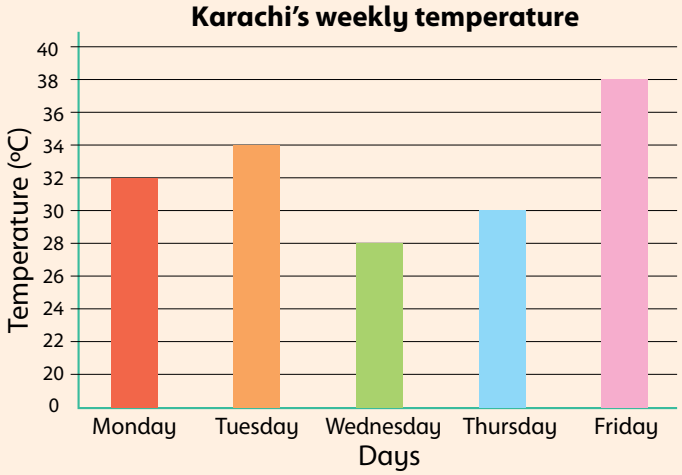
Have the students do a class survey where they acquire the data and present it in the form of a tally chart.

Data Handling and Probability

1. Write the numbers for each tally mark.

Tally marks	Numbers
𝍸 𝍸 |||	
𝍸 𝍸 ||||	
𝍸	
𝍸 ||	
||||	

2. The bar graph shows the weekly temperature in Karachi.



a. What does the horizontal axis show?

_____

b. What does the vertical axis show?

_____

c. Which day was temperature the highest?

_____

d. Which day was temperature the lowest?

_____

e. How much hotter was Tuesday than Wednesday?

_____

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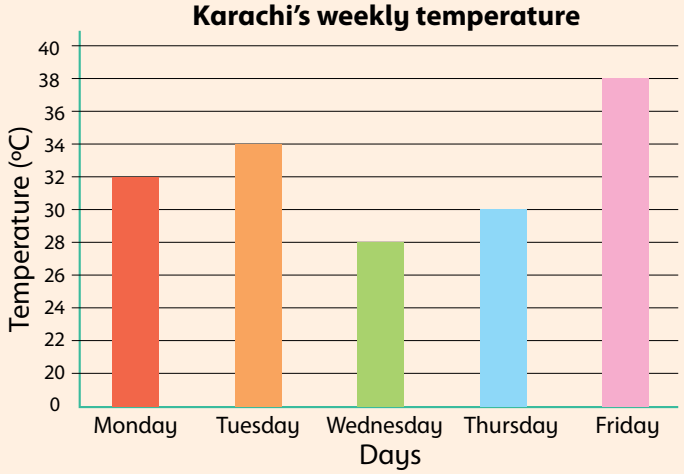
Data Handling and Probability

1. Write the numbers for each tally mark.

Tally marks	Numbers
𝍸 𝍸 |||	13
𝍸 𝍸 ||||	14
𝍸	5
𝍸 ||	7
||||	4

2. The bar graph shows the weekly temperature in Karachi.



a. What does the horizontal axis show?

Days

b. What does the vertical axis show?

Temperature

c. Which day was temperature the highest?

Firday

d. Which day was temperature the lowest?

Wednesday

e. How much hotter was Tuesday than Wednesday?

34 - 28 = 6°

Glossary

addition: the process of calculating the total of two or more numbers or amounts.

anticlockwise direction: to move from right to left in a circular motion.

area: the total space taken up by a 2D shape of an object.

bar graph: a method of representing data using horizontal or vertical bars.

capacity: the amount of liquid a container can hold.

certain: the chance of an event definitely happening.

circle: a curved shape with no sides or corners.

clockwise direction: to move from left to right in a circular motion.

currency: the official money used by a country

denominator: the number below the fraction line.

division: the process of equally sharing or grouping something.

estimation: a rough calculation of a number, quantity or a value.

even numbers: numbers that can be completely divided into pairs.

fraction: a part of a whole.

full rotation: turning an object four-quarters from a fixed point to bring it back to its original position.

horizontal line: a line that extends from right to left or left to right.

impossible: the chance of an event not occurring at all.

islamic calendar: a calendar that is based on the phases of the moon.

length: the horizontal measurement from one end to the other.

less likely: the less chance of an event happening.

like fractions: two or more fractions that have the same denominator.

mass: the measurement of how heavy an object is.

more likely: the more chance of an event happening.

multiplication: the process of repeatedly adding the same number.

multiplication table: a table that shows the result (or product) when one number is multiplied by a set of numbers.

number pattern: a series or sequence of numbers that follow a particular pattern.

numerator: the number above the fraction line.

odd numbers: numbers that cannot be completely divided into pairs.

ordinal number: a number that refers to the position of an object in a series.

parallel lines: lines that go on forever but never meet one another.

patterns: an arrangement of shapes, figures, and objects that repeat in a specific order.

perimeter: the total length of the boundary of any shape.

perpendicular lines: lines that are formed when a horizontal and a vertical line meet at a point.

pictograph: a method of representing data or information using symbols or pictures.

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place value: the value of a digit according to its position in a number.
probability: the chance of an event happening.
product: the result of multiplying two numbers.
quadrant: a quarter of a circle.
rectangle: a flat 4-sided shape with opposite sides equal.
roman numerals: symbols, used by ancient romans, to represent numbers.
rounding off: a method of estimation that makes a number simpler for calculations.
semicircle: a half-circle.
solar calendar: a calendar that is based on the rotation of earth around the sun and the solar year.
square: a flat shape that has 4 equal sides.
standard units: the most commonly used unit of measurement.
standard weights: pieces of metal that are used as reference for a specific amount of mass.
subtraction: the process of taking away a number from another number.
tally chart: a method of collecting and recording data using tally marks.
tally marks: a method of counting data.
temperature: the measurement of how hot an object is.
thermometer: the tool or device for measuring temperature.
three-dimensional (3D) shape: a solid shape that has length, width, and height.
triangle: a flat 3-sided shape.
turns: to move an object around a fixed point.
two-dimensional (2D) shapes: a flat shape that only has length and width.
unit fraction: fractions that always have 1 as its numerator.
unlike fractions: two or more fractions that have different denominators.
unlikely: the chance of an event not happening to an extent.
vertex: a point where two sides of a shape meet.
vertical line: a line that extends from up to down or down to up.