TEACHER'S MANUAL

MASTERY IN MATHEMATICS THROUGH THE CONCRETE PICTORIAL ABSTRACT (CPA) APPROACH
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Our Core Philosophy

This Teacher’s Manual has been designed to promote good teaching practices for teachers to implement the Single National Curriculum. This series provides teachers with the flexibility to choose the elements that are right for their learners.

Teachers must create a conducive environment for learning Mathematics in the class that rewards creativity and enjoyment. When introducing a concept, teachers need to ensure that pupils can relate mathematical activities and problems to relevant and real-life situations. Teaching mathematical concepts with real-life context and providing hands on experience facilitates the teaching process, so long as the context is comprehensible to the class. Pupils should be able to apply what they learn in class to real-life situations to find solutions. This series engages pupils by providing hands-on and interactive activities, as well as individual exercises. Each unit is book ended by class discussions, inviting pupils to share their perspective, and all concepts are supported by real-life tie ins. This approach begins every unit by inviting each pupil individually to have an opinion, and at each unit’s end, they can discuss how their opinions have changed, and whether they see the importance of what they learned. The heavy focus on inquiry-based learning, demonstration approach, and cooperative learning allows the teacher to expose the class to different teaching styles, which will ultimately help pupils to better understand their own needs as learners. The teachers’ manual provides instructions on the use of resources to help them carry out the above mentioned objectives. If a concept is taught in a comprehensive manner with clear instructions supplemented with hands-on activities and practice, most pupils would be able to achieve the set assessment target. Each pupil has a set pattern and pace of grasping concepts, but the expectation is the plateau of mathematical competency for all. In this regard, the manual serves as a support to teachers regardless of what series they use.

The Teacher’s Manual supports a meaningful and holistic approach to teaching the strands of Mathematics. The buildup of concepts throughout this series is progressive and comprehensive. With the implementation of hands-on activities, the learning of a mathematical concept is complemented with experiences that make learning Mathematics enjoyable and give pupils the ownership of independent and group practices. Multiple strategies are implemented through activities in the form of games, standard and non-standard materials and resources. The Teacher’s Manual facilitates teachers to implement this aspect of the series proficiently. The Teacher’s Manual provides a structure whereby teachers and coordinators can select, combine and improvise various pedagogical practices for the pupil-centric textbook and workbooks. In this regard, the Teacher’s Manual provides the following elements:

• **SNC Aligned** – SLOs listed at the start of each unit, as well as next to each activity in the margins.
• **Unit Guides** – Detailed lesson plans for the lessons to keep the teaching approach organised and accessible for the teachers. It encompasses prior learning, pre-emptive pitfalls, introduction, and problem solving.
• **Inclusivity in the Class** – An essay detailing some of the most prevalent disabilities in schools. How to see the signs, and how to make sure your class is a good learning environment for all your pupils.
• **Tackling Math Anxiety and Avoidance** – Math should be taught in a fun and inviting way, and to do it right, one must understand what not to do. This write up discusses all the contributors of Mathphobia, as well as how to see the signs of it in pupils.
• **Let’s Begin** – An introductory paragraph to start a class discussion, preparing the class to break into a new unit.
• **Activities** – Structured activities designed to make sure that pupils learn everything they need to know in an interactive and hands on way.
• **Let’s Try It** – Class exercises for pupils’ individual or pair work so they can practice concepts as they learn them.
• **Let’s Talk Math** – Mathematical communication support. Real-life tie ins are necessary for pupils to really appreciate the math that they are learning. This will help you start a conversation at each unit’s end, bringing the topic to conclusion, as well as leading pupils to reflect on what they learnt.

• **Let’s Get Practical** – An end of unit activity that incorporates a real-life tie in, including as many SLOs as possible.

• **Confusion Bar** – A bar that ranks confusion levels from 1 to 5, both reminding the teacher to check in, as well as allowing them to track the number of pupils whose understanding is not up to par.

• **Math Lab** – Alongside our activities we list page numbers from Math Lab; an activity handbook that might help struggling pupils, and also help all pupils practice their concepts.

• **Self Assessment** – Given at the end of each unit, a page for the teacher to assess how well the class has understood the lesson, in accordance with the SNC’s “Role of a Teacher”.

A user-friendly guide to the SNC to help teachers perform to the best of their abilities, and to remind pupils that there is a place for creativity in Math. It is crucial that children build a good relationship with the subject at early stages, given that there is so much of it in day to day life, and also, a solid foundation would be very helpful for later years.
Tackling Math Anxiety and Avoidance

The fact that it is common for students to struggle with math is often written off as nothing more than a difficult subject being neglected by unmotivated students. Surely, if children put in the necessary practice time, they would succeed at whatever they tried. Or perhaps some children just aren’t able to comprehend ideas so complex because they’re not smart enough.

Researchers believe that about 20% of people suffer from “math anxiety” and some psychologists believe it to be a diagnosable condition. Math anxiety will most likely lead to “math avoidance”. Students will often appear unfocused and like they are looking for reasons to leave the class. It might look like they would prefer anything to actually trying to learn the material. It will seem like they are lazy or naughty, but the fact is, these children are likely just looking for an escape from a stressful situation. They don’t ask for help or guidance because they don’t believe that they have any chance of doing better, and because they feel unable to confront their fears. The stress that they feel during class also impacts their ability to learn. Children are already so susceptible to distractions that a high stress situation can almost entirely block their working memory. Furthermore, these feelings are not simple enough for young children to be able to explain to adults, even if they are offered help. What they understand is that they are low achievers, they are bad at math, and they will always be bad at math.

When trying to understand how to fix or avoid this in the class, here are some things you should keep in mind:

Math Anxiety is Contagious

As a teacher, if you start seeing math avoidance ask yourself what might have triggered it. Is the overall class attitude toward math negative? How did it become that way? It is not uncommon for the idea to be picked up from the teacher. That’s why it is important to never present the subject as something that students should worry about. Don’t tell your students that the next unit is hard. Instead, give them the lesson, and let them ask questions so they know that it’s not a big deal to need help.

Do Not Promote the Idea That Some People are Just Not Good at Math

Also, be sure to reassure your students that everyone is different, but everyone can do math. Remind them that it is not their fault if something did not make sense the first time because all people have different ways of learning. Or better yet, tackle new topics by catering to multiple learning styles. Incorporate some activities and some creativity so that at the end of the introduction, they will all have a clearer idea of the concept.

Avoid Shame in the Class

One of the bigger roots of stress in the class is the fear of failure. Instead of calling out children by name and asking them to answer a question in front of the class, ask the question and allow them to raise their hands. If you notice some children that tend not to volunteer, check their written work to see how they’re performing. If they’re doing well, then they’re simply not comfortable speaking up in front of their classmates and maybe just need a confidence boost. If they’re not performing well, then you are likely dealing with avoidance.

Group Weaker Students with Students that Could Help Them

When doing group exercises in the class make sure the students who are struggling are evenly distributed. Often, they will feel more comfortable approaching their peers for help, or might even learn from watching them, because they won’t be feeling as though they are the ones faced with the problem. Furthermore, children have a better idea of what was challenging about a subject than an adult. They may be able to clear up some confusion for their friends that the teacher was not aware of.

Students Who Experience Math Anxiety Can Actually Be Good at Math

Do not think of these children as underachievers. Instead, think of them as students who have something crucial missing from their learning process. Instead of repeating the same explanation, try to use different language, or better yet, design an experience that will show them what you’re trying to explain. Keep in mind that anxieties are impacting students’ comprehension skills, so your approach must be something that helps students feel like their is less pressure to succeed.
Inclusivity in the Class

Every student is differently abled, and as teachers, we try multiple approaches to cater to each one of them. However, some students need special consideration. Below are some examples of students who could be held back in the class due to their special needs, and small considerations that could be made that might make all the difference without compromising on learning objectives. Be sure to be aware of exactly how severe the impact is before deciding what changes to make. The goal here is to create an environment where the children can adapt to life amongst abled people, and learn to be as independent as possible, which is why one should try to avoid extra attention. Children should never believe that they are not able to do things, and instead be given the tools to find ways to do things.

Sight

While it is commonly believed that visually impaired, or blind students need constant help, teachers should keep expectations high, while still making it clear that it is always alright to ask for help, as is for regular students. Any changes or adaptations should apply to the entire class, to avoid singling anyone out.

Some good practices to incorporate are being more verbal, especially when writing on the board, and always calling children by their names rather than pointing. When the illustrations in the book are pertinent to the lesson, describe them aloud to the entire class so that no one misses out. If possible, use tangible objects as counters, so that the class is not entirely reliant on images. If you do see these students struggling, instead of rushing in to help, offer information to the entire class, for example, if the child is having trouble finding a book, describe the shape instead of getting it for him or her.

Hard of Hearing

Depending on when these children lost their hearing, they may be lacking in vocabulary, and have trouble speaking.

Seat these students near to the front of the class since they will be almost entirely reliant on the blackboard, and they may be able to lipread if they have clear sight of the teacher. Therefore, the teacher should always face the class when speaking, and also, keep in mind that hearing-impaired students cannot listen and take notes simultaneously, especially if watching an interpreter. If possible, make sure important information is also available as handouts, including class announcements about deadlines and scheduling. Furthermore, any videos or documentaries screened at school should have subtitles.

Speech

These students will need some facilitation when encountering new vocabulary. It might be helpful if before starting a new unit, there is five-minute class discussion about the unfamiliar terminology that might pop up so that they can make note of it. Always ask students if they need help before assuming that they do. If they can successfully complete a task that involves communication, praise them, but do not draw too much attention as if it was unexpected. It might seem necessary to eliminate verbal assessments for these students but be cautious about this. There should always be an opportunity for the student to attempt to improve, or practice their communication abilities, and they should feel comfortable doing so. Small improvements should be acknowledged, and the goal should remain to meet the learning objectives however possible.

Memory

To help these students, one must understand the difference between working short-term and long-term memory. When a student learns new information, it is initially stored in working memory, as he or she uses it, and with time, as it stops being pertinent to their actions, it shifts to long term memory. If the child can recall concepts that were taught within the last 24 hours, but struggling to remember information from two weeks ago, then the issue lies with their long-term memory. If it is the other way around, like if they are forgetting instructions they were just given, then it is their working memory that is the problem.
While it has a bad reputation, rote learning can be very helpful for these students. Even employing repetition to really drill things into their minds might be helpful. The more modern approaches like project-based learning will certainly help them grasp concepts, but those concepts need to stick in their minds, so constantly relating new material to what was learned previously, and revising will help achieve this. Also, encourage active reading when assigning homework. Ask students to make notes while doing reading so that they can engage more with the text and have a personalized reference point when they need to revise. Lastly, create associations. Make games out of math activities, sing songs, use acronyms, and relate math to real-life. These students will likely have to work slightly harder on their own time, but these small changes to the class will both encourage and facilitate this.

**Dyslexia, Dyscalculia, and Dysgraphia**

While these learning disabilities are estimated to affect 5 to 20% of people globally, they often go undiagnosed. Since students are not aware that the way they perceive things is different, as a teacher, one must be aware of the signs.

**a) Dyslexia**

causes problems with reading, writing, and spelling. Some signs to look out for are delayed speech development, trouble pronouncing words, for example, saying “taplop” instead of laptop, trouble with sentence construction, even verbally, and lack of appreciation for rhymes. These children will often seem disinterested in learning the alphabet as they won’t comprehend it as well as their peers.

**b) Dyscalculia**

a range of difficulties with maths. Students may not immediately understand the meaning of numbers and applying mathematical principals. To identify students suffering from it, look out for children who lose track when counting, and rely heavily on visual aides, like fingers when counting. Placing objects in order, and connected numerals (7) with written out words, like seven will be a struggle for these children.

**c) Dysgraphia**

affects the act of writing that requires a set of motor and information processing skills. The signs include problems with spelling, handwriting, and expressing thoughts on paper, because students will not be able to think and write at the same time. Their writing will show an inconsistency in spacing, and missing words and letters. An unusual hand position while writing or keeping the paper at an angle is also a symptom.

All these learners will be different. Some may be able to get by in a normal class environment, while some will need special allowances. For instance, allowing the student to bring in an audio recording device would be very helpful. Furthermore, providing a multisensory learning experience will make it less likely that they will miss certain things entirely. It is imperative that these allowances are only made where necessary, and that, as often as possible, they apply to the entire class, as opposed to just one or two students.

**Autism**

When dealing with Autism, one must keep in mind that it is a spectrum, and that it will be different in every student. Some children are diagnosed early on as their Autism affects their every day lives, but some are not diagnosed until quite late in life, as the symptoms vary both in nature and in visibility.

Students who make little or no eye contact, are not able to interact with others, repetitive movements (like flapping arms, or tapping), have low spatial awareness, and are extra sensitive to bright lights and sounds might be on the spectrum. While only a professional can make a diagnosis, proper medical help is not always accessible, and parents do not always notice the signs. Autistic children are often also prone to tantrums, and can come across as insensitive, and or, unemotional.

While this is a complicated disorder, small efforts can go a long way in helping these students thrive. Highly structured environments, following a routine, and giving plenty of warning before big changes will make these students feel more comfortable, and able to focus on subject matter. Limit class distractions and give written
instruction instead of long verbal announcements. These children express themselves differently, but often are very intelligent and passionate. Approaching their learning with a positive attitude will do wonders for them.

**ADHD (Attention Deficit/Hyperactivity Disorder)**

ADHD is a disorder that leads to problems paying attention, impulse control, and hyperactivity. While all children are easily distracted, it will be especially apparent in these children. Like Autism, a diagnosis can only be made by a professional, but since not all children will have that privilege, teachers can facilitate their learning by making the class environment as stable and predictable as possible.

The instructions given in class should always be clear, and if possible, consistent. All students should understand what is expected of them, and this should be repeated as often as seems necessary. Furthermore, instead of just verbally communicating them, also put them up in the room so that students can refer to them whenever they need to. A good tool is to have the children tell you what they understood was or is expected of them, as children often listen without absorbing, and children with this particular disorder may be skilled at appearing engaged, whereas their mind is actually elsewhere.
Single National Curriculum 2020

The curriculum for Mathematics is comprised of the following four strands. The strands are intentionally kept broad to allow flexibility to the teachers to adapt their teaching styles in accordance with their students.

These strands include Numbers and Operations, Algebra, Geometry and Measurement and Data Handling. All of this content is underpinned by reasoning and logical thinking. All standards, benchmarks and students’ learning outcomes are built around these strands.

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<th>Key Learning Strands</th>
<th>Standards</th>
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| **1. Numbers and Operations** | • identify numbers, ways of representing numbers, comparing numbers and effects of number operations  
  • compute fluently with fractions, decimals and percentages  
  • examine real-life situations by identifying mathematically valid arguments and drawing conclusion to enhance their mathematical thinking |
| **2. Algebra**                | • analyse number patterns  
  • known facts, properties and relationships to analyse mathematical situations  
  • examine real-life situations by identifying mathematically valid arguments and drawing conclusion to enhance their mathematical thinking |
| **3. Geometry and Measurement** | • identify measurable attributes of objects, construct angles and two-dimensional figures  
  • analyse characteristics and properties of geometric shapes and develop arguments about their geometric relationships  
  • examine real-life situations by identifying, mathematically valid arguments and drawing conclusion to enhance their mathematical thinking |
| **4. Data Handling**          | • collect, organise, analyse, display and interpret data/ information  
  • examine real-life situations by identifying mathematically valid arguments and drawing conclusion to enhance their mathematical thinking |
The Standards for Mathematics are further sub-divided into the following Benchmarks for Grade I – V.

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<th>Benchmarks Grade IV – V</th>
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<td>Numbers and Operations</td>
<td>The students will be able to:</td>
<td>The students will be able to:</td>
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<tr>
<td>• Identify numbers, ways</td>
<td>• identify, read and write whole numbers up to 10,000</td>
<td>• read and write whole numbers up to 1,000,000 (1 million) in numerals and words</td>
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<td>of representing numbers,</td>
<td>• read and write Roman numbers up to 20</td>
<td>• add and subtract numbers of different complexity and of arbitrary size</td>
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<td>comparing numbers and</td>
<td>• identify and differentiate even and odd numbers up to 99</td>
<td>• multiply and divide numbers, up to 6 digits, by 2 or 3-digit numbers and by 10,100 and</td>
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<tr>
<td>effects of operations in</td>
<td>• arrange, compare numbers up to 3 digits using symbols (&lt;, &gt; or, =)</td>
<td>1000</td>
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<td>various situations.</td>
<td>• identify and recognise place values up to 5-digit numbers</td>
<td>• solve real-life situations involving operations of addition, subtraction, multiplication, and division</td>
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<td>• compute fluently with</td>
<td>• represent and identify the given number on number line</td>
<td>• recognise and differentiate between factors and multiples of two or three 2-digit numbers</td>
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<td>fractions, decimals and</td>
<td>• round off a number to the nearest 10 and 100</td>
<td>• find highest common factor (HCF) and least common multiple (LCM) of two, three, or four numbers, up to 2-digits</td>
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<td>percentages</td>
<td>• add, subtract numbers up to 4 digits</td>
<td>• solve real-life situations involving HCF and LCM</td>
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<td>• examine real-life</td>
<td>• develop multiplication tables up to 10</td>
<td>• recognise and compare like and unlike fractions</td>
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<td>situations by identifying</td>
<td>• multiply number up to 2 digits with 1-digit numbers</td>
<td>• arrange, convert and simplify fractions</td>
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<tr>
<td>mathematically valid</td>
<td>• recognise and use of division symbol, divide up to 2-digit numbers by 1-digit number</td>
<td>• add, subtract, multiply and divide fractions</td>
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<tr>
<td>arguments and drawing</td>
<td>• solve real-life situations involving addition, subtraction, multiplication, and division</td>
<td>• solve real-life situations involving addition, subtraction, multiplication and division of fractions</td>
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<td>conclusion to enhance</td>
<td>• recognise fractions and different forms of fractions with the help of objects and figures</td>
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<td>mathematical thinking</td>
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<td>Standards</td>
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<tr>
<td>• express and match fractions in figures and compare fractions with same denominators using symbols $&lt;$, $&gt;,$ or, $=$</td>
<td>• apply unitary method for solving real-life situations</td>
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<td>• identify and write equivalent fractions for a given fraction</td>
<td>• identify and recognise decimal numbers</td>
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<td>• add and subtract two fractions with same denominators</td>
<td>• convert decimal numbers into fractions and vice versa</td>
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<td>• add and subtract numbers up to 3 decimal places</td>
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<td>• multiply and divide decimal numbers with whole numbers</td>
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<td>• round off decimal numbers up to specified number of decimal places</td>
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<td></td>
<td>• solve real-life situations involving decimal numbers (up to 3 decimal places)</td>
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<td>• convert percentage to fraction and to decimal and vice versa</td>
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<tr>
<td>Algebra</td>
<td>• develop the concept of equality using addition and subtraction of numbers</td>
<td>• develop the concept of equality using addition, subtraction, multiplication, and division of numbers</td>
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<td>• analyse number patterns</td>
<td>• identify and complete geometrical patterns on square grid according to attributes like shape, size and orientation</td>
<td>• identify and describe repeating pattern using relationship between consecutive terms and generate number patterns</td>
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<tr>
<td>Standards</td>
<td>Benchmarks Grade I – III</td>
<td>Benchmarks Grade IV – V</td>
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<tr>
<td>Geometry and Measurement</td>
<td>• use language to compare heights/ lengths, masses and capacity of different objects</td>
<td>• convert standard units of length, mass, capacity, and time</td>
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<tr>
<td>• identify measurable attributes of</td>
<td>• read, recognise and use units of length (kilometre, metre and centimetre), mass</td>
<td>• solve the real-life situations involving addition and subtraction of units of</td>
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<td>objects, construct angles and two-</td>
<td>(kilogram and gram) and capacity (litre and millilitre) and time (minute and second)</td>
<td>distance/ length, mass, capacity, and time</td>
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<tr>
<td>dimensional figures</td>
<td>• add and subtract in units of length, mass, capacity and time for solving real-life</td>
<td>• distinguish parallel and non-parallel lines</td>
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<td>• analyse characteristics and</td>
<td>situations</td>
<td>• identify, classify and construct different types of angles</td>
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<td>properties of geometric shapes and</td>
<td>• use solar and Islamic calendar to find a particular date/ day</td>
<td>• describe and classify 2-D figures and 3-D geometrical objects</td>
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<td>develop arguments about their</td>
<td>• recognise and identify two- and three-dimensional figures</td>
<td>• determine perimeter and area of square and rectangle</td>
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<td>geometric relationships</td>
<td>• determine perimeter of square, rectangle, and triangle</td>
<td>• describe and complete symmetric figures with respect to given line of symmetry and</td>
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<td>• examine real-life situations by</td>
<td>• identify and differentiate straight line and curved line</td>
<td>point of rotation</td>
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<td>identifying, mathematically valid</td>
<td>• identify and draw points, lines, line segments, and rays</td>
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<td>arguments and drawing conclusion to</td>
<td>• identify and describe symmetrical shapes</td>
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<td>enhance mathematical thinking</td>
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<td>Data Handling</td>
<td>• read, interpret and represent data using Carroll diagrams, picture graphs and tally</td>
<td>• read and interpret bar graphs, line graphs and pie charts</td>
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<td>• collect, organize, analyse,</td>
<td>charts</td>
<td>• represent real-life situations using pie chart</td>
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<td>display and interpret data/</td>
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<td>• find an average of given quantities in the data</td>
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<td>information</td>
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<td>• draw and read simple bar graphs both in horizontal and vertical form</td>
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<td>• examine real-life situations by</td>
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<td>• solve real-life situations using simple bar graphs</td>
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<td>identifying, mathematically valid</td>
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Unit 1

Whole Numbers

1.1 Ordinal Numbers
i. Write ordinal numbers from first to twentieth
ii. Write numbers 1 to 100 in words.

1.2 Numbers up to 100
i. Read numbers up to 999.
ii. Write numbers up to 999 as numerals.
iii. Recognise the place value of a 3-digit number.
iv. Identify the place value of a specific digit in 3 digit numbers.
v. Compare 2-digit numbers with 3-digit numbers (hundreds, tens, and ones).
vi. Compare 3-digit numbers with 3-digit numbers (hundreds, tens, and ones).
vii. Count backward ten steps down from any given number.
viii. Arrange numbers up to 999, written in mixed form, in increasing or decreasing order.
ix. Count and write in 10s (e.g. 10, 20, 30, …).
x. Count and write in 100s (e.g. 100, 200, 300, …).
x. Identify the smallest/largest number in a given set of numbers.
xii. Recognise that 1000 is one more than 999 and the first 4-digit number.

Plan Ahead:

Ordinal Numbers 4 lessons
Numbers up to 100 7 lessons
The approximate duration of this unit should be 14 lessons.

Before You Start:
Pupils must have knowledge of numbers 0 to 100, meaning they can write them in words, as well as numerals. They will also be familiar with ordinal numbers, although only up to 10, and number patterns, having previously learnt to count backwards in tens.

Watch Out For:
Some pupils might have trouble adjusting to 3-digit numbers, so they, may need some extra practice to get comfortable with them. This unit also introduces hundreds of new numbers to spell, but they are all words that pupils can already spell.

This Pairs with:
Math Lab 2, page 2 to 22.
**Make Sure You Have:**
2 and 3-digit number cards  Balls
Baskets/bags      Coin

**If They’re Struggling:**
Spell the numbers out loud in class, and instead of chanting, ask for individual responses. Also, encourage pupils to break up numbers. Six hundred and thirty-four might seem like a brand-new spelling, but they already should know how to spell six, hundred, and thirty-four. The spellings that are new are a thousand, and the ordinal numbers. Spelling tests should be a good way to keep these spellings from being forgotten. To help with placement, colourful number lines, as well as other visuals could be helpful. When you see the confusion bar, take note of how many pupils fall under each level. If pupils are at a level 3 or below, have them solve the equivalent Math Lab pages in pairs, having weaker students work with more confident students. First do allow the class to collectively ask questions. If all pupils are at a 4 or above, move on to the next activity.

**Let’s Begin**
Ask pupils what the biggest number they know is. Some of them will repeat what they’ve learned in class, while some may volunteer information planned at home. Let them challenge each other’s ideas and discuss for about 30 seconds, before drawing a number line on the board. Then ask them what the biggest number they’ve learned in class is. The answer should be 100. Label the number line with 0, 50 in the middle, and 100 and the end. Ask the class if anyone knows how to write the number after 100. Tell them that they are welcome to guess if they are not sure. If they do know, extend the number line slightly and write 101 on the board. Write up to 111, and explain that in the tens, the last digit goes up by only one, so it is the same in the hundreds. Invite volunteers to the board to write (in numerals) 102 to 120. Once this is done, ask the pupils if they have any idea how these are supposed to be said. Give them some time to guess, but if they are not able to figure it out, read the numbers aloud and have them repeat after you. They might find it strange that the word “and” is present in a number but tell them that this should only make it easier to remember. To make it simpler for them to understand, explain that the last two digits of all the numbers are said and written just as they are in between 0 and 99. The fact that they now have a 1 before them simply means that they now must be said as “one hundred and...”
This pairs with Math Lab page 2

Give pupils a word list of numbers 1 to 100 and the ordinal numbers 1 to 20. Make groups of three to five pupils. Since they already know most of these spellings, allow them one day to revise at home. Once they have done this, hold a spelling bee in class. Tell them that you will be saying a number aloud, and they may discuss the spelling amongst each other, within their groups. Explain that the first group to volunteer a group member will be allowed to answer. The chosen group member will have 10 seconds to write the number on the board correctly. If they are wrong, another group will have a chance to raise their hand. If the first group gets it right, they will be awarded 5 points. The second attempt, if correct will earn 3. If after the third attempt, the number has still not been spelled correctly, make note of it so that you can be sure to go over it later. Do as many numbers as possible, but do not spend more than 20 minutes on this activity. At the end, award the titles first, second, and third.

Tell pupils that they should be prepared for random spelling tests throughout the next couple of weeks on the numbers 1 to 100, and ordinal numbers 1 to 20. Whenever there is free time at the end or beginning of a class, do 10 to 20 words at a time. This way, pupils will be sure to keep revising the spellings, and they will be more likely to stick in their heads. Do not stretch this out over more than four weeks, and make sure that all the words are covered.

If pupils are not able to figure out the place value of hundreds write a 1 on the board and point out that it falls into the category of ones. Then write a 10 and point out that the 1 in 10 falls into the category of tens. At this point they will hopefully have noticed the pattern, so when you write 100 on the board, and ask them what the place value of the 1 is, they should be able to guess hundreds.

Remind the class about place values in 2-digit numbers. Then ask a volunteer to write any 2-digit number on the board. Point to one digit at a time and ask them what they think the place value of that digit is. Go from smallest to biggest. Once the place values have been written on the board, add a 1 in front of the number, making it a 2-digit number. Tell them that if the right most digit is in the ones, and the middle one is in the tens, what category do they think the left most digit should fall into. Give them some time to guess that it is in hundreds, and if they don't, refer to the Let’s Pause above to help them get to that conclusion on their own. Call out numbers between 100 and 999 and call on pupils individually to write them on the board and point out the place value of each digit as they write it. Make sure every child has a turn.
Let's try it

Call out three-digit numbers at random and ask pupils to only make note of the digit that is in the tens. After ten numbers, switch to the hundreds, and do ten more numbers. Have pupils compare work to make sure there are no mistakes.

Ask the pupils to write the numbers 100 to 999 in their notebooks as homework, but break it up into 100 to 250, 251 to 500, 501 to 750, 751 to 999. Assign these over the course of two weeks, and do not assign any other homework as they are doing this.

SLOs

1.2
1.2
1.2
vi
vi
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vi

Activity 3
15 to 20 minutes
2 and 3-digit number cards coin

This pairs with Math Lab page 19

Put 2-digit and 3-digit numbers on pieces of paper, or cards, and place them face down at the front of the class. Ask pupils to pair up and tell them you will be playing a game of more than or less than. This is how the game will work: a pair will come to the front of the class, and the teacher will flip a coin. If the coin lands on heads, the larger number will win. If it lands on tails, the smaller number will win. The pair will have to pick one card each and hold them to their foreheads, so everyone but them can see what number they have. Make sure the numbers are written clearly enough for the entire class to be able to see or have the rest of the pupils move forward. Once the cards are on their foreheads, the class will have to identify the winner. Ensure that you put enough cards down so that each pupil gets a new number, and once one has been picked up, remove it from the pile so that it is not repeated. Also, be sure to put in only about a third as many 2-digit numbers as 3-digit numbers.

Refer to If they're struggling

Confusion level
1 - Does not understand any concept
2 - Does not understand most of the concepts
2 - Does not understand most of the concepts
2 - Does not understand most of the concepts
2 - Does not understand most of the concepts
2 - Does not understand most of the concepts
2 - Does not understand most of the concepts
2 - Does not understand most of the concepts
2 - Does not understand most of the concepts

Number of Pupils

1 - Does not understand any concept
2 - Does not understand most of the concepts
3 - Understands some concepts but has questions
4 - Understands all the concepts, just needs more practice
5 - Feels confident solving questions
If pupil is below 3 use Math Lab

Confusion level
1 - Does not understand any concept
2 - Does not understand most of the concepts
3 - Understands some concepts but has questions
4 - Understands all the concepts, just needs more practice
5 - Feels confident solving questions
If pupil is below 3 use Math Lab
Activity 4
15 minutes
3-digit number cards

This pairs with Math Lab page 22

Using the 3-digit number cards from the previous activity, ask the pupils how they would find a number 10 steps down from these numbers. They may initially be nervous about the size of the numbers but remind that they only need to go down ten steps. Start with numbers like 175 where only the middle digit will change. Tell them that they can ignore the 1 and should just focus on finding the number ten steps down from 75. Remind them that place values will help here. Since 7 is in the place of the tens, that should go down by 1 ten, so the answer should be 165. Only explain this to them if they fail to figure it out on their own. Invite a volunteer to the board and give the class a number to subtract 10 from. Give the class exactly 30 seconds to try and come up with the right answer and ask them to make note of it in their notebooks. Then ask the volunteer at the board to write the number on the board and keep writing the numbers backward until they have written ten, thereby finding the number ten steps down. So, for example, if the original number was 367, the pupil at the board would write: 366, 365, 364, 363, 362, 361, 360, 359, 358, 357. It would then become clear that the correct answer is 357. Do this until the whole class is getting the answer right. If some pupils are struggling, ask them to work in pairs with pupils who are not struggling. Once they are up to speed, introduce a number like 205. Give them a minute to try to find the answer before having the volunteer try it on the board. Explain that the value of the hundreds also changes because the value of the tens cannot go lower than 0. Also try a number like 103 that will turn into a 2-digit number.

Activity 5
10 minutes

Write a group of 10 numbers on the board, all 3-digit, and ask the pupils to spot the biggest and the smallest. Repeat these 3 times with different sets of numbers, then tell them, that instead of only identifying the biggest and the smallest, they need to arrange the numbers in ascending order. Explain that this means from smallest to biggest. Then give them a fresh set and ask them to now arrange these numbers in descending order; meaning from biggest to smallest. Do this a few more times so that they can get the hang of it, alternating between descending and ascending. In the last set, slip in the number 1000. Most pupils will probably realise that it is the largest number given the fact that it has four digits. If none of them ask about it, ask them if there are any numbers on the board that seem unfamiliar. Once they identify the odd one out ask them if they can guess what number comes before 1000. If they do not immediately guess 999, refer to the Let’s Pause on page 18. Explain that 1000 is the first 4-digit number.
Let's try it

Give pupils five sets of five 3-digit numbers on the board and ask them to arrange five in descending order, and five in ascending order. They should do this individually at their desks, and then swap work so that they can peer review. Instead of giving them the right answers for the review, tell them they can volunteer to write the correct answer on the board. If they do not volunteer, do not force them.

Let’s Pause

If pupils are having trouble write the 4-digit numbers, meaning that they do not realise that there are larger numbers than three-digit number, they may need to revise place value.

1.2
ix
x
xi

Activity 6
15 minutes
balls
baskets/bags

This pairs with Math Lab page 21

This activity is best done outdoors. Bring two kinds of balls to class. Approximately half should be small, and the rest should be slightly larger. Once might use tennis balls and cricket balls. Tell the pupils that the smaller balls are tens, and that the larger balls are hundreds. Then ask them to pair up, and give each pair a basket. Take the class into an open area and ask them to form a circle. Tell them that the goal is to get as many balls into their baskets as possible, so that if they add all the tens and hundreds together, they get a large number. When you say go, they can break out of the circle and start grabbing balls. However, they need to make sure to keep their baskets with them so that they don’t get confused for someone else’s, and they also should try to stay close to their partner so that they can both put balls in the basket. When you say go, start rolling the balls on the ground in every direction. There should be many more balls than pupils. Make it clear before hand that they are not allowed to snatch each other’s balls, and any pushing or shoving will lead to disqualification. Once all the balls have been picked up, ask them to stop and count. Remind them that the larger balls are equivalent to 100 and that the smaller balls are equivalent to 10. Ask them to compare totals and assign themselves ranks using ordinal numbers. If anyone has a total higher than 1000 then tell them they should stop counting and just declare their total as 1000.
Let’s talk Math

Ask pupils if they think it is important to have the numbers go so high. What would they need to count that would need such large numbers? When they come up with some examples, ask them, as a creative exercise to try to come up with a way to count a large quantity of objects only with numbers up to 100. They may suggest that you could say, if you were trying to count 400 objects, that there were four hundreds. Point out that four hundreds is quite close to four hundred. Show pupils that although it can seem like there are so many numbers to remember, once they know how to count to hundred, the rest are quite easy to remember. Then ask them if they enjoyed working with number patterns. Did they find them useful? Were they complicated or easy? Point out that once they are confident with number patterns, addition would become much easier. For example, 70 + 68 is a sum that would require a lot of working, but using number patterns, one can figure out that adding 60 to 70 is just 70, 80, 90, 100, 110, 120, 130, and then by adding the 8 after, you get 138. The same can be done with subtraction. Let them discuss this for five minutes.

Let’s get practical

For this activity, try to take the class outdoors. Tell them that you are playing a game of tag. Set a small number of pupils, relative to the size of the class as the chasers and tell the rest of them that their job is to run away. Then explain that all the chasers are going to be tens, and the runners will be hundreds. Each time a hundred is tagged by a ten, it will go up by ten. So, if a runner is tagged 5 times, he or she will be a hundred and fifty. The first to get to 200 loses. When a runner is tagged, they must freeze on the spot until they are able to calculate their new value. Nobody can tag a runner while they are frozen. Allow the class to play for a while to increase their comfort with counting in tens.
Multiple Choice Questions

Read out the questions or write them on the board. You may ask pupils to either write the correct answer on a white board and hold it up or call out the options one by one, asking them to raise their hands to show which one they have chosen.

1) With the number 639 which digit is in the place of the tens?
   a) 6
   b) 3
   c) 9

2) If the following numbers were arranged in ascending order, which one would be third? (Write the following on the board 293, 782, 28, 901, 499, and 500)
   a) 28
   b) 499
   c) 500
   d) 901

3) Which of the following is incorrectly arranged in descending order?
   a) 1000, 499, 387, 199, 201, 64
   b) 999, 800, 785, 774, 200, 55
   c) 750, 625, 624, 599, 407, 200
   d) 279, 272, 234, 219, 209, 200
### Unit 2

**Number Operations**

#### 2.1. Addition of 2-digit numbers (with carrying)

1. Add ones and ones.
2. Add ones and 2-digit numbers with carrying.
3. Add 2-digit numbers and 2-digit numbers with carrying.
4. Solve real-life number stories, involving addition of 2-digit numbers with carrying.

#### 2.2. Addition of 3-digit numbers (without carrying)

1. Add 3-digit numbers and ones without carrying.
2. Add 3-digit numbers and 2-digit numbers without carrying.
3. Add 3-digit numbers and 3-digit numbers without carrying.
4. Solve real-life numbers stories involving addition of 3-digit numbers without carrying.

#### 2.3. Addition of 3-digit numbers (with carrying)

1. Add 3-digit numbers and 1-digit number with carrying of tens and hundreds.

#### 2.4. Subtraction of 2-digit numbers (without borrowing)

1. Subtract 1-digit numbers from 2-digit numbers with borrowing.
2. Subtract 2-digit numbers from 2-digit numbers with borrowing.
3. Solve real-life number stories of subtraction of 2-digit numbers with borrowing.

#### 2.5. Subtraction of 3-digit numbers (without borrowing)

1. Subtract 1-digit number from 3-digit number without borrowing.
2. Subtract 2-digit number from 3-digit number without borrowing.
3. Subtract 3-digit number from 3-digit number without borrowing.
4. Solve real-life number stories of subtraction up to 3 digits without borrowing.
5. Analyse simple situations identifying correct operation of addition and subtraction with carrying/borrowing in mixed form.

#### 2.6. Subtraction of 3-digit numbers (with borrowing)

1. Subtract 1-digit number from 3-digit number with borrowing.
2. Subtract 2-digit number from 3-digit number with borrowing.
3. Subtract 3-digit number from 3-digit number with borrowing.
4. Solve real-life number stories of subtraction up to 3 digits with borrowing.
5. Analyse simple situations identifying correct operation of addition and subtraction with carrying/borrowing in mixed form.

#### 2.7. Multiplication

1. Recognise multiplication as repeated addition (e.g. $2 + 2 + 2 = 6$ is equivalent to $3 \times 2 = 6$ and $3 \times 2 = 6$) and use multiplication symbol “$\times$”.
ii. 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…).

iii. Develop multiplication tables of 2, 3, 4, 5 and 10 till the multiplication of 10 x 10.

iv. Multiply numbers within multiplication table.

v. Write number sentence for multiplication from the picture such as 2 x □ = 6.

vi. Solve number stories on multiplication up to 1-digit numbers.

2.8. Division

i. Recognise and use division symbols ÷.

ii. Recognise division as successive subtraction.

iii. Divide numbers within the multiplication tables with remainder zero.

iv. Solve number stories involving division up to 1-digit numbers.

2.9. Addition, Subtraction, Multiplication and Division

i. Solve real-life situations (using Pakistani currency as well) involving addition, subtraction, multiplication, and division.

Give reasons for choosing the correct operation.

Plan Ahead:

Addition of 2-digit numbers (with carrying) 7 lessons
Addition of 3-digit numbers (without carrying) 7 lessons
Addition of 3-digit numbers (with carrying) 7 lessons
Subtraction of 2-digit numbers (with borrowing) 7 lessons
Subtraction of 3-digit numbers (without borrowing) 7 lessons
Subtraction of 3-digit numbers (with borrowing) 7 lessons
Multiplication 8 lessons
Division 9 lessons
Addition, Subtraction, Multiplication and Division 4 lessons

The approximate duration of this unit should be 62 lessons.

Before You Start:

The class should be comfortable with the idea of addition and subtraction, but not at all with carrying and borrowing. It is important that they are aware of place value, so that they are able to understand the number operations in this unit. Having just learnt about number patterns will help them understand the similarities between addition and multiplication, which then in turn will help them with division.

Watch Out For:

While pupils have no prior knowledge of multiplication and division, what they have learnt previously should serve as an excellent foundation. They might be intimidated by the idea of a foreign concept, but introducing it slowly, and allowing them to wrap their heads around it should help them develop their skills and ideas.
This Pairs with:
Math Lab 2, page 23 to 49.

Make Sure You Have:
Chalk or tape  Assorted object
Bowl     Picture sheets
Chits     Posters
Blocks    Counters

If They're Struggling:
A bit of revision of place value should go a long way, if pupils are having trouble with carrying and borrowing. As will plenty of extra practice. Solving sums on the board, while asking the class to help, many times, even after most of the class seems comfortable is almost necessary. Given that many new concepts are introduced in the unit, it would be wise to move slowly through anything that is new. When you see the confusion bar, take note of how many pupils fall under each level. If pupils are at a level 3 or below, have them solve the equivalent Math Lab pages in pairs, having weaker students work with more confident students. First do allow the class to collectively ask questions. If all pupils are at a 4 or above, move on to the next activity.

Let’s Begin
Previously pupils have learnt simpler number operations. Ask them if they ever had a hard time adding or subtracting, and if they think they’re good at it. If they say they are, ask them if they think they could be better, and if they say they are not, ask them how they think they could improve. After they have answered, ask the class to add 20 and 20. Then ask them to add 50 and 10. Then, ask them to add 26 and 38. Point out that with the third sum, although the numbers were smaller, it’s a little bit trickier to calculate, because here the addition involves carrying. Instead of giving them this reason, simply say that it’s a hard question, and that you can teach them a math trick to make it much easier. Mention that you have one for subtraction as well. Ask pupils to tell you what they personally find challenging about number operations, and if they have any tricks, mental or on paper, that they could share with the class.
Tell pupils that you are doing an addition activity. Write sums on the board but use the children as counters to solve them, by having them make groups at the front of the class. So, for instance, if the sum is 3 + 5, then three children will go in one group, and five will go in the other. The rest of the class will then have to figure out what the total will be when the group is combined. The first three times only use single digit numbers. And as they add the groups together, make note of the working on the board, like so:

\[
\begin{align*}
3 + 5 &= 8
\end{align*}
\]

After three sums of single-digit numbers have been done, add a single digit and a double-digit number that involve carrying. For example, 13 plus 8. Make your group of 13 and 8, and then ask the class to help you. Tell them because 13 is a two-digit number, it should demonstrate place value. Arrange the pupils into two lines, one of three and a one of ten. Then explain that the line of 8 is not divided because it is a single-digit number. Explain to the pupils that when adding, one must go by place value. Ask the class to help you as you do this. Follow along on the board as you add the 3 and the 8. As the pupils will know, the answer will be 11. Then point out that since 11 will clearly not fit in the ones, the 1 will carry over to the tens. Show this on the board by adding one to the tens but show this in the pupils by moving ten of the pupils from the group of 11 to the group of 10. Make sure they understand that the reason you moved 10 and not 1 is that the one that carried was in the tens. At this point the board will look like this:

\[
\begin{align*}
13 + 8 &= 21
\end{align*}
\]

Let’s Pause

Point out to pupils that even though these are larger numbers, they can still count on their fingers if they need to when they add by place value.

Give the pupils a couple of examples of number stories that include carrying and ask them to help you solve them on the board. Only add 2-digit numbers. Then ask them to make up their own number stories based on real-life experiences. The only rules are that they must include double digits and carrying. As they come up with them they may present to the class, and the class will make note of the sum. So if the number story is, “Zoha invited 15 people to her birthday party. Her twin brother, Zain invited 17. How many are coming in total?”, the pupils should write:

\[
\begin{align*}
15 + 17 &= 32
\end{align*}
\]

Give them 7 minutes to present as many number stories as possible.
### Activity 3
30 minutes
chalk/tape

This pairs with Math Lab page 23

This activity is best done outdoors. Using chalk, or tape create three parallel number lines on the ground, as shown below:

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Explain each line shows one place value, so the left most will portray the hundreds, the middle one the tens, and the right most, the ones. Tell pupils to use this number line to solve the following questions.

1) \(300 + 7\)  
2) \(450 + 5\)  
3) \(320 + 9\)  
4) \(950 + 2\)  
5) \(466 + 11\)  
6) \(212 + 14\)  
7) \(720 + 29\)  
8) \(540 + 25\)  
9) \(101 + 80\)  
10) \(300 + 600\)  
11) \(350 + 110\)  
12) \(100 + 120\)  
13) \(820 + 100\)  
14) \(621 + 241\)  
15) \(356 + 223\)

Have three pupils volunteer to act as markers on the number line and ask the other pupils to help them figure out how to move. Tell them that they should go one place value at a time, always going from left to right. For instance, to solve \(350 + 110\), they should start on 3, 5, 0, respectively. To work out the sum, the pupil on 0 will stay put, the 5 will move up one, and then the three will also move up one. Once the question bank has been solved, present pupils with up to 5 number stories that they must solve using the number lines. Make sure that they number stories involve three-digit numbers and no carrying. Here are some examples of number stories you can tell:

1. Lyla goes to a school with 350 children, and her brother goes to a school with 400 children. How many pupils in both schools?
2. Hassan needs to buy a book for Rs 230. At the store, he remembers he also needs a notepad which costs Rs 225. How much will he pay if he buys both?
3. There are two flights landing at the airport at 6 o’clock. One has 115 passengers, and one has 164. How many passengers in total will land at 6 o’clock.
4. Kamran is planning his wedding. He has 140 family members and friends that he would like to invite, while his wife has 210. How many wedding invitations will Kamran need to have made?
5. Farah is writing a book. She has already written 620 pages but is planning to write 350 more. How many pages will her book have in total?

Assign 15 minutes of classwork from the textbook for pupils to practice.
This pairs with Math Lab pages 24 and 25

Solve the following questions in front of the class. Explain that you will be using counters to represent each place value. For example:

```
H T O
2 6 9
+ 9
```

As we can see with the counters, the ones column initially had eighteen, but since there can only be one digit in each place value, we removed ten counters from the ones, and added one to the tens. Repeat this so that the pupils understand why ten counters in the ones column are equal to one in the tens column. Solve the rest of the questions on the board, showing carrying, while also showing the answers with the counters.

```
1) 304 + 7  4) 260 + 62  7) 372 + 422
2) 798 + 7  5) 535 + 82  8) 103 + 399
```

Activity 5

Ask pupils if they think that using place value made it easier to add large numbers. If they say yes, ask if they think it would also help with subtraction. Bring up carrying and ask pupils if they can come up with a similar way to subtract numbers on paper. Show them how to solve the first four following, using carrying on the board:

```
1) 15 – 9  6) 52 – 48
2) 23 – 15  7) 93 – 37
3) 76 – 49  8) 57 – 9
4) 81 – 39  9) 42 – 34
5) 27 – 19  10) 66 – 59
```

Give them 20 counters each and ask them to solve the rest preferably in groups, using the counters if they need to.

Let's try it

Read out up to ten number stories to the class, involving carrying, and ask pupils to solve them individually at their desks. They should show their working.

Some examples of number stories you can use are as follows:

1) Amna is helping her mother make cupcakes to sell at a funfair. They have made 366, but they still have enough ingredients left for 145 more. Amna’s mother decides to use all the ingredients. How many cupcakes will they eventually have at the fair?

2) Rabia is raising awareness about the environment. She asks volunteers to help her plant trees in a forest that only has 126 trees left. After a week of hard work, Rabia and her volunteers have planted 399 trees. How many trees does the forest have now?

3) Jehanzeb has saved Rs 450 when his grandfather gives him a jar full of change. After he counts the change in the jar, he finds it has Rs 288. How much money does Jehanzeb have now?
Let's try it

Ask the pupils to solve the following individually:
1) If there are 18 people on a bus and 9 get off, how many are left?
2) Ifrah buys 36 balloons, but 8 pop in the car. How many does she have when she gets home?
3) Somaiya makes 55 brownies for a party, but only 37 get eaten. How many are left?
4) Malik is selling 52 pencils at his store. During the week, 17 are bought. How many pencils does he have left at the end of the week?
5) A company orders 75 paper cups a day for their employees. They notice that at the end of the day there are always 16 left over. How many paper cups get used at the company every day?

Assign 15 minutes of classwork from the textbook for the pupils to practice borrowing.

This pairs with Math Lab page 23

This activity is very similar to activity 3, except the pupils will be learning subtraction without borrowing. Ask three pupils to volunteer as counters, and make a number line, like so:

```
  0  1  2  3  4  5  6  7  8  9
  0  1  2  3  4  5  6  7  8  9
  0  1  2  3  4  5  6  7  8  9
```

Explain to pupils that just like in activity 3, they will be using the number line to try to solve their subtraction questions by going through the numbers digit by digit. Go through the first three questions with them and have them solve the rest of their own. If there are too many pupils, have multiple number lines. Make sure to do at least fifteen sums, being sure to teach them how to subtract one-digit numbers, two-digit numbers, and three-digit numbers from three-digit numbers.

Here are some questions you could use:

1) 345 – 5  
2) 782 – 12 
3) 470 – 370  
4) 382 – 1  
5) 828 – 27  
6) 474 – 104 
7) 819 – 5  
8) 273 – 11  
9) 649 – 318  
10) 826 – 4 
11) 776 – 70 
12) 691 – 510  
13) 289 – 7  
14) 652 – 31  
15) 450 – 240

Let's try it

Bring pupils back to class and give them up to ten subtraction number stories that do not involve borrowing. Ask them to solve them individually at their desks. Here are some examples of questions you can use:

1) If 360 pupils go to a school and 20 pupils are absent, how many are present?
2) Malaika has 850 rupees. She spends 300. How much money does have now?
3) Ansa wrote a 368 page book, but her editor asked her to remove 7 pages. How many pages will she have left?
4) There are 886 pupils in a school. 450 are in the junior campus, so how many are there in the senior campus?
5) Naima reads the first 56 pages of a 158 page book. How many more pages until she is done?
**Activity 7**
15 minutes

Fill a bowl with chits, that each have a subtraction questions on them. There must be an equal amount of single digit numbers being subtracted from three-digit numbers, two-digit numbers from three-digit numbers, and three-digit numbers from three-digit numbers. They should all require borrowing. After each pupil has picked a chit, give them 2 minutes to think. Tell them they must come up with a number story to match their equation. After the 2 minutes are up, ask each of them to read their number story aloud to the class. The first one to raise their hand with the right answer will get a point. At the end, total the points and name the top three pupils. Here are some examples of equations you can put on the chits:

1) 864 – 806  
2) 678 – 9  
3) 962 – 479  
4) 852 – 66
5) 965 – 789  
6) 672 – 199  
7) 574 – 98  
8) 524 – 8
9) 373 – 5  
10) 754 – 75  
11) 643 – 478  
12) 314 – 169

**Activity 8**
20 minutes

The aim of this activity is for the class to connect addition and subtraction to its real-life applications. Arrange the class in a circle. Tell them that you will be going around the circle and everyone will have to share a real-life example where one would need to use addition or subtraction. However, they mustn’t share whether it is an addition example, or a subtraction example. The rest of the class will have to raise their hands to guess. Remind them that it shouldn’t take too long to tell. The way the game will work is that once a pupil has shared an example, and guessed the right answer to another pupil’s example, they may leave the circle and start on their homework in class, therefore having less homework at the end of the day. The first child to raise their hand will get to answer, but once a pupil has gotten one right, they can’t attempt anymore. Start by giving them an example of a question from your life. Here’s an example of what it should be like; “If my water bottle had 500 ml of water in it at the start of the day, and 200 ml at the end of the day, how can I figure out how much water I drank?” The correct answer to this would be to subtract 200 from 500.

Assign 15 minutes of homework from textbook. Some may be done in class as per above activity.
This pairs with Math Lab pages 29 to 31

Activity 9
15 minutes

Draw the multiplication sign “×” on the board and ask the class if they know what multiplication is. Let them discuss what they might know about it for a couple of moments, and then explain the concept of multiplying. Using 2 × 2, explain that this simply means two twos, meaning what number do two twos get when you add them together. Link this to addition explaining that while 2 × 2 is equivalent to 2 + 2, 2 × 3 is equivalent to 2 + 2 + 2. Tell them at this point that, as a rule, in multiplication, it does not make a difference to the answer if you switch the first and second number. So 4 × 2 is the same as 2 × 4. Demonstrate this by writing 4 + 4 and 2 + 2 + 2 + 2 on the board and asking the class to solve both. Then divide the class into 2, and give one side the following to solve: you could use:

- 6 × 2
- 4 × 2
- 2 × 6
- 2 × 4

Then give the other side of the class these (inverted versions of the same):

- 5 × 3
- 6 × 4
- 3 × 5
- 4 × 6
- 3 × 6
- 5 × 6

Allow them to compare answers so they can be assured that there is no difference.

Activity 10
30 minutes

bowl/chits

Assign 5 children to each of the following numbers; 3, 4, 5, 10. If the class has fewer than twenty pupils some of them will have to do more than one number. Explain the concept of the number sequences using 2 as an example. Write the two times on the board with answers, and go through the answers, pointing out that the pattern in the number sequence is simply to move up two numbers every time, or rather, to just add two. Ask the class to copy the multiplication table for two. Relate multiplication tables to the patterns they learnt in previous classes with shapes. Once they have grasped the concept, invite the five pupils assigned to the number 3. Present them with a bowl of chits. This bowl will contain ten chits that will have multiples of three starting from 3 all the way to 30. Since there are only 5 pupils, only 5 chits will be picked out. The pupils will then have to arrange themselves in ascending order, and with the help of the rest of the class identify the missing numbers, and where they’re missing from. Furthermore, each pupil will have to figure out on their own where they fall on the times table. Help them do this by writing what they figure out on the board. Make note of all the numbers present, and what 3 was multiplied by to get them. This will help the class find the missing pieces. Repeat this activity with 4, 5, and 10 spending no more than 6 minutes on each number.
Let's try it

Ask pupils to write down multiplication tables for 3, 4, 5, and 10, after putting the complete table for 2 on the board as an example (which they should copy down). If they get stuck, or are unable to remember, they need only use what they learnt in activity 9 to figure out what the answers are. Each table need only go up to 10. Give pupils no more than 7 minutes for each table. Once they are written, ask pupils to go over them as homework so that they are more comfortable with them, and can use them as a point of reference to solve multiplication questions.

Activity 11

6 minutes
28 sorted objects
sheets with picture

Present the pupils with an assorted variety of objects. Place them at the front of the class and show them how to write a multiplication sentence. So, for example, if there are 15 objects, pupils could write $3 \times 5 = 15$. Rearrange the objects three times, making sure the total number of objects is always a multiple from one of the tables already learnt. Ask them each time to come up with as many multiplication sentences as possible, for example 12 would have $2 \times 6$, $3 \times 4$, $4 \times 3$, and $6 \times 2$. Divide the class in two more and hand out sheets showing pictures of objects or use a textbook or story book. Make sure that both groups get different material. Ask pupils to make multiplication sentences for the pictures but to leave them incomplete by replacing a number with a question mark, like so $3 \times ? = 6$. After they have done, ask each pupil to swap their work with a pupil in the other group so they can fill in the blanks in each other’s work.

Let's try it

Assign classwork from the textbook so that the class can practice their multiplication. Be sure that the questions do not go beyond the tables of 2, 3, 4, 5, and 10. Remind them that they can refer to their times tables if they are stuck.

Let's try it

Ask pupils to solve up to ten multiplication stories as individual classwork. Here are some examples of stories you could use:

1) If Sophie’s two cats had three kittens each, how many kittens are there?

2) Asha is having a party, and her mother says there must be three pieces of candy for every child at the party. If the total number of children at the party is 8, how many pieces of candy should Asha’s mother have ready?

3) Mikyle stops at a store to buy himself some gum that costs Rs 5. Before he buys it, he decides he should buy some extra gum to share with his family. How much will it cost him to buy 5 pieces of gum?

4) A teacher needs 4 printouts for each of her pupils. If she has 10 pupils in her class, how many printouts should she get?

5) Ali has 5 uncles, and they each have 3 children. How many cousins does Ali have?
Put pupils in pairs, and using building blocks, ask each pupil to arrange a building of 8 blocks. Draw the division symbol on the board and explain that it represents division. Then write on the board $8 \div 2$. Stop here and ask them what they think this means. Remind them to think of the meaning of the word divide. As they volunteer their answers, tell each pair that their buildings are made of 8 blocks, so what would it mean if you asked them to divide the building by two? Most pupils here might realise that this would mean to separate the blocks into 2 piles, but if not, explain the meaning of the word divide, and explain that divide by two simply means to divide into 2 equally. Once they understand this, show that by physically dividing the blocks into two piles, one can come to the answer by counting the blocks in each pile. Repeat at this point that the way to solve an equation that looks like this $8 \div 2$ is to break the first number into as many equal parts as the second number, and the answer would be how many parts there are. Solve on the board $8 \div 4$, and $8 \div 1$ so that the pupils can follow along with their blocks. Then write on the board $20 \div 5$. Point out that this is not a question that could be solved with blocks because the numbers are too large. Ask pupils if they can think of a way they could do division without physical objects. Give them a moment to think and ask them if they think they could use subtraction. Lead them to the conclusion that if they continually subtract 5 from 20 until they eventually get 0, they can simply count the number of times they subtracted it and come to the answer. Try this on the board three more times with numbers divisible by 3 and 4.

**Let’s try it**

Ask the pupils to solve up to ten division questions in pairs and to ask for guidance if they need it. The numbers should all be from within the multiplication tables of 2, 3, 4, 5, 10. Here are some examples of questions you can give them:

1) $6 \div 2$
2) $8 \div 4$
3) $10 \div 5$
4) $9 \div 3$
5) $60 \div 10$
6) $15 \div 5$
7) $15 \div 3$
8) $50 \div 5$
9) $100 \div 10$
10) $21 \div 3$
11) $35 \div 5$
12) $40 \div 5$
13) $33 \div 3$
14) $36 \div 6$
15) $44 \div 2$
16) $45 \div 5$
17) $18 \div 2$
18) $14 \div 2$
19) $80 \div 10$
20) $24 \div 4$

Ask the class if they think they could make number stories for division like they made for multiplication. Give them some examples, using words like “how many each” or “how many per” that they would be familiar with, so they get an idea of how much division there is in every day life. Ask them to pair up and to each to come up with their own examples of division in real-life. They should then create their own number story based on their real-life example and challenge their partner to solve it. Clarify at the start that they should only use single-digit numbers.
Hand out post its in 4 different colours making sure each pupil gets one of each colour. Explain that each colour represents a number operation (addition, subtraction, multiplication, division), and have them write the symbol for every operation on its corresponding post it. Make sure they know they all must follow the same colour system and may not make up their own. Explain that you will be reading out a real-life situation, kind of like a number story, but it will be up to them to decide which number operation they need to solve the problem. Tell them you will read out the question twice, count to three, and then everyone must vote by holding up the right post it. The different colours will make it easier to see who is voting for what. Remind them that they must not shout out their answers but wait for a chance to put up their post it. Here are some examples of real-life situations:

1) Ayla has 20 chocolate bars and wants to share them equally between her 5 friends. How many will each friend get? (Divide)
2) Laila is hosting a dinner and wants to make sure there are 3 slices of pizza for each guest. How many slices should there be 6 guests? (Multiply)
3) Ali is making scrambled eggs for his family. He always uses 2 eggs per person. If he is using 8 eggs, how many people is he cooking for? (Divide)
4) Saira bought 18 apples but 6 were damaged as she brought them home. How many apples are still perfect? (Subtract)
5) Zeba ordered 22 new pens. After this, her total number of pens is 35. How many pens did she have previously? (Subtract)
6) If you go shopping at a store where everything costs Rs 10, how many objects can you buy with 80 rupees? (Divide)
7) If you go shopping at a store where everything costs Rs 10 and buy 6 things, how much will you pay? (Multiply)
8) Misha made 2 cups of tea for each of her guests, and afterward, there were 18 dirty teacups. How many guests were there? (Divide)
9) Aleesa has invited 6 of her friends and 3 of her cousins to her birthday party. How many people has she invited? (Addition)
10) Ali invites his friends to play cricket in the park. Out of the 25 people he invited, 18 are coming. How many people were not able to come?

At the end of this activity, have a quick class discussion, touching on each of the questions and ask pupils what their reasoning was for making the choices they did.

Another way to think about a division sentence like $6 \div 3$ is ‘how many times do you need to put 3 together to make 6?’. Also point out that since division is the opposite of multiplication, pupils can check their answers with the multiplication tables. So $25 \div 5 = 5$ can be rearranged into $5 \times 5 = 25$. 

Let’s Pause
Let’s talk Math

Ask pupils if they think it is important to have the numbers go so high. What would they need to count that would need such large numbers? When they come up with some examples, ask them, as a creative exercise to try to come up with a way to count a large quantity of objects with numbers only up to 100. They may suggest that you could say, if you were trying to count 400 objects, that there were four hundreds. At this point you should point out that four hundreds is quite close to four-hundred. Use this to show pupils that although it can seem like there are so many numbers to remember, once they know how to count to a hundred, the rest is quite easy to remember. Then ask them if they enjoyed working with number patterns. Did they find them useful? Were they complicated or easy? Point out that once they are confident with number patterns, addition would become much easier. For example, 70 + 68 is a sum that would require a lot of working, but using number patterns, one can figure out that adding 60 to 70 is just 70, 80, 90, 100, 110, 120, 130, and then by adding the 8 after, you get 138. The same can be done with subtraction. Let them discuss this for 5 minutes.

Let’s get practical

For this activity, try to take the class outdoors. Tell them that you are playing a game of catch. Set a small number of pupils, relative to the size of the class as the chasers and tell the rest of them that their job is to run away. Then explain that all the chasers are going to be tens, and the runners will be hundreds. Each time a hundred is tagged by a ten, it will go up by ten. So, if a runner is tagged 5 times, it will be a hundred and fifty. The first to get to 200 loses. The game will be, the runners run, and the chasers need to tag them. When a runner is tagged, they must freeze on the spot until they are able to calculate their new value and announce it. Nobody can tag a runner while they are frozen. Allow the class to do this for a while to increase their comfort with counting in tens.
Self Assessment

2.1. Addition of 2-digit numbers (with carrying)
2.2. Addition of 3-digit numbers (without carrying)
2.3. Addition of 3-digit numbers (with carrying)
2.4. Subtraction of 2-digit numbers (with borrowing)
2.5. Subtraction of 3-digit numbers (without borrowing)
2.6. Subtraction of 3-digit numbers (with borrowing)
2.7. Multiplication
2.8. Division
2.9. Addition, Subtraction, Multiplication, and Division

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Multiple Choice Questions
Read out the questions or write them on the board. You may ask pupils to either write the correct answer on a white board and hold it up or call out the options one by one, asking them to raise their hands to show which one they have chosen.

1) Calculate the following: 26 + 33.
   a) 69
   b) 59
   c) 70
   d) 50

2) Calculate the following: 25 x 3
   a) 75
   b) 65
   c) 80
   d) 100

3) Calculate the following: 81 ÷ 9.
   a) 9
   b) 10
   c) 12
   d) 7
Unit 3

Fractions

3.1 Fractions

i. Recognise fractions as equal parts of a whole

ii. Identify half, one third and quarter with the help of objects and figures (without writing \( \frac{1}{2}, \frac{1}{3}, \frac{1}{4} \)).

iii. Represent half, one third and quarter in numerical form (\( \frac{1}{2}, \frac{1}{3} \) and \( \frac{1}{4} \)).

iv. Shade the equal parts of a given figure to match a given fraction.

v. Recognise and name unit fractions up to \( \frac{1}{10} \).

vi. Recognise fractions like two thirds (\( \frac{2}{3} \)), three fourths (\( \frac{3}{4} \)), four fifths (\( \frac{4}{5} \)), up to nine tenths (\( \frac{9}{10} \)).

Plan Ahead:

Fractions 9 lessons

The approximate duration of this unit should be 9 lessons.

Before You Start:

The class should have a good understanding of what half and quarter mean, and since they are already familiar with division, they will able to understand the concept of dividing into equal parts.

Watch Out For:

Use one shape at a time, but the same fraction must be demonstrated with different shapes, so that children see a fraction associated with any shape or any set of objects. This is so that pupils understand that fractions can apply to anything that has equal parts.

This Pairs with:

Math Lab 2 pages 42 to 62.

Make Sure You Have:

Chart paper A4 sheet
Assorted fruit Oranges
Let’s Begin

Begin with a recapitulation of fractions, using a story and build up more stories on the rest of the fractions. For example, mamma bear spread some chocolate sauce over a crusty pie cut in quarters. She put it on one quarter for baby bear, one for papa bear and one for her own share. How many quarters did she put the sauce on? How many quarters did not have any chocolate sauce? Of course, at this point you won’t say “three over four” but continue to refer to the fractions in different ways. The answer is three quarters or \( \frac{3}{4} \); and one-quarter or \( \frac{1}{4} \). One could even say 3 out of the four pieces. Explain that this could also be used to refer to four separate balls, if those balls were being looked at as a whole, and that counting like this, in portions is called fractions. The definition of the word is a small or tiny part, amount, or proportion of something.

If They’re Struggling:
To help them grasp the idea, associate the fractions with fraction names.
2 equal parts: 2 halves in a whole
3 equal parts: 3 thirds in a whole
4 equal parts: 4 quarters in a whole
10 equal parts: 10 tenths in a whole

When you see the confusion bar, take note of how many pupils fall under each level. If pupils are at a level 3 or below, have them solve the equivalent Math Lab pages in pairs, having weaker students work with more confident students. First do allow the class to collectively ask questions. If all pupils are at a 4 or above, move on to the next activity.

SLOs

Activity 1
15 minutes
Oranges

This pairs with Math Lab pages 42 to 44

Place three oranges or any available object that can be easily cut into halve and quarter in front of the class and ask them to count them. Then take away two and ask them to count again. After they count one, cut it in half and remove one half so that there is only half an orange. Then ask them to count the oranges. Some might say half or one. Point out that there is half of one orange, so one is the wrong answer. Take out two more oranges and cut one into three pieces and one into four. Explain that while the piece of the first orange is referred to as a half, a piece of the second one is referred to as a third of an orange. Let them guess what the last one is referred to. Some of them might know the world quarter, but some might guess fourth. Let them know that both are technically correct. A quarter is generally one of four pieces. Highlight the fact that all the pieces need to be equal for these labels to apply. Write the word half on the board and ask the class if they know what the number for half is. Let them guess and eventually write \( \frac{1}{2} \) on the board. Explain that numbers written like this are called fractions and are used for numbers that are not whole. Point out that the orange is one out of two, because it is one of two pieces. Ask them if they can guess how to write a third or a fourth. Let them come to the board to write their best guesses.
Let's try it

Give pupils a worksheet or have them copy off the board. Write $\frac{1}{2}$, $\frac{1}{3}$, and $\frac{1}{4}$ on one side, and draw four circles on the other. Colour them in according to the fractions and colouring one completely so that the pupils can match the numbers to the circles.

Activity 2

This pairs with Math Lab pages 45 to 49

If possible, arrange the class in a circle for this activity. Hand everyone an A4 sheet. Tell the pupil they should each fold their paper to show the fraction $\frac{1}{2}$. Remind them that the direction in which they fold is not important so long as both sides are equal. Ask them to hold up their paper when they are done. Point out that whether the paper is folded lengthwise or laterally, both are right as the paper is still equal on both sides. Then ask them to fold the paper according to $\frac{1}{3}$. Once more, point out that the direction of the folding is irrelevant. Lastly ask them to do $\frac{1}{4}$. Use this opportunity to point out that a quarter is a half of a half.

Assign 15 minutes of classwork from the textbook relating to fractions.

Refer to If they’re struggling

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Activity 3

This pairs with Math Lab page 50

Write the following fractions on the board; $\frac{1}{2}$, $\frac{1}{3}$, $\frac{1}{4}$... $\frac{1}{10}$. Ask pupils to read them out and tell them that they can be said as one over six, or one sixth, or even sometimes as a sixth. Then point out that 2/3 is also a fraction. Invite a volunteer to the board to draw what they see as 2/3. This could be done by drawing a square or a circle and shading it. Once this is done, ask pupils what other fractions they can think of that have 2, 3, 4, 5, 6, 7, 8, 9, 10 in the denominator. Give them 5 minutes to write down as many as they can think of, including the ones on the board, reminding them that the top number should not be bigger than, or equal to the denominator. If they are able to write down all the numbers they should have 45 in total. If they have less than 45, have them compare work to try and figure out what they missed.

Let's try it

Give each pupil a circular piece of paper. On the back of each one, there will be a fraction. Ask them to colour a part of the circle to represent the fraction. Remind them that they can fold their circle to make sure all the parts are equal. Give them 5 minutes to do this, and then ask them to show their circle to the pupils seated next to them and have them guess the fraction. The fraction should be one of the 45 previously taught.
Let's try it

Ask pupils to draw a representation of any fraction that has a denominator up to ten. Give them an example of a drawing on the board, perhaps a drawing of 5 balloons, 3 pink, and 2 blue. Write under the drawing, \( \frac{3}{5} \) of these balloons are blue. Ask them to make a drawing of anything they like, and write a sentence under it, stating what fraction the image is meant to be showing. Encourage them to be creative and think outside the box.

Let's talk Math

Is a fraction a number? Ask pupils this question and allow them to discuss it. What are their reasons for saying it is? And what are the counter arguments for those. Ask them to keep in mind that this conversation is a gathering of opinions, not a way to try and determine a correct answer. Everyone is encouraged to speak, even if they are thinking aloud. Pupils should consider that one of the functions of a number is that they can specify a quantity of things, and that is something that a fraction can do as well, but in a different way. Ask them how they would know when to use a number and when to use a fraction. If you asked how many pupils in the class are wearing glasses, which should they use? A number. But if you asked what part of the class is wearing glasses, taking the class as a whole, it could be seen as an opportunity to use a fraction.

Let's get practical

Tell each child that they are in charge of finding 8 “customers”, can be within the class, and taking their order for what they would like on their pizza. Here are some options:

- Mushroom
- Basil
- Olives
- Onion
- Pepperoni
- Tomato
- Jalapeno
- Capsicum

Each person placing orders can choose as many toppings as they like, or they can opt for a plain pizza. Once the pupils have each noted down 8 orders, hand out chart paper. Help everyone draw a circle and put 4 lines through it so that it is divided into 8. Then ask them to get to work drawing their pizza. Now they must make sure that there is a slice for each customer, so as they draw the pizza, they must be careful of where they draw their toppings. If only two people wanted basil, then there should be basil on only two slices, but those slices need to also have the rest of the ingredients requested with basil. Once they are done, they should list write a fraction for each of the ingredients listed above. If one of them was not used at all, they should just write 0. For the rest, it should be the fraction of the pizza that has the topping, so the number of slices over 8. Have them do this on their own but allow them to ask as many questions as they need. Allow them to cut up their pizza and serve the slices to their customers. If the school were to have access to an oven, this activity could be done in groups with real pizza dough, and with actual toppings instead of drawn on ones.
Multiple Choice Questions

Read out the questions or write them on the board. You may ask pupils to either write the correct answer on a white board and hold it up or call out the options one by one, asking them to raise their hands to show which one they have chosen.

1) Draw the circles below on the board. Which of the following represents $\frac{6}{8}$?
   a) ![Circle A]
   b) ![Circle B]
   c) ![Circle C]

2) What is the right fraction to represent the shaded part of this circle?
   a) $\frac{4}{8}$
   b) $\frac{2}{4}$
   c) $\frac{1}{2}$
   d) All of the above

3) A quarter of these balls would be how many? (Here, draw 4 balls on the board.)
   a) 4
   b) 8
   c) 2
   d) 1
Unit 4
Measurement: Length, Mass, and Capacity

4.1. Length
i. Compare the lengths of different objects.
ii. Recognise the units of length (metre and centimetre).
iii. Use standard metric units of length (metre and centimetre) and their abbreviation to measure and record lengths of variety of objects.
iv. Use addition and subtraction within 100 to solve real-life situations involving lengths in same units.

4.2. Mass
i. Compare the mass of different objects.
ii. Recognise the units of mass, i.e. kilogram, gram.
iii. Use standard metric units of mass (kilograms and grams) and their abbreviation to measure and record mass of variety of objects.
iv. Use addition and subtraction within 100 to solve real-life situations involving mass in same units.

4.3. Capacity
i. Compare capacity of different objects using nonstandard units (jug, glass, cup, etc.).
ii. Recognise and use the standard metric units of capacity, i.e. litre and millilitre.
iii. Use addition and subtraction within 100 to solve real-life situations involving capacity in same units.

Plan Ahead:
Length 6 lessons
Mass 6 lessons
Capacity 6 lessons

The approximate duration of this unit should be 18 lessons.

Before You Start:
Pupils would have learned about the concepts of length and mass before, but always with non-standard units. This unit will be their first interaction with these units in the class. However, they may still know a little bit about them from home.

Watch Out For:
Avoid any confusion between the units to measure mass, length, and capacity. Also, be sure to explain the fact that it is almost always alright to use the abbreviations instead of the words, but they do have to make sure they learn the correct spelling.
This Pairs with:
Math Lab 1, page 63 to 66

Make Sure You Have:
Chart paper
A4 sheet  Ruler
Balance scales  Oranges
Water  Pupils’ toys and books
Assorted fruit  Measuring cups
Digital scales  Metre ruler
Water containers

If They’re Struggling:
Try to connect the non-standard units previously learned to what they are learning now. Explain that these units are agreed upon universally, which is why it is important that everyone learn to use them: but they are still just measurements. The phrase “100 ml of water” is the same as half a cup of water. When using addition and subtraction with these units, make sure they know to treat the numbers just as numbers, because the unit will not affect the math. Also, be sure to assign plenty of classwork from your textbook and workbook so that they are not entirely dependant on the activities, because this unit will require plenty of practice.

When you see the confusion bar, take note of how many pupils fall under each level. If pupils are at a level 3 or below, have them solve the equivalent Math Lab pages in pairs, having weaker students work with more confident students. First do allow the class to collectively ask questions. If all pupils are at a 4 or above, move on to the next activity.

Let’s Begin
Ask pupils how they know if an object is heavy or light. They will most likely answer that they can tell by lifting it. Ask them, is that really a good way to check? Let them discuss what could go wrong. If they don’t realise themselves, point out that just because one person thinks that something is heavy, it doesn’t necessarily mean that everyone else will, or that it is in fact, heavy. Then, bring up length, and ask if they can connect that idea to length as well. Lead the pupils to the idea that if you decide whether something is heavy by lifting it, and if it is long by looking at it, you are really deciding if something is heavy for you or looks long to you. While these are valid observations, they are not so good for sharing ideas. A friend may tell you that something is heavy, but you may find it light. A standard way to communicate the mass of an object, or the length or capacity is necessary. Ask pupils if they know of any.
### SLOs

<table>
<thead>
<tr>
<th>4.1</th>
<th>Activity 1</th>
<th>5 minutes</th>
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<tr>
<td>i</td>
<td>Ask the class what they think the longest object in the class is. Challenge their answers and offer more ideas if they are stuck. Then ask what the shortest object is. Make a list on the board of the longest 5, and the shortest 5. If they are within reach, help the pupils measure them using non-standard units, like hand span to make sure that they are right about which one is longest/shortest.</td>
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### Let's Pause

Pupils might need a reminder to write the units next to their answer. Remind them that without the unit, they’re not really answering the question.

### Activity 2

<table>
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<tr>
<th>4.1</th>
<th>Activity 2</th>
<th>10 minutes</th>
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<tr>
<td>ii</td>
<td>Show the class a metre ruler and ask them to vote whether they think it’s long or short. Ask for examples of what they think they could measure with a ruler that big. After they come up with a few, ask the class what they understand by the word measure. Let them do their best to answer, and then ask how they have measured things previously. If they are confused, explain that you are asking about units. Most of them will probably mention using body parts like hand span or arms. Ask at this point if they can see any flaws with using body parts to measure. Let them volunteer ideas, and they will hopefully conclude that using a non-standard unit of measurement, especially a body part is too inconsistent. If they do not, discuss how we use measurements in real-life. Use the examples of giving measurements to a carpenter. If one said, “build me a wardrobe three hands wide,” the carpenter would not be able to get the same measurements using his or her own hands. Liken this to days of the week. Explain that we have standard units of measurement that can be used globally because they are necessary. Tell them about metres and centimetres while passing around the metre ruler so that pupils can get familiar with them. Ask questions like, “can you guess how many centimetres can fit in a metre?”</td>
<td></td>
</tr>
<tr>
<td>iii</td>
<td>Let’s try it</td>
<td></td>
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As homework, ask pupils to trace the outline of one of each of their family’s hands in their notebook. Tell them to be sure to also trace their own hands, and to label them. In class, ask each pupil to measure each hand in centimetres, using a ruler. Draw a hand on the board and measure it so they know how to do it. Measure from top to bottom, and from side. Remind them to mark their measurement points so that they can find them again if they need to. Once they know what they’re doing, ask them to measure the outlines they got from their families, and compare them. Ask the class if the size of each person’s hand was quite different, or not. Point out that therefore we do not use non-standard units. Measurements must always be precise. Ask the pupils to come up with examples of what could go wrong if people used the wrong measurements. |
Ask pupils, in pairs, to measure five to ten objects around the class or outdoors to get used to the units.

Using the measurements of the hands from the previous Let's Try It, ask the pupils to find differences between the measurements. Have a volunteer share their measurements on the board. Have the class help you to; arrange them from smallest to biggest, calculate the difference between the width and length of each hand and the one bigger than it, also find the difference between the biggest and the smallest. So, if the hands from smallest to biggest are, in order, A, B, C, D, find the difference between A and B, B and C, C and D, and A and D.

Assign up to five measurement-based addition and subtraction questions, within 100 using only one unit in each. Here are some examples you can use:

1) Samana has grown 3 centimetres. She is 98 centimetres tall. How tall was she before?
2) If a teacup is 8 centimetres tall, but you have to leave the top 2 centimetres empty to avoid spilling. How many centimetres high will the tea be from the bottom of the teacup?
3) In a relay race, I run 50 metres and my friend runs 35. How many did we run in total?
4) A teacher has a roll of tape that is 50 centimetres long. She uses an 18-centimetre-long piece of tape to secure a wire to a wall. How much tape is left in the roll?
5) Mahnoor's hair is 25 centimetres long when she decides to cut off 7 centimetres. What will her hair length be after her haircut?

Ask every pupil, the day before to bring in their favourite toy and their favourite book from home. Remind them not to bring anything delicate or valuable. Once they all have a book and a toy, make groups of four to six. Let's say you have group A, B, C, D, and E. Ask each group to compare weights, just by feel and list their books and toys from heaviest to lightest in each group, keeping the book list separate from the toy list. After they have made their lists, combine groups in sets of twos so that there are half as many groups left. If there are an odd number of groups, let one of the groups be of three, so hypothetically you then have A and B in one group, C, D, and E in one group. Ask pupils to work collaboratively with their new group members and create new lists together, once again, listing the entire group's toys and books in order of heaviest to lightest, and once again, keeping the book list separate from the toy list. Remind them that they are going only by feel. Also make sure they don't spend more than 7 minutes making each list. Once the new lists are made, collect them, and introduce the class to balance scales. Give them a quick explanation of how they work, in case they have forgotten, and then explain that you will be using them to create a list for the whole class, on the board, using the balance scales to get a more accurate idea of which book or toy is heavier than the other. At this point you need not use any units; only adjectives like heavy and light. Make pupils help you identify which side of the balance scales is lower.
Collect copies of textbooks and or workbooks from all the pupils’ classes. If there are less than five books, borrow some from the school library, but make sure there are no more than five. Try to have as much variation in weight as possible. For this class, try to have as many weights as possible. At minimum a one-kilogram weight, a five-hundred-gram weight, and a one-gram weight are necessary. Introduce these to the class and ask them to pass them around as you explain the activity. Write the words kilogram and gram on the board and explain them in relation to the weights. Ask pupils if they can guess what one would need weights for. How could one make use of an object that they knew the exact weight of? If they don’t come to an answer, ask them if the weights could be used with the balance scales. Lead them to the conclusion that using weights can help one determine the approximate weight of an object, or at least whether it is more or less than a fixed number. Previously, we used the balance scales to determine whether objects were heavier or lighter than each other, whereas now we can determine whether an object is heavier or lighter than a certain weight. The class should already understand the benefits and uses of standardized units of measurement. Once the class is through with all the weights, use the balance scales to weigh the books. Have the class assist you. Try to get an exact weight for each book. During this weighing process, it should become quite clear that using balance scales to determine the weight of an object is actually quite difficult, especially when one has limited access to weights. At this point, introduce them to a more modern weighing scale that gives an exact weight, making sure that it is to the gram. Allow pupils to gather round as you weigh all 5 books. Write the weights on the board so that they can then arrange them in ascending order. Take this opportunity to show them how these units and their abbreviations are written. Be careful to have measurements only in Kgs or in grams.

Make groups of five to seven pupils and ask each group to incorporate “props” found around the class to prepare a skit of what would happen in real-life if one did not understand weight. To make sure they understand, ask them where weight is used in real-life. If they are having trouble brainstorming, give them the examples of luggage checks at the airport, buying fruits and vegetable by the kg, and even on pre-packaged foods at the grocery store. Allow a few minutes of class discussion to share ideas, and then let each group have 12 minutes to prepare their acts, telling them that they should seek to highlight the importance of understanding weight while also creating a sort of number story, so that each skit provides an addition or subtraction sentence. Ask them to keep numbers under 100, and skits between one and two minutes. After all of the skits, ask the pupils what number stories they were able to identify. Solve them on the board.
Let’s try it

Assign up to ten addition and subtraction questions to pupils, using grams and kilograms as units, but only one unit at a time. Here are some examples of questions you can use:

1) An ice cream shop makes 10 kg of ice cream every morning to sell. One evening, as they close, they have 1 kg leftover. How many kgs were sold?
2) A boy needs 100 g of apple slices to make apple pie. Using a digital scale, he sets aside 500 g of apples, but after he slices them, and removes all the peels and cores, he only has 65 g of slices. How many more grams will he need to have the whole 100 g?
3) A girl had 30 grams of sugar in a jar. After she accidentally knocks it over, only 13 g of sugar are left in the jar. How much sugar did she lose?
4) A box of highlighters weighs 99 g. After all the pink ones are removed, the remaining highlighters weigh 48 g. How many grams of pink highlighters had been in the box?
5) Shehla’s luggage allowance on her flight is 30 kg. She has one bag that weighs 18 kg and one that weighs 6 kg. How many more kilograms of luggage can she add before meeting her limit?

Let’s Pause

As you teach pupils to measure liquids, enforce the fact that they must place the container on a flat surface, and look at it from eye level to get an accurate measure of how full the container is. This is especially important when using measuring cups, as looking from the wrong angle will cause the surface of the water to align with the wrong measurement mark.

Activity 7

Ask pupils how much water they have in their water bottles. They may be confused about answering this question, so ask them if they can think of any non-standard units for measuring liquids, like hand span for length. They will hopefully come up with ideas like jugs, cups, bottles. Some may suggest standard units but remind them to stick to non-standard. Then, provide as many water containers as possible. Examples are: fish bowls, cups, bottles, mugs, jugs. Remember that the same kind of container can be used in various sizes. Make the class into small groups and give each group a choice of up to three containers, making sure the groups swap every two minutes. While they have their containers, allow them access to water so that they can transfer water between each one, making note of how many times they could fill a cup for example without emptying a jug. This activity would be best done outdoors, to avoid a messy class, and also close to a tap and a drain if possible. Do remind pupils that water should never be wasted, so ask them to use as little as possible, and help you come up with a use for the water. At the end of the activity, explain the word capacity to the class.

Let’s Pause

Pupils may struggle with the spelling of millilitre and litre, so be sure to give them plenty of practice writing them. Also point out the difference between the American and British spelling, explaining that both are correct, but that they should adhere to the British spelling for school.
Ask pupils if they have any idea what the standard units for measuring liquids are. Let them make suggestions, and then write ml and l on the board. Write millilitre and litre under their respective abbreviations. Explain that these are the units that we use to measure liquid, but ask them, if you use a ruler or measuring tape to measure length, and a weighing scale to measure weight, how could one potentially measure capacity? Ask them if any of them ever help their parents in the kitchen, and if they’ve ever seen a liquid measured out. The ideal answer would be a measuring cup, but pupils might also just say cup, or tablespoon. Establish with the class that the only way to measure a liquid is by putting it into a container meant for measuring. Then show them a cup, and any other measuring containers, that you could borrow from the science laboratory. Make groups and give each group a measuring cup that has markings in ml. Ask each group to fill the cups to the highest ml mark, and reduce it by 10 ml. Tell them to keep pausing to check the level, making sure they haven't poured out more than 10 ml, reminding them that they will not get an accurate measure until they place the cup on a flat surface. Continue asking them to pour out small amounts, perhaps into plants around the school if the school staff is alright with that. Ask each group in advance to make sure to take note of how much they are pouring out and how much is left in the form of number sentences.

Let’s try it

Assign up to ten addition and subtraction questions relating to real-life situations. The numbers should remain below 100. Here are some examples of questions you can use:
1) If Maryam buys 75 ml of chilli oil for a dinner party, and only 30 ml is used, how much chilli oil will she have left?
2) Aslam is making 100 ml of dip out of cream cheese, olive oil, and garlic puree. If he is using 10 ml of olive oil, and 20 ml of garlic puree, how much cheese should he use?
3) Syeda has two plants. Daily, she puts 30 ml water in one, and 25 ml in the other. How much water do the two plants require in total, in a day?
4) In a day, Nusrat uses 11 ml of hand sanitizer. At the end of the day 23 ml remains in the bottle. How much sanitizer was in the bottle at the start of the day?
5) Sophia drops a new bottle of ink and 21 ml spill out. If there is are 19 ml left in the bottle, how much ink was there before she dropped it?

Let’s Pause

Pupils might find it confusing to identify what is suitable for measuring with litres and millilitres. Explain that these units are meant only for liquids but explain that sometimes substances like butter and cheese are measured in millilitres, depending on the texture. Ultimately, it is up to everyone to decide how best to measure what they need with the tools they have available.
Let’s talk Math

Since these are the first measurement units the pupils will have learnt in class, ask them if they will be incorporating them into their lives at all. And if not now, do they think they will in the future? Where do they think measurement might be really important? Are there any situations where not properly measuring could lead mistakes? Allow the pupils to try to come up with examples, and also examine their own lives to see where knowing one’s measurements could improve it. Also get them to think about when they see others using measurements. Ask them to try to come up with one example each. Allow the class 5 minutes to write a reflective writeup stating their thoughts on the unit.

Let’s get practical

For this activity, pupils will be working on a recipe. Make groups of up to six, and let them get to work. The recipe should include grams, millilitres, and centimetres. If you have access to an oven, try this recipe for biscuits. Be sure to handle the oven yourself, but let pupils do the measuring.

4 grams teaspoon baking soda
2 grams teaspoon baking powder
240 ml butter softened
300 grams cups white sugar
1 egg
5 ml vanilla extract

Preheat oven to 375 degrees F (190 degrees C). In a small bowl, stir together flour, baking soda, and baking powder. Set aside.

In a large bowl, cream together the butter and sugar until smooth. Beat in egg and vanilla. Gradually blend in the dry ingredients. Roll out the dough until it is about 1 cm thick. Then, using a cookie cutter, or even the top of a glass, or a knife, cut out circles, and place them onto a baking sheet.

Bake 8 to 10 minutes in the preheated oven, or until golden.

If an oven is not available, try this recipe:

1 apple per every 3 children, cut into 1 cm thick slices
240 ml water + 45 ml juice of 1 lemon
120 g peanut butter
20 g cocoa powder
rainbow sprinkles
chocolate sprinkles
mini chocolate chips

Cut small circles out in the middle of each apple slice. Soak the apple rings into the water and lemon juice mixture for 5-10 minutes. Pat dry completely. Mix together the peanut butter and cocoa powder until smooth and well combined. Slather over each slice. Add the toppings of choice.
Self Assessment

4.1. Length
4.2. Mass
4.3. Capacity

Multiple Choice Questions

Read out the questions or write them on the board. You may ask pupils to either write the correct answer on a white board and hold it up or call out the options one by one, asking them to raise their hands to show which one they have chosen.

1) What can we measure with centimetre?
   a) The mass of a book
   b) The height of a bottle
   c) The capacity of a swimming pool

2) It takes 25 jugs of water to fill up Asim’s bath tub. After he pours in the 13th jug, the jug falls and breaks. How many more jugs would Asim have poured?
   a) 15
   b) 10
   c) 12
   d) 13

3) Which of the following is a measure of mass?
   a) Kilogram
   b) Litre
   c) Metre
   d) None of the above
Unit 5

Time

5.1. Time

i. Recognise the number of hours in a day and numbers of minutes in an hour.

ii. Read and write the time from a clock in hours and minutes (with five-minute intervals) e.g. read 8:15 as eight fifteen and 8:50 as eight fifty.

iii. Recognise a.m. and p.m.

iv. Draw hands of a clock to show time in hours and minutes (with five minutes intervals).

v. Use solar calendar to find a particular date/day.

vi. Use Islamic calendar to find a particular date/day.

Plan Ahead:

Time 9 lessons

The approximate duration of this unit should be 9 lessons.

Before You Start:

Pupils are familiar with time and with both kinds of clock. In this unit they will learn more about how to tell time more specifically, but they should first be absolutely comfortable with the concept of time. The Islamic and solar calendar should also both be familiar, so pupils should know the names of the months.

Watch Out For:

This unit simply refines the knowledge pupils already have about time. Any uncertainty about concepts previously learned will make it harder to move through the unit, so it would be a good idea to start with a class discussion that could serve as a quick revision. Just catching some pupils up to speed will be helpful. Also, calculating which number on the clock signifies how many minutes will seem very tricky to pupils who don’t have a lot of experience with mental math. Assure the class that they are free to write out the working if they need to.

This Pairs with:

Math Lab 2 pages 65 to 66.

Make Sure You Have:

Globe
Torch
Signs for a.m. and p.m.

Analogue clock
Digital clock
Calendars (Islamic and solar)
If They’re Struggling:
If pupils are struggling to read the minute hand on analogue clocks, it would be helpful to have the whole class go over the 5 times table. If the problem persists, then you will know that it stems from an issue of understanding. Liken the clock to the 5 times table, and assure pupils that if they understand that, the clock will be no issue. Also, remind them that if they remember that when the minute hand points to 3 it is 15 minutes after the hour, 6 is 30 minutes, and 9 is 45, then they can work out what time it is slightly faster. The class may also be confused about learning both calendars together, so make it very clear that they must learn both, and give an equal amount of time to both.

When you see the confusion bar, take note of how many pupils fall under each level. If pupils are at a level 3 or below, have them solve the equivalent Math Lab pages in pairs, having weaker students work with more confident students. First do allow the class to collectively ask questions. If all pupils are at a 4 or above, move on to the next activity.

Let’s Begin
Use a globe and a torch to demonstrate how the Earth rotates and the Sun shines on the Earth. Students are not yet expected to understand how the Earth’s rotation explains night and day, but the visual image of the rotation of the Earth taking 24 hours from midnight to midnight helps students to understand the concept. Ask pupils what they think people would have done before clocks. Ask them what other indicators there are that the day is moving forward or coming to an end. Encourage them to come up with more than just the movement of the sun. Ask them if they feel different as the day progresses. Ask them if they think there is any alternative way to live in the modern-day world without using time. Allow them to brainstorm and share ideas, seeing how creative they can be. Ask them each to write down their favourite idea in their notebooks so that they can refer back to it at the end of the unit.

SLOs
This pairs with Math Lab page 65
Activity 1
10 minutes
Write on the board; days, minutes, hours. Ask pupils to help you put them in order of largest to smallest. They will likely already be aware of what minutes are. Then ask, how long an hour is. While the right answer is 60 minutes, pupils might be confused about how to answer the question. Given that hours are a unit of time, and they may not be familiar with the idea of conversion, you may eventually have to tell them the answer. Explain that after one minute has passed, sixty times, a whole hour has passed. Ask them then, how long a day is. If no one knows the answer, tell them 24 hours. Hold up a clock in front of the class. Point out that one round of the clock by the hour hand is an hour, but the minute hand, in one round makes 60 minutes. Then point out how the clock makes 24 rounds each day.

Let’s Pause
Pupils might find it confusing when an hour hand is in between numbers. Explain that if that is the case, the time is the number that it has passed, not the one it is about to reach.
Using an analogue clock, explain to pupils verbally how to read time. Explain that all they must do is read the number the hour hand is pointing to and then the minute hand. Pupils might find it confusing to read the minute hand, so remind them that this is where their five times table will come in handy. Ask each of them to find it in their notebooks so that they can refer to it if need be. Explain that when the minute hand is pointed at 3, they must multiply 3 by 5, concluding that it is 15 minutes past the hour. If it is pointed at 6, then it is 30 minutes past the hour. Once they are comfortable with an analogue clock, show them how to read a digital clock, also with the minutes being multiples of 5.

Let’s try it
Tell the class you are doing a silent exercise, so no one can speak. If they have an urgent question, they must raise their hands and wait to be called on. They must remain at their desks, you will be showing them a clock, and they must be ready with their notebooks to write down the correct time shown. Show them at least fifteen times and ask them to peer review. Only show times where the minute hand is pointing to a multiple of 5.

Assign classwork from the textbook so pupils can practice what they have learned.

Let’s Pause
A.m. stands for ante meridiem and p.m. stands for post meridiem. These are Latin words, the former meaning before midday, and the latter; after midday.

This pairs with Math Lab page 66
Ask the class they do at one o’clock on a weekday. They might respond by naming the class or activity they usually have at that time. Or they may simply say that they’re in school. Give them about 30 seconds to put forward their answers. Then stop them and say that you tend to be asleep at one o’clock during the week. Some might be confused, but others may understand that you are referring to 1 a.m. Remind pupils that although there are 24 hours in a day, the hours on the clock only go up to 12. This means each time happens twice. Once while the sun is rising, and once while the sun is setting. Allow the pupils a moment to wrap their heads around this. Then ask them if they think it could be at all problematic to have every time happen twice a day. If you ask someone to meet you at dinner for 8, It is probably a fair bet that they will not expect dinner at 8 in the morning, but situations are not always so easy to distinguish between. Point out that flights land throughout the day and night. If someone told you their flight was landing at 6, it is probably a fair bet that they will not expect dinner at 8 in the morning, but situations are not always so easy to distinguish between. Point out that flights land throughout the day, and night. If someone told you their flight was landing at 6, it could mean morning, or night. Ask pupils if they know an easy way to distinguish between 8 in the morning and 8 in the evening. Regardless of whether they know, write a.m. and p.m. on the board. Explain that a.m. refers to all times that are after midnight and before noon, while p.m. refers to times that are after noon, but before midnight. Be sure to specify that midnight is always 12 a.m., and noon is 12 p.m. Once this is understood, tell them you will be reading out some scenarios and the time they occurred at, and pupils will have to hold up a sign saying a.m. or p.m. to vote. They can easily make these with paper from their notebooks. Here are some examples of scenarios you can use:
1) I had breakfast at 8 o’clock (a.m.)
2) I went to sleep at 9 o’clock (p.m.)
3) I watch my favourite show every weekend at 10 o’clock (p.m.)
4) I started a new book at 1 o’clock (p.m.)
5) I baked cookies for my parents at 7 o’clock (p.m.)
6) I took my dog to a nearby park for a walk at 10 o’clock (a.m.)
7) I set my alarm for 9 o’clock (a.m.)
8) On my birthday, I invited my friends over for cake at 4 o’clock (p.m.)
9) Every day I do a quick workout at 8 o’clock (a.m.)
10) Yesterday I accidentally left home without my phone at 6 o’clock (p.m.)

Most of these would have been quite easy for pupils to sort as the activities listed are specific to a certain time of the day. However, some of these scenarios could have occurred, both in the morning, and the evening, like watching a television show, or doing a workout. Therefore, it is important that there is a quick way of always specifying time.

Let’s try it

Ask pupils, as a class project to create a personal timetable, for two days. One should be any day in the pupil’s own life, and one should be a day in the life of their favourite fictional character. Ask them to use chart paper and give them some examples on the board of what it should look like. Let them know they can pick up ideas from their class timetable. The only requirements are that they cover all 24 hours for both days, and that they mention a.m. or p.m. next to each time. They can make it in a list format, or a table. Encourage them to be creative with design, and remind them that both timetables must allot at least 8 hours for sleeping (exceptions might have to be made for fictional character, depending on who they are). This can be set as classwork, or homework.

Let’s pause

Make sure pupils know, when they draw clocks, the minute hand is generally a little longer than the hour hand.

Refer to If they’re struggling

Confusion level 1 – Does not understand any concept 2 – Does not understand most of the concepts 3 – Understands some concepts but has questions 4 – Understands all the concepts, just needs more practice 5 – Feels confident solving questions

Number of Pupils

Assign 20 minutes of textbook questions as classwork.

If pupil is below 3 use Math Lab

53
Activity 4
7 minutes

Ask pupils to follow along with you in your notebooks as you draw on the board. Start by drawing a circle. Then write 12, 3, 6, 9 with 12 at the top, 6 at the bottom, and 3 and 9 on the sides, as they would go on a clock. Point out that when drawing a clock, writing these 4 numbers first makes it easier to place the rest. Then write the rest of the numbers and make a dot in the centre of the circle. Ask pupils to give you a time. Once you have one, draw it onto your clock. Then ask for another time. Ask the class to help you decide where to place the hands of the clock to reflect that time. Do this until you are confident that all pupils understand the placement of hands on an analogue clock.

Let's try it
If possible, hand out a worksheet with 9 clocks printed on it, without hands. If a worksheet can't be made, have pupils draw the circles in their notebooks and fill in the numbers by looking at what they drew in their notebooks in the previous activity. Let them know that the circle doesn't have to be exactly perfect circle, and that the number placement is more important. Ask them to draw hands on each of them to show the following times:

1) 8:30  
2) 4:45  
3) 3:15  
4) 6:25  
5) 2:55  
6) 9:05  
7) 3:00  
8) 10:35  
9) 11:10

Activity 5
5 minutes calendars

Place a large calendar in front of the class and open it to the front page. Although the pupils will have studied the months of the year, but might need a refresher, in which case, flip through the calendar once, reading the months aloud. Show the pupils how the calendar can be used to find out what the of the week will fall on a specific date, as well as what date it will be on a certain day of the week. For example, you can check what the date will be next Saturday, as well as what day the last day of the month will be on. Ask pupils to help you find three to five more dates and allow them to come forward and examine the calendar. If possible, pass some smaller calendars around the class.

Let's try it
Ask pupils beforehand to get the birthdays of at least five people who are not in the class. They could be parents, siblings, or grandparents. Then, depending on how many calendars you have available, ask them to find out what day of the week each of the five birthdays fall on. Pupils can be requested to bring desk calendars from home if they are able, and hopefully there will be enough for three to four pupils to share one. If not, do this as a class activity with the large calendar.

Assign 20 minutes of textbook questions as classwork.
Activity 6
10 minutes
Islamic calendars

The Islamic calendar will also be familiar to the pupils but go over the months once for their revision. They are as follows:
Allow pupils to examine the actual calendar, and if there are smaller versions available, pass it around. Then, if there are multiple calendars available, make groups for a group activity. The number of groups should be the same as the number of calendars available. If there are not enough, do this as a class activity. Find out which day of the year, the first of each of the Islamic months falls on. So, by matching the Islamic and the solar calendar, find out which date on the solar calendar is the first of Muharram, Safar, Rabi-ul-awwal, and so on.

Let's try it
If this activity is not doable in the class, assign it as homework. Ask pupils to under supervision, use the internet to find out what date of the Islamic calendar they were born on. Then ask them to go through the calendars from the year they were born, to the present year, and find out which date on the solar calendar their Islamic birthday fell on each year. Let them know that it will be a different date every year. Ask them to make note of this in their exercise books so that you can make sure it was done right.

Assign 20 minutes of textbook questions as classwork.

Let's talk Math
Ask pupils if the way that they see time has changed since they last studied it. Do they think it is any more or less important, and did they find it easier? Then ask them to flip back in their notebooks to the start of the unit to see what they wrote down during the Let’s Begin, and ask them to consider, given what they’ve learnt about time so far, do they still think their alternative is better? Ask those who say yes why, and ask the same of those who said no. At the end of the discussion, ask them to take 5 minutes to write a reflective paragraph about what they learnt during this unit.

Let’s get practical
Ask pupils to create their own calendar sheet of their birthday month. Allow them to choose whether they would like to use the Islamic calendar or the solar one. They should each choose a month, and then, on a chart paper, create a calendar sheets showing the days of the week during that month, with plenty of space to write in each day. Encourage them to be creative and decorate their calendars however they like. Ask them under to make note of their routine during the average weekday and weekend day. It only needs to show; wake up time, breakfast, lunch, dinner, and bedtime. In this format: 9:50 a.m. Then, on their birth date, they should draw a miniature analogue clock to show the time they were born, correct to the nearest 5 minutes.
Self Assessment

5.1. Time

<table>
<thead>
<tr>
<th>Refer to If they're struggling</th>
<th>Confusion level</th>
<th>1 – Does not understand any concept</th>
<th>2 – Does not understand most of the concepts</th>
<th>3 – Understands some concepts but has questions</th>
<th>4 – Understands all the concepts, just needs more practice</th>
<th>5 – Feels confident solving questions</th>
<th>If pupil is below 3 use Math Lab</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of Pupils</td>
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</tbody>
</table>

Multiple Choice Questions

Read out the questions or write them on the board. You may ask pupils to either write the correct answer on a white board and hold it up or call out the options one by one, asking them to raise their hands to show which one they have chosen.

1) How many hours in a day and minutes in an hour?
   a) 25 hours in a day and 60 minutes in an hour
   b) 24 hours in a day and 50 minutes in an hour
   c) 24 hours in a day and 60 minutes in an hour
   d) 25 hours in a day and 50 minutes in an hour

2) What time is shown on this analogue clock? (Here, draw a clock on the board showing 3:55)
   a) 3:50
   b) 3:25
   c) 3:30
   d) 3:55

3) What is the purpose of a.m. and p.m
   a) A.m. is used for analogue clocks, and p.m. is used for digital
   b) A.m. is a different way of keeping time from p.m.
   c) A.m. time is before noon, and p.m. time is after noon, but before midnight
   d) None of the above
# Unit 6

## Geometry

### 6.1. Two Dimensional Figures

- i. Identify the figures like square, rectangle, triangle, circle, semi-circle, and quarter-circle.
- ii. Identify vertices and sides of a triangle, rectangle, and square.

### 6.2. Straight Lines and Curves

- i. Differentiate between a straight line and a curve.
- ii. Identify straight lines and curves from the given drawings.
- iii. Use ruler to draw a straight line of given length (exclude fractional length).

### 6.3. Patterns

- i. Make/complete geometrical patterns on square grid according to one or two of the following attributes.
  - Shape
  - Size
  - Orientation

### 6.4. Three Dimensional (3-D) Objects

- i. Recognise and name 3-D Objects (cubes, cuboids, cylinder, cone, sphere).

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**Plan Ahead:**

- Two dimensional figures: 5 lessons
- Straight lines and curves: 4 lessons
- Patterns: 5 lessons
- Three dimensional (3-D) objects: 4 lessons

The approximate duration of this unit should be 18 lessons.

**Before You Start:**

Pupils are familiar with 3-D and 2-D shapes from their daily life. They have seen and held objects, such as a ball (a sphere), a dice (a cube), a toothpaste box or a lunch box (a cuboid), an ice cream cone (a cone), etc. They have also felt the flatness of shapes, such as a floor tile (a square) or a windowpane (a rectangular), a round plate (a circle). They have a visual idea of what each looks like, but often get confused with names. At this level their knowledge of shapes takes a slightly more formal shape.

**Watch Out For:**

Make sure to give plenty of time for pupils to get used to names, especially when introducing the 3-D shapes at the end of the unit.

**This Pairs with:**

Math Lab 2, page 67 to 71.
Make Sure You Have:

Foam sheets   Rulers
Scissors     A4 Sheets
Markers     Playdough

If They’re Struggling:

Pupils may become frustrated trying to be accurate when constructing lines, so do not give them too much practice in one go. Also relate the line of symmetry to mirrors, and use real life examples of shapes. When you see the confusion bar, take note of how many pupils fall under each level. If pupils are at a level 3 or below, have them solve the equivalent Math Lab pages in pairs, having weaker students work with more confident students. First do allow the class to collectively ask questions. If all pupils are at a 4 or above, move on to the next activity.

Let’s Begin

Ask the class to volunteer any information they remember about shapes, and which shapes they can name. As they name them, ask them to come up to the board and draw them. Write the name of each shape down next to them. When they are done, if there is a circle, a square, a rectangle, and a triangle on the board, group them together, and tell the class that these are the shapes they should focus on. If one of them is missing, add it, and explain to the class what it is called. For the purpose of this activity, include all the shapes on the board. Ask pupils if they see any similarities, or differences. Try to prompt them to be aware of the lines. Which ones are curved, and which ones are straight, even if the circle is the only shape on the board that does have a curved line.

SLOs

Activity 1
20 minutes
6.1 foam sheets scissors markers
This pairs with Math Lab page 67
Square, rectangle, triangle and circle are shapes that the class should already be aware of. The new introductions are only semi circles and quarter circle. Make groups of four to six pupils and hand out foam sheets, markers, and child friendly scissors. Ask each group to make cut outs of each shape, being very careful with the scissors, and making sure to draw them with a marker first. Remind them that with the semi circle and the quarter circle, it might be easier to draw a full circle and then draw a line through it, or even just cut it in half. Also remind them to make sure the sides of the square are as equal as possible.

Activity 2
6 minutes
6.1 ii
Allow pupils to pass their foam shapes around during this activity and keep a square so that you can demonstrate. Ask the class if they know what vertices are. Explain that they are the corners of the shape, and that number of sides and number of vertices are two of the characteristics that are most often used to identify shapes. Ask the class to help you count the number of vertices and sides on the square you’re holding. At this point, ask them to stop passing their foam shapes. Ask each of them now, to stand at their desks for just long enough to hold up the shape they have and state the number of vertices and sides. The pupils holding the circle and semi circle and quarter circle need not count sides and vertices. They may simply name their shape.
Activity 3
10 minutes

Ask pupils about the previous activity. Which shapes did they not identify the vertices of? Ask a volunteer to come and draw all six shapes on the board. Ask pupils, what sets the square, the rectangle, and the triangle apart from the other three shapes. The aim is, that they should pick up on the fact that the circle, the semi circle, and the quarter circle involve curved lines, whereas the other shapes do not. Establish the fact that while all the lines in the first three shapes are straight, one of the lines in each of the last three shapes is curved. Ask pupils to come to the board and draw an example of a curved line and a straight line. Then tell them to look around the class and point out where they see curved lines and straight lines.

### Let's try it

Present each pupil with a picture, possibly from a colouring book, that includes straight lines and curved lines. Ideally, it will be very simple, and will not confuse pupils. If such a picture can’t be found, make a simple drawing and photocopy it. Ask the pupils, in pairs, to go through the and identify as many curved lines and as many straight lines as possible, by outlining them with differently coloured highlighters, or markers. Use as many pictures as necessary for them to spend at least 10 minutes on this exercise.

Activity 4
7 minutes ruler

Ask pupils about the straight lines they see in their immediate surroundings. Point out the ceiling, the windows, the door, and how all of these things had to be made of a very precise size. Discuss how when, constructing lines, for a purpose, as a designer, or an architect, or even just when you are making a drawing. Ask pupils to come to the board and ask them to draw a line. When they have done so, ask how they decided how long it should be. How did you know where to start it and where to end it. Explain to the class that while these pupil chose for themselves what the length of their line would be, sometimes, when drawing a line for a reason, it has to be a certain length. Ask pupils how they would go about drawing a line of a prescribed length. What tools would they use? At this point, some of them may have reached the conclusion that they would be able to use a ruler. Ask if anyone would like to come to the board to show the class how to do it. If no one volunteers, draw a line yourself, keeping in mind the only distance measuring units pupils have learnt so far are metres and centimetres.
Activity 5
15 minutes

Ask pupils to help you continue it, and then ask what the pattern is. Previously, they learnt about patterns that had different shapes. This pattern has the same shape, but it has one key difference. They should pick up on this, so when they point it out, be sure to highlight that even though the patterns they learnt previously had a series of different shapes, one can make a pattern with anything. Then, present this pattern:

Orientation is another way that one could make a pattern. Write the following on the board; shape, size, orientation. These are the three ways in which an object in a pattern could differ from another. Pupils must be conscious of all three when working to identify pattern. Present the class with at least four more patterns to solve on the board before wrapping up the activity.

Let’s try it

Present pupils with five or more patterns on the board to copy down and complete. They should only include circles, triangles, squares, rectangles, and the variations should be based on size, shape, and orientation. Here are some examples of patterns you could use:

Let’s try it

Ask pupils to draw lines of the following lengths in their notebooks, or on an A4 sheet if the notebooks are too small. Remind them that drawing a line diagonally will make it fit better. This is individual work to be done at their desks.

1) 2 cm 3) 9 m 5) 13 cm
2) 5 cm 4) 10 cm 6) 17 cm
Divide the class into two groups. Make sure that there are pupils of varying ability in each group. Tell them they will be having a competition, and the group that is the best at working as a team will win. Hand each child an A4 sheet, and ask them to draw three patterns on them, making sure to leave plenty of space so that the patterns can be continued. Explain that once each one of them have made a sheet of three patterns they should write their name in the corner, and all hand their sheets to you. Then make two stacks of worksheets, one from each group, and swap them, giving each group, among themselves the other team’s worksheets. Each team must then distribute the worksheets, there should be one per pupil, and solve them. The first team to get through all the worksheets will win. They can definitely help, or seek help from, teammates. An important rule is that if anyone designs a worksheet of patterns that does not make sense, or is unsolvable, then they will be disqualified. If any worksheets remain unsolved at the end of the game, solve them on the board. Make sure to give pupils at least six minutes to design their worksheets and remind them they can brainstorm in their notebooks.

This pairs with Math Lab pages 70 and 71

Give each pupil a lump of playdough. Ask them to make squares. Make one yourself as well. After a minute, draw a square on the board. Then ask the class, “What’s the difference between the square on the board and the playdough square?” Allow them to guess, and then explain the concept of the third dimension. Explain that the square on the board has height and width, but the play dough square, even if they are quite flat, the still have some depth. Use the idea of 3D movies as an example of depth. Then draw on the board, next to the square; a circle, a rectangle, a triangle. Explain then that a 3-dimensional square is called a cube. They are not the same shape, but since they are quite similar, they often are linked together. This is because the cube’s faces are squares. Ask the class if they know a 3D shape that could be linked to the other three shapes. If they come up with anything other than cuboid, cone, cylinder, and sphere, write it down, and draw it in the corner of the board, but say that it is not what you’re looking for. Give them two minutes to guess, before drawing the aforementioned 3D shapes. Ask the class now, to pay attention to how the cube has been drawn differently from the square, and the same with the cuboid. The sphere, however, on the board, will look just like a 2D circle. Explain that a sphere is hard to draw because of its lack of edges, but that’s what the playdough is for. Ask the pupils to copy you, as you roll your playdough, allowing the class to follow you. Then do the same with the cylinder, the cuboid, and finally, the cube.

Assign 15 minutes of classwork from the textbook so that pupils can revise these concepts.
Let’s talk Math
Discuss how we have different sized and shaped objects around us. We can see triangles, squares, and circles everywhere. Some of these shapes have length, breadth, and height and are 3D (three-dimensional) objects. For example houses have length, breadth, and height and are 3D objects. Others like a sheet of paper can be imagined to have a length and a breadth only. Such objects are two-dimensional objects and are 2D shapes. Ask pupils why they think it is important to have different names for 3D shapes and 2D shapes. Why not call a cube a 3D square? Prompt them to discuss what kind of confusion it would lead to. Encourage them to think about the third dimension, and ask them how much it changes the shape. Remind them that once a square becomes a cube, it has more vertices, and more sides, so it is not really the same shape. A 2D shape can be the face of a 3D shape, but that doesn’t make them the same shape.

Let’s get practical
Divide the class into groups of 4 to 5 pupils. Ask each group to create a sequence of shapes but using the 3-dimensional shapes they have just learnt about. Give them 10 minutes to plan the sequence, reminding them to take into account the resources available to create it, and also, how much time they have. Then ask them to create the sequence. Give each team an equal amount of playdough, and tell them to leave just enough to make 4 more shapes. It should be clear when they are finished what the pattern is. Once they are finished, ask all the groups to arrange their shapes at the front of the class, and allow them all to take their seats. Then have the class help you add 4 more shapes to each sequence, asking to group that created it not to help.
Self Assessment

6.1. Two Dimensional Figures
6.2. Straight Lines and Curves
6.3. Patterns
6.4. Three Dimensional (3-D) Objects

Multiple Choice Questions

Read out the questions or write them on the board. You may ask pupils to either write the correct answer on a white board and hold it up or call out the options one by one, asking them to raise their hands to show which one they have chosen.

1) Which of the following shapes has three sides and three vertices? (Draw the following on the board)
   a) Triangle
   b) Square
   c) Circle
   d) Rectangle

2) Which of the following would complete this pattern? (Draw the following on the board)

```
    □ □ □ □
    □ □ □ □
    □ □ □ □
    □ □ □ □
```

   a) Small square, rectangle, big square, circle
   b) Rectangle, big square, circle, small square
   c) Small square, big square rectangle, circle
   d) Circle, small square, rectangle, big square

3) Which 3D shape is this object? (Hold up an example of a sphere)
   a) Sphere
   b) Cylinder
   c) Cone
   d) None of the above
Lesson plans to be used in conjunction with the New Countdown book series.
# Syllabus Matching Grid of New Countdown Book 2 with the Single National Curriculum 2020

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<th>Math Labs</th>
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<td>i. Write ordinal numbers from first to twentieth</td>
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<td>2</td>
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<td>ii. Write numbers 1-100 in words</td>
<td>3 - 5</td>
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<td>i. Read numbers up to 999</td>
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<td></td>
<td></td>
<td>ii. Write numbers up to 999 as numerals</td>
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<td>iii. Recognize the place value of a 3-digit number</td>
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<td>24</td>
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<tr>
<td></td>
<td></td>
<td>iv. Identify the place value of a specific digit in a 3-digit numbers</td>
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<td>24</td>
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<tr>
<td></td>
<td></td>
<td>v. Compare 2-digit numbers with 3-digit numbers (hundreds, tens and ones)</td>
<td>20, 21</td>
<td>24</td>
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<tr>
<td></td>
<td></td>
<td>vi. Compare 3-digit numbers with 3-digit numbers (hundreds, tens and ones)</td>
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<td>vii. Count backward ten steps down from any given number</td>
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<td>27</td>
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<td></td>
<td>viii. Arrange numbers up to 999, written in mixed form, in increasing or decreasing order</td>
<td>23, 24</td>
<td>8</td>
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<td></td>
<td>ix. Count and write in 10s (e.g. 10, 20, 30, …)</td>
<td>15, 16</td>
<td>27</td>
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<td></td>
<td></td>
<td>x. Count and write in 100s (e.g. 100, 200, 300, …)</td>
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<td>7</td>
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<td>xi. Identify the smallest/largest number in a given set of numbers</td>
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<td></td>
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<td>13</td>
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<td>Unit</td>
<td>Contents and Scope</td>
<td>SLOs</td>
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<td>Math Lab</td>
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<tr>
<td></td>
<td><strong>2.1. Addition of 2-digit numbers (with carrying)</strong></td>
<td>i. Add ones and ones</td>
<td>29</td>
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<tr>
<td></td>
<td></td>
<td>ii. Add ones and 2-digit numbers with carrying</td>
<td>29, 30</td>
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<td></td>
<td></td>
<td>iii. Add 2-digit numbers and 2-digit numbers with carrying</td>
<td>31 - 35</td>
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<td>iv. Solve real life number stories, involving addition of 2-digit numbers with carrying</td>
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<td></td>
<td><strong>2.2. Addition of 3-digit numbers (without carrying)</strong></td>
<td>i. Add 3-digit number and ones without carrying</td>
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<td>ii. Add 3-digit number and 2-digit number without carrying</td>
<td>36 - 40</td>
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<td>iii. Add 3-digit number and 3-digit number without carrying</td>
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<td>iv. Solve real life number stories involving addition of 3-digit numbers without carrying</td>
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<td><strong>2.3. Addition of 3-digit numbers (with carrying)</strong></td>
<td>i. Add 3-digit number and 1-digit number with carrying of tens and hundreds</td>
<td>41 - 43</td>
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<td>ii. Add 3-digit number and 2-digit number with carrying of tens and hundreds</td>
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<td>iii. Add 3-digit numbers with 3-digit numbers with carrying of tens and hundreds</td>
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<td>iv. Solve real life number stories involving addition of 3-digit numbers with carrying of tens and hundreds</td>
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<td><strong>2.4. Subtraction of 2-digit numbers (with borrowing)</strong></td>
<td>i. Subtract 1-digit number from 2-digit numbers with borrowing</td>
<td>44 - 47</td>
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<tr>
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<td>ii. Subtract 2-digit numbers from 2-digit numbers with borrowing</td>
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<td>iii. Solve real life number stories of subtraction of 2-digit numbers with borrowing</td>
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<td>Unit</td>
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<td>2.5.</td>
<td>Subtraction of 3-digit numbers (without borrowing)</td>
<td>i. Subtract 1-digit from 3-digit number without borrowing</td>
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<td>ii. Subtract 2-digit number from 3-digit number without borrowing</td>
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<td>iii. Subtract 3-digit numbers from 3-digit numbers without borrowing</td>
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<td>iv. Solve real life number stories of subtraction up to 3 digits without borrowing</td>
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<td>2.6.</td>
<td>Subtraction of 3-digit numbers (with borrowing)</td>
<td>i. Subtract 1-digit number from 3-digit number with borrowing</td>
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<td>ii. Subtract 2-digit number from 3-digit number with borrowing</td>
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<td>iii. Subtract 3-digit number from 3-digit number with borrowing</td>
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<td>iv. Solve real life number stories of subtraction up to 3 digits with borrowing</td>
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<td>v. Analyze simple situations identifying correct operation of addition and subtraction with carrying/borrowing in mixed form</td>
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<td>2.7.</td>
<td>Multiplication</td>
<td>i. Recognize multiplication as repeated addition (e.g. 2+2+2=6 is equivalent to 3 times 2 = 6 and 3 x 2 = 6) and use multiplication symbol “x”</td>
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<td>ii. 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...)</td>
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<td>iii. Develop multiplication tables of 2, 3, 4, 5 and 10 till the multiplication of 10x10</td>
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<td>iv. Multiply numbers within multiplication table</td>
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<td>v. Write number sentence for multiplication from the picture such as 2 x □ = 6</td>
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<td>vi. Solve number stories on multiplication up to 1-digit numbers.</td>
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<td>i. Recognize and use division symbols÷.</td>
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<td>ii. Recognize division as successive subtraction</td>
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<td>iii. Divide numbers within the multiplication tables with remainder zero</td>
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<td>iv. Solve number stories involving division up to 1-digit numbers</td>
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<td>Unit 2: Number Operations</td>
<td>2.8. Division</td>
<td>i. Solve real life situations (using Pakistani currency as well) involving addition, subtraction, multiplication, and division. Give reasons for choosing the correct operation</td>
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<td>ii. Recognize fractions as equal parts of a whole</td>
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<td>iii. Identify half, one third and quarter with the help of objects and figures (without writing 1/2, 1/3, 1/4)</td>
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<td>iv. Represent half, one third and quarter in numerical form (1/2, 1/3 and 1/4)</td>
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<td>v. Shade the equal parts of a given figure to match a given fraction</td>
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<td>vi. Recognize and name unit fractions up to 1/10.</td>
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<td>vii. Recognize fractions like two thirds (2/3), three fourths (3/4), four fifths (4/5), up to nine tenths (9/10)</td>
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<td>4.1. Length</td>
<td>i. Compare the lengths of different objects.</td>
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<td>ii. Recognize the units of mass, i.e. kilogram, gram</td>
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<td>iii. Use standard metric units of mass (kilograms and grams) and their abbreviation to measure and record mass of variety of objects.</td>
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<td>i. Differentiate between a straight line and a curve</td>
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<td>Covered in Primer A and Primer B</td>
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<td>i. Make/ complete geometrical patterns on square grid according to one or two of the following attributes • Shape • Size • Orientation</td>
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Whole Numbers

Suggested Time Frame
10 to 12 periods

Learning Curve
Previously students have been working with numbers up to 99. They know hundred rupees and have seen a hundred rupee note. Hundred has to be introduced as addition of 1 to 99 following the same pattern as in 10, addition of 1 to 9. Then, they learn to work with 3-digit numbers.

Real-life Application
Numbers play an important role in our daily life. They are directly or indirectly connected to our daily routine. We find numbers involved in:

- home address
- phone numbers
- telling time
- measuring objects
- cooking
- prices and discounts
- number of peoples in a gathering
- profit and loss in the business
- paying bills

Frequently Made Mistakes
- Confusion in putting the sign of greater than and smaller than correctly.
- Wrong placement of numbers in the place value chart.
Summary of Key Facts

3-digit numbers are greater than 2-digit numbers.
Comparison and ordering of numbers depends upon the place values of the digits.

Model Lesson Plan

Topic
Comparing and ordering 3-digit numbers.

Duration
80 minutes

Specific Learning Objective
By the end of the lesson students will be able to compare 3-digit numbers using the terms 'greater than' and 'smaller than', using symbols (> or <), and arrange a set of numbers in ascending and descending order.

Key Vocabulary
ascending, descending, greater than, smaller than, order, and place value.

Resources
White board, a place value chart with H, T, and O.

Strategy
Engagement Activity (10 minutes)
Show them two 3-digit numbers on the board, ask them which number is greater and how they know.

Main Developmental Activity (25 minutes)
Stick the place value chart having H, T, and O columns, in one corner of the board. Review the topic of place value to hundreds. Write a 3-digit number in the place value chart. Ask the value of each digit.
Revise comparing 2-digit numbers by writing two 2-digit numbers, 43, and 63, on the board. Involving the students, compare digits in the tens place. If they are equal, move to the ones place and decide which of the numbers is greater. Ask them to answer with the appropriate term i.e. using greater than or smaller than. Then ask them to put the appropriate sign (> or <) between the numbers.
Now explain that the same method is applied to comparing 3-digit numbers. Write two 3-digit numbers in the place value chart. Starting from the hundreds place they will compare the digits in each place value and decide which one is greater. Then they will decide the appropriate sign (> or <). If they are confused with the signs, recall the idea that the open mouth of a hungry crocodile always moves towards the greater number.
Using their learning of comparing 3-digit numbers, they can consequently arrange a set of numbers in ascending and descending order.
Addition

Suggested Time Frame
6 Periods

Learning Curve
Students know how to add numbers in the Tens column and Ones column using the abacus and the number line. They now review addition of one-digit numbers and later 2-digit numbers without carrying over. Word problems are also given to make learning relevant and the students learn and apply in everyday life situations. This makes the study fun and interesting.

Once this is clear, students add 3-digit numbers with 3-digit numbers without carrying over. Next, they learn addition with carry over i.e., the students learn how to group ones into 10, then tens into 100s.

Real-life Application
Addition is a basic operation applied in all aspects of life. We use addition for buying, selling, cooking, measuring, and many other things.

Frequently Made Mistakes
- Numbers not written in correct places.
- Confusions in borrowing and carrying forward.
- Not regrouping the numbers correctly.

Summary of Key Facts
- Addition of numbers is commutative.
- Zero added to zero results in zero.
- Zero added to a number does not change the number.
- Any number added to itself is the same as doubling the number.
Model Lesson Plan

Topic
Addition of 3-digit numbers with carrying.

Duration
40 minutes

Specific Learning Objective
The students will be able to add two 3-digit numbers with carrying and without carry forward.

Key Vocabulary
2-digit, 3-digit, carry, and carry forward.

Resources
Bundles of ten pencils and a few loose pencils, cards having different numbers of stars.

Strategy
Engagement Activity (5 minutes)
Tell the students they have 4 bundles of 10 pencils and 8 loose pencils and I have 3 bundles of 10 pencils and 4 loose pencils. How many pencils altogether?

Main Developmental Activity (25 minutes)
Instead of solving 3-digit addition problems directly in the notebooks, solve the sums through an activity using star card. Group the students in pairs. Considering that they have already done the addition of 2-digit numbers with/without carrying forward, ask each pair to draw 6 cards. They will make two 3-digit numbers from the cards as shown opposite.
Students will add the numbers and write their answers below the two lines of cards.
Subtraction

Suggested Time Frame
6 to 8 periods

Learning Curve
Students have already learnt to subtract Tens and Ones using the abacus and the number line. They have learnt to subtract two 2-digit numbers. They are able to find the unknown by completing the equations such as \[ \_\_\_ \_ + 4 = 7 \]
Now they will learn to group ones into 10, then tens into 100s. They will be able to subtract two 3-digit numbers with/ without borrowing.

Real-life Application
The method of subtraction is applied to billing, purchasing, dividing, and handling money etc.

Frequently Made Mistakes
- Writing numbers incorrectly.
- Writing wrong numbers as a result of carelessness.

Summary of Key Facts
- Symbol used for subtraction and equality are \(-\) and \(=\) respectively.
- Subtraction can be performed on a number line.
- Subtraction equations can be constructed to find the difference or missing number in the subtraction sum.
- Numbers are not commutative with respect to subtraction.
Model Lesson Plan

Topic
Subtraction.

Duration
80 minutes

Specific Learning Objective
By the end of the lesson, students will be able to perform subtraction of two 3-digit numbers with borrowing.

Key Vocabulary
subtract, take away, less, minus, left over, and take out etc.

Resource
Bundles of ten pencils and a few loose pencils, cards having different numbers of stars.

Strategy
Engagement Activity (10 minutes)
Tell the students that they have 4 bundles of 10 pencils and 8 loose pencils. They need to give away 2 bundles of 10 pencils and 9 loose pencils to a friend, Ahad. How many pencils are left over?

Start from single pencils, 9 pencils cannot be given away from 8. So, one bundle of 10 pencils needs to be opened and 8 pencils can easily be given away from 18 pencils.

Main Developmental Activity (30 minutes)
Instead of solving 3-digit subtraction problems directly in the notebooks, we solve the sums through an activity with stars cards. Group the students in pairs. Considering that they have already done the addition of 2-digit numbers with/without borrowing, ask each pair to draw 6 cards. They will make two 3-digit numbers from the card as shown below.
Students will subtract the number and write their answer below the two lines of cards. Once the students understand the concept thoroughly, let them have enough practice of both concrete objects and numbers. Then they are given number (and word) problems to solve on their own. With time and practice, in an identical manner, students are taught conversion of hundreds to tens as well.
Suggested Time Frame
8 periods

Learning Curve
The students are familiar with addition and repeated addition. They learnt multiplication of 1-digit numbers. They also learnt that multiplication is a form of repeated addition. They learnt skip counting using the number line. Here, they will learn multiplication of 2-digit and 3-digit numbers with 1-digit numbers.

Real-life Application
The multiplication facts can be easily identified when we create arrays. Arrays can be found everywhere in real life around us. They are a fantastic starting point for noticing and describing multiplication (and therefore division) facts. For example:

- Drawer units
- Egg boxes
- Floor tiles
- Wire fencing
- Pictures displayed on a wall
- Marching soldiers
- Chocolate chunks in a bar
- People sitting in a theatre, stadium

Frequently Made Mistakes
- Multiplication errors due to not remembering the times table.
Summary of Key Facts

- Multiplication is repeated addition.
- Numbers follow the commutative property with respect to multiplication.

Model Lesson Plan

Topic
Verification of commutative property of multiplication

Duration
40 minutes

Specific Learning Objective
By the end of the lesson students will be able to compute and verify the commutative property of addition of numbers.

Key Vocabulary
order, commutative, property, and remain.

Resources
Counters

Strategy

Engagement Activity (5 minutes)
Ask students to write the 2 times table.

Main Developmental Activity (20 minutes)
Take 27 counters and arrange them by placing 9 counters in a line and making 3 such lines. Ask the students how many counters there are. Ask the students to calculate the total number of counters, converting it into multiplication language. It will become 3 multiplied by 9 equals 27.

The above activity shows $9 \times 3 = 3 \times 9 = 27$

This implies that the result of $9 \times 3$ and $3 \times 9$ are the same, irrespective of the order of the numbers.

Write a few sums on the board, like $2 \times 6$, $3 \times 9$, $2 \times 5$, and $9 \times 8$

Ask them to copy down these sums in their notebooks and write each sum interchanging the position of the numbers. Then find the product (it will be same every time). Tell this property of numbers is called the commutative property of numbers.
Division

Suggested Time Frame
8 periods

Learning Curve
Students are familiar with multiplication. Division can only be understood if there is a sound knowledge of multiplication to build on, and if students have adequate practical experience in this area. Unknowingly, students have plenty of division activity in their everyday lives. Any process that involves sharing equally is, after all, a form of division. They will learn to divide using a number line, times tables, and the long division method.

Real-life Application
Division is frequently used in our daily life. We divide:
  • the people in groups.
  • money among people.
  • a piece of ribbon, cloths, and rope etc into equal parts.
  • money when budgeting.
  • equal number of toys among siblings.

Frequently Made Mistakes
  • Students make errors due to not remembering tables.
  • Instead of subtraction, they add the divisors.
  • They get confused between dividend and divisor.

Summary of Key Facts
  • Division can be described as repeated subtract.
  • Division means the grouping, sharing, and dividing of a set of objects equally.
  • Dividend, divisor, quotient, and remainder are special terms associated with division.
  • Division does not follow the commutative property of numbers.
**Model Lesson Plan**

**Topic**
Division using times table.

**Duration**
80 minutes

**Specific Learning Objectives**
By the end of the lesson students will be able to divide a number using times tables.

**Key Vocabulary**
divide, share, group, equally, dividend, divisor, quotient, and remainder

**Resource**
Times table chart

**Strategy**

**Engagement Activity (10 minutes)**
Ask the students to develop a times table of a number of their own choice. Now tell them that division can be performed using the times table. They should be encouraged to learn their times table by heart, so that division of numbers would become an easy task for them.

**Main Developmental Activity (40 minutes)**
Recall some multiplication facts, for example $3 \times 5 = 15$ and $5 \times 3 = 15$

$15 \div 3 = 5$ and $15 \div 5 = 3$

With the help of the times table explain the method to find the quotient.

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$36 \div 4 = 9$  $36 \div 9 = 4$  $20 \div 4 = 5$  $20 \div 5 = 4$

Explain to the students that to find $36 \div 4$ and $36 \div 9$, they first find the number 36 in the grid, then they will go vertically upward and horizontally to left of this number. They will find 9 and 4. It means $36 \div 4 = 9$ and $36 \div 9 = 4$.

Similarly they can proceed for $20 \div 4 = 5$ and $20 \div 5 = 4$. 
Fractions

Suggested Time Frame
8 periods

Learning Curve
Students have a fair idea about fractions much before they come to school. They are asked time and again to share a chocolate bar equally with their siblings—if there is just one other child then each gets half. If there are 3 other students, each gets half of a half, i.e. a quarter.

Activities involving fractions ($\frac{1}{2}$ and $\frac{1}{4}$) increase both their visual and analytical skills. Students work with a variety of shapes and quantities, such as a net bag full of 10 marbles or 20 mints, etc.

Real-life Application
We can find fractions everywhere around us. Slices of a bread, cake, and pizza are very common examples. Fractions are used such as $\frac{1}{2}$ glass water, quarter spoon spices, $2\frac{1}{2}$ glasses of milk, and $\frac{1}{3}$ cup of flour etc. In time we say half hour and quarter hour.

Frequently Made Mistakes
- Confusion in writing numerator and denominator in the proper place.
- Matching fractions with shapes.

Summary of Key Facts
- There are proper, improper, and mixed fractions.
- Unit fraction has 1 in the numerator.
- Equivalent fractions are obtained by multiplying or dividing the numerators and denominators with the same number.
Lesson Plan

Topic
Learning one-third and more fractions.

Duration
80 minutes

Specific Learning Objective
By the end of the lesson students should be able to Recognise and write the unit fractions and other fractions which are not unit fractions.

Key Vocabulary
fraction, equal parts, divide, shape, one-third, and unit fraction.

Resources
Two big circular cutouts, A pair of scissors, Small circular cutouts counted as per the number of students in the class.

Strategy

Engagement Activity (10 minutes)
Distribute small circular cutout to each child. Ask half of the rows to divide it into halves and half of the rows in quarters using scissors. Ask them to show their half and quarter pieces, then reinforce halves and quarters by comparing the shapes.

Main Developmental Activity (30 minutes)
Now hold the big circular cutout and show it to class. Fix it on the board and asking for their attention divide the circle in three equal parts with a pencil and a ruler. Shade one part of the circle. Ask the students that from three equal parts what will be the fraction of shaded part. Recall that \(\frac{1}{2}\) and \(\frac{1}{4}\) are the fractions obtained from two and four equal parts of the shapes. So when we have thee equal parts the required fraction will be \(\frac{1}{3}\). Tell them when we take one part out of more than one equal parts, these fractions are known as unit fraction. This concept can be extended to any number of shaded parts from equal parts of a shape. Divide the other big circle into eight equal parts as done previously. Shade three parts of them. Ask the students what the fraction will be. It will be \(\frac{3}{8}\). Reinforce the learning by shading different number of parts.
Length

💡 Suggested Time Frame
6 periods

🔍 Learning Curve
Students have worked with long, longer and longest; short, shorter and shortest in Class 1. Also, they are familiar with many words which mean the measurement of length, such as metres of cloth, height of a child, length of the road to school and the tallest building in the world.

💡 Real-life Application
- Length is an important and basic unit of measurement used in our daily life found all around us.
- Length is used in measuring distance.
- The distance from your house to the grocery store, your uncle’s house, or the nearest park are measured in units of length i.e. kilometres or metres.
- The height of a tree, a building, wall, peoples, mountains, and hills etc are measured in metres.
- Games like cricket, hockey, badminton, tennis, and football are very popular among the people. The length of the cricket pitch, length and breadth of the tennis and badminton courts, and football grounds are measured in metres.

⚠️ Frequently Made Mistakes
- They make mistakes in reading length while using the metre rule.
- Usage of incorrect units.
- Inappropriate usage of units with the objects.
Summary of Key Facts

- The length of something is the distance between the two ends.
- The length of something can be measured in metres, centimetres, and millimetres.
- Short means of small length.
- Long means having big length.
- Short and long are opposites.
- Length is also a property of time. An amount of time has a length.

Model Lesson Plan

Topic
Addition of units of length (m, cm)

Duration
80 minutes

Specific Learning Objective
By the end of the lesson, students will be able to add the length of objects measured in metres and centimetres both.

Resources
A metre rule, glue or jam clips, and two pieces of ribbons of different lengths and colours.

Key Vocabulary
length, distance, ruler, centimetre, metre, units, and measure

Strategy
Engagement Activity (10 minutes)
Ask the students to measure the length of their lunch boxes in cm. Now ask every two students sitting on the same desk to add the lengths of their lunch boxes on a piece of paper. Take the feedback by asking the sum from each desk.

Main Developmental Activity (25 minutes)
Show them two different colour ribbons and tell them that you are going to measure them separately. Take the metre rule and measure it in front of the students. Say the length is 1 m and 30 cm. Write this measurement on the board. Now take the other piece, repeat the same procedure, say the length is 1m 50 cm, write the measurement on the board. Now tell them that it is easy to find the addition of lengths which have both the units m and cm. Write the two quantities on the board vertically. Tell them, first we add cm and write the total under cm. Then add the metres and write the total
under m. The result will be the total length of two ribbons. At this level total number of centimetres should not exceed or be equal to 100.

Now join the two pieces with some glue or jam clips. Measure the length of the joined ribbon. The length will be equal to the length calculated on the board. A little difference in the length may be due to the overlapping of the ribbons to join them.

Weight

⏰ Suggested Time Frame
6 periods

👈 Learning Curve

Students are familiar with many words which indicate weight. They have heard in their daily-life experiences people talking about kilos of fruits and grams of chocolates, butter, etc. They are even familiar with words, such as heavy and light in Class 1. Slowly, students discover that the lighter object is not necessarily the smaller one.

💡 Real-life Application

In the old days, people compared the weights of objects by lifting them in their hands. Students try this with daily life objects and make a note of their findings—a lunch box is lighter than a bag of books. Charts and a story about astronauts going to the Moon make information interesting. On the surface of the Moon everything weighs less than it does on our planet Earth. The knowledge of weight is used in many ways in our daily life.

- We buy vegetables, fruit, lentils etc in kilograms and grams.
- In cooking, ingredients are used with specific weights.
- Students have less weight than adults.

⚠️ Frequently Made Mistakes

- Using inappropriate units for the objects of different weight.
- Making mistakes in deciding the same units for addition or subtraction.
- Not taking care of the same units while adding and subtracting.

📚 Summary of Key Facts

- Kilogram and gram are the fundamental units of weight.
- Every object has some weight.
- The weight of objects can be converted from bigger units to smaller units and vice versa.
Lesson Plan

Topic
Using weights (grams)

Duration
80 minutes

Specific Learning Objective
By the end of the lesson, students will be able to use gram weights.

Key Vocabulary
weight, weigh, kilo, kilogram, and gram

Resources
Weights of 500 g, 200 g, 100 g, 50 g, and 10 g. A chart paper with pictures of a tiger, an insect, a book, and a box of milk packs.

Strategy
Engagement Activity (10 minutes)
Paste the chart on the board, write the approximated weight of a tiger (400 kg), a book (500 g), an insect (1 kg), and a box of milk packs (3 kg). Ask the students to identify which of the weights is not reasonable. Discuss their answer for a few minutes, coming to the final answer, that an insect cannot be as heavy as 1 kg.

Main Developmental Activity (30 minutes)
Now show them 500, 200, 100, 50, and 10 gram weights. Distribute the weights in the class to feel the heaviness. They will keep on exchanging the weights until the whole class will get the opportunity to experience all of the weights. Write the names of a few objects on the board and ask them to tell the approximated weights of the objects. At this stage they can be taught that using these weights they can make 1000 g by grouping them differently. Referring to page 121 show and explain to them the different combinations of the weights.

Capacity

Suggested Time Frame
4 periods

Learning Curve
Students get a fair idea about capacity by playing with different containers, filling them with sand, clay or water. Vocabulary such as full, empty and half-full are applied to various containers.
A bucketful of water, a spoonful of medicine, a cupful of hot chocolate, etc.; students are familiar with these phrases in their daily life. Situations, such as the petrol tank of a car gets 20 litres of petrol in it at the petrol pump, the bathtub is filled with 50 buckets of water when there is a water shortage and a bottle has 1 litre of soda, etc. are discussed. Also, comparative capacities like, will a narrow, tall glass hold more water than a flat, wide plate?

With practical work students understand that the word ‘capacity’ refers to the amount of liquid a container can hold.

**Real-life Application**

- Doctors recommend 8 glasses of water a day which is about 2 litres.
- If a car’s fuel tank holds 25 litres of petrol, it means its capacity is 25 litres.
- We also find measuring cups and spoons with different capacities in the kitchen.

**Frequently Made Mistakes**

- Difficulty in estimating the capacity of different sized containers.
- Sometimes the students cannot recall that 1000 ml makes 1 litre.

**Summary of Key Facts**

- 1000 ml = 1 litre.
- Big quantities of liquid are measured in litres.
- Small quantities of liquid are measured in millilitres.

**Model Lesson Plan**

**Topic**
Converting millilitres into 1 litres

**Duration**
80 minutes

**Specific Learning Objectives**
By the end of the lesson, students will be able to measure liquids in 500, 250, 100, and 50 ml containers and converting them into litre measures.

**Key Vocabulary**
capacity, containers, and millilitres.
Resources
Beakers and flasks of different capacity used in the science laboratory, 10 ml and 30 ml empty washed medicine bottles, an empty litre bottle, a jug of water.

Strategy
Engagement Activity (10 minutes)
Show them two medicine bottles one 10 ml and the other 30 ml in capacity. Ask how many 10 ml bottles will fill the 30 ml bottle. Take the feedback and explain if there is any ambiguity.

Main Developmental Activity (30 minutes)
Arrange a table with containers of different sizes and put estimation cards in front of different containers. Ask the students to guess the capacity of the container and write it down on the cards. Later, ask them to fill the containers and write down the actual capacity of the containers.
**Suggested Time Frame**
6 periods

**Learning Curve**

They have a fair idea about time, long before they come to school—wake-up time, school time, lunch break and meal time, etc. They have heard their parents or teachers speak about summer vacations, monsoon floods and winter clothes.

Students best understand time if it is taught to them in relation with their own experience. They know that there are seven days in a week and are familiar with the names of the days in a week. They also know that there are an average 30 days in a month and 12 months in a year. With the passage of time, they get familiar with dates of the month in association with the days of the week and the names of the months.

With greater exposure and practice, they are able to read the clock face and are able to tell the time accurately.

**Real-life Application**

- Students can make a timetable for their daily activities. For example, breakfast time, school time, break time, lunch time, play time, reading time, and sleep time.
- We find time on invitation cards, doctor’s appointments, and meeting slips etc.
- A program list of a conference or any event.
- Important national and universal days and dates.

**Frequently Made Mistakes**

- Making mistakes in differentiating big and small hands of a clock.
- Making mistakes in converting 5-minute intervals of time.
Summary of Key Facts

- There are 24 hours in a day, 60 minutes in an hour, and 60 seconds in a minute.
- There are 12 months in a year, 4 weeks in a month, and 7 days in a week.
- There are 365 days in a week.
- From midnight till noon, “a.m.” is written with the time and from noon till midnight, “p.m.” is written with the time.

Model Lesson Plan

Topic
To tell time in 5-minute intervals

Duration
80 minutes

Specific Learning Objective
By the end of the lesson, students will be able to tell the time in hour and minutes.

Key Vocabulary
hour, minute, interval, and clock.

Resources
A big clock drawn on a coloured chart paper, showing big and small hands cut in strips of chart paper attached in the centre of the clock with a common pin to move freely.

Strategy
Engagement Activity (10 minutes)
Write the topic Time on the board and ask students to discuss about time with their partners. Guide them to talk about their daily routine. They can share their play time, bed time, and story time, etc. After 5 minutes ask a few students to share their ideas with other students.

Main Developmental Activity (30 minutes)
Explain to students that they will be learning about 5 minutes interval time. Reinforce the learning of exact time and half past time. Display the big clock on the board. Move the hands of the clock, telling the time with hours and minutes. Tell them that there are 5 minutes from one digit to the next digit and we start counting from 12. So from 12 to 1 it is 5 minutes and from 1 to 2 it is again 5 minutes. Therefore from 12 to 2 will make 10 minutes. In the same way we keep on adding 5 minutes every time. As repeated addition is a form of multiplication, so minutes can be found by checking the placement of the big hand and multiplying the number with 5.

Move the hands of the clock onto different numbers and ask the time.
**Suggested Time Frame**

6 to 8 periods

**Learning Curve**

Students are familiar with 3D and 2D shapes from their daily life. They have seen and held objects, such as a ball (a sphere), a dice (a cube), a toothpaste box or a lunch box (a cuboid), an ice cream cone (a cone), etc.

They have also felt the flatness of shapes, such as a floor tile (a square) or a windowpane (a rectangular), a round plate (a circle), a kite (a quadrilateral) and the 4 parts of a kite (triangles). They have a visual idea of what each looks like, but often get confused with names. At this level their knowledge of shapes takes a slightly more formal shape.

**Real-life Application**

We have different sized and shaped objects around us. We can see triangles, squares, and circles everywhere. Some of these shapes have length, breadth, and height and are the 3D or the three-dimensional objects. For example houses have length, breadth, and height and are 3D objects. Others like a sheet of paper can be imagined to have a length and a breadth only. Such objects are two-dimensional objects and are 2D shapes.

**Frequently Made Mistakes**

- The students make mistakes in identifying and differentiating the faces and vertices of 3D shapes.
- Difficulty in recalling the names of the shapes.

**Summary of Key Facts**

- The 3 D shapes are composed of three dimensions. They have faces, edges, and vertices.
• A cube, rectangular prism, sphere, cone and cylinder are the basic 3-dimensional shapes we see around us.
• Some 3D shapes have flat faces, some have curved faces, and some have both.
• The 2D shapes are composed of two dimensions i.e. length and breadth.

Model Lesson Plan

Topic
3 D Shapes

Duration
60 minutes

Specific Learning Objective
By the end of the lesson, students will be able to identify the faces, edges, and vertices of a cube.

Key Vocabulary
cube, cuboid, vertex, faces, edges, sphere, cone, and cylinder.

Resources
Wooden geometrical solids

Strategy

Engagement Activity
Small Group Activity (10 minutes)
Divide the class into groups and let each group list the name of the things that they can find in a cube and cuboid shape. Ask them to write as many things as they can.

Main Developmental Activity (25 minutes)
Use Geometrical Solids (easily available in the market) for introducing the shapes. Let students explore different 3D shapes. Ask: What is the same? What is different? The cube looks the same when it is turned because every face is a square. Cuboids can be laid down or stood up on the longer or shorter faces. Let students count the total number of faces, edges and vertices on both the cube and cuboid. Let students feel the face, edges, and corners of the shapes by holding the shapes in their hands. Ask them how many corners and faces there are in a cube.
Glossary

> 
> a sign inserted between two numbers to show that the first number is greater than the second number

Example
32 > 20

< 
< a sign inserted between two numbers to show that the first number is less than the second number

Example
32 < 40

A 

a.m.
we use a.m. to tell the time from 12 midnight to just before 12 noon

C 

centimetre (cm)
a smaller unit of measure of length (see metre)

cone 
a three-dimensional figure with a flat face that is a circle and a curved surface

cube 
a three-dimensional figure with 6 flat faces that are squares

cuboid 
a three-dimensional figure with 6 flat faces that are either squares or rectangles

curve 
a line that bends and is not straight

cylinder 
a three-dimensional figure with 2 flat faces that are circles and a curved surface
### D
**denominator**
the number below the line in a fraction, showing the number of equal parts the whole is divided into

Example

\[
\begin{array}{c}
\frac{3}{4} \\
\end{array}
\]
denominator

**division**
splitting a number into equal parts, also known as “fair sharing”

### F
**fraction**
a part of a whole cut into equal parts

Example

\[
\begin{array}{c}
\frac{1}{3} \\
\end{array}
\]

### K
**kilogram (kg)**
a unit of measure of mass, where 1 kg = 1000 g

### L
**length**
the measure of an object from one end to the other

**line**
a straight figure with no bends

Example

\[
\begin{array}{c}
\overline{ \hspace{3cm} \hspace{3cm} } \\
\end{array}
\]

**litre (l)**
a unit of measure of volume

### G
**gram (g)**
a smaller unit of mass (see kilogram)

### M
**mass**
the amount of matter in an object

**metre (m)**
a unit of measure of length, where 1 m = 100 cm

**multiplication**
repeated addition of a number
multiplication table
shows the results of the same number multiplying a set of other numbers, usually in an increasing order numbers

Example

<p>| | |</p>
<table>
<thead>
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<tbody>
<tr>
<td>$1 \times 2$</td>
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<td>$2 \times 2$</td>
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<td>$3 \times 2$</td>
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<td>$9 \times 2$</td>
<td>=</td>
</tr>
<tr>
<td>$10 \times 2$</td>
<td>=</td>
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</tbody>
</table>

p.m.
we use p.m. to tell the time from 12 noon to just before 12 midnight

pattern
a repeated set of shapes or numbers following a fixed rule

Example

number pattern
the arrangement of numbers that follow a fixed pattern

Example

38, 36, 34, 32, 30, ?, ?  

= 2 = 2 = 2 = 2

From the number pattern above, the next two numbers are 28 and 26.

numerator
the number above the line in a fraction, showing the number of equal parts that are to be added together

Example

3 numerator

4

quarter circle
a figure that results when a circle is divided into four equal parts

Example

regrouping
to trade a number and make groups of ten when adding or subtracting

rupee
a currency of money used in countries such as Pakistan and India
**S**

**semicircle**

*a figure that results when a circle is into two equal parts*

**Example**

![Semicircle example](image)

**sphere**

*a three-dimensional figure with a curved surface*

**Example**

![Sphere example](image)

**W**

**weighing scale**

*a instrument that measures the mass of an object*

**Example**

![Weighing scale example](image)

**word problem**

*a mathematical story*

**Example**

There are 8 sweets in a container. 7 more sweets are placed into the container. How many sweets are there in the container now? 

$8 + 7 = 15$

There are 15 sweets in the container now.
Lesson plans to be used in conjunction with the Maths Wise book series.
## Syllabus Matching Grid of Maths Wise Book 2 with the Single National Curriculum 2020

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<td>iv. Shade the equal parts of a given figure to match a given fraction</td>
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<td>59</td>
</tr>
<tr>
<td></td>
<td></td>
<td>v. Recognize and name unit fractions up to 1/10.</td>
<td>64</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>vi. Recognize fractions like two thirds (2/3), three fourths (3/4), four fifths (4/5), up to nine tenths (9/10)</td>
<td>68</td>
<td>60 - 71</td>
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<tr>
<td>Unit</td>
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<tr>
<td><strong>4.1. Length</strong></td>
<td>i. Compare the lengths of different objects.</td>
<td></td>
<td>73</td>
<td>73</td>
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<tr>
<td></td>
<td>ii. Recognize the units of length (meter and centimeter)</td>
<td></td>
<td>74</td>
<td></td>
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<tr>
<td></td>
<td>iii. Use standard metric units of length (meter and centimeter) and their abbreviation to measure and record lengths of variety of objects.</td>
<td></td>
<td>76</td>
<td></td>
</tr>
<tr>
<td></td>
<td>iv. Use addition and subtraction within 100 to solve real life situations involving lengths in same units</td>
<td></td>
<td>78, 79</td>
<td></td>
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<tr>
<td><strong>4.2. Mass</strong></td>
<td>i. Compare the mass of different objects.</td>
<td></td>
<td>80</td>
<td></td>
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<tr>
<td></td>
<td>ii. Recognize the units of mass, i.e. kilogram, gram</td>
<td></td>
<td>81</td>
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<tr>
<td></td>
<td>iii. Use standard metric units of mass (kilograms and grams) and their abbreviation to measure and record mass of variety of objects.</td>
<td></td>
<td>82</td>
<td></td>
</tr>
<tr>
<td></td>
<td>iv. Use addition and subtraction within 100 to solve real life situations involving mass in same units.</td>
<td></td>
<td>83</td>
<td></td>
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<tr>
<td><strong>4.3. Capacity</strong></td>
<td>i. Compare capacity of different objects using nonstandard units (jug, glass, cup, etc.)</td>
<td></td>
<td>84</td>
<td>74</td>
</tr>
<tr>
<td></td>
<td>ii. Recognize and use the standard metric units of capacity, i.e. liter and milliliter</td>
<td></td>
<td>85</td>
<td>74</td>
</tr>
<tr>
<td></td>
<td>iii. Use addition and subtraction within 100 to solve real life situations involving capacity in same units.</td>
<td></td>
<td>85, 86</td>
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<tr>
<td>Unit 5: Time</td>
<td>5.1. Time</td>
<td>i. Recognize the number of hours in a day and numbers of minutes in an hour</td>
<td>89</td>
<td></td>
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<td></td>
<td></td>
<td>ii. Read and write the time from a clock in hours and minutes (with five-minute intervals) e.g. read 8:15 as eight fifteen and 8:50 as eight fifty</td>
<td>90</td>
<td></td>
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<td></td>
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<td>iii. Recognize a.m. and p.m.</td>
<td>95</td>
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<td></td>
<td></td>
<td>iv. Draw hands of a clock to show time in hours and minutes with five minutes intervals</td>
<td>91 75</td>
<td></td>
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<td></td>
<td></td>
<td>v. Use solar calendar to find a particular date/day</td>
<td>98</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>vi. Use Islamic calendar to find a particular date/day</td>
<td>101 77</td>
<td></td>
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<tr>
<td></td>
<td>6.1. Two dimensional figures</td>
<td>i. Identify the figures like square, rectangle, triangle, circle, semi-circle, and quarter-circle</td>
<td>104 - 107 78 - 79</td>
<td></td>
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<td></td>
<td></td>
<td>ii. Identify vertices and sides of a triangle, rectangle and square</td>
<td>105</td>
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<tr>
<td></td>
<td>6.2. Straight lines and curves</td>
<td>i. Differentiate between a straight line and a curve</td>
<td>107</td>
<td>80</td>
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<td></td>
<td></td>
<td>ii. Identify straight lines and curves from the given drawings</td>
<td>107</td>
<td>80</td>
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<td></td>
<td></td>
<td>iii. Use ruler to draw a straight line of given length (exclude fractional length)</td>
<td>112</td>
<td>80</td>
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<tr>
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<td>6.3. Patterns</td>
<td>i. Make/ complete geometrical patterns on square grid according to one or two of the following attributes • Shape • Size • Orientation</td>
<td>113</td>
<td>81</td>
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<tr>
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<td>6.4. Three dimensional (3-D) objects</td>
<td>i. Recognize and name 3- D Objects (cubes, cuboids, cylinder, cone, sphere)</td>
<td>115</td>
<td>82 - 83</td>
</tr>
</tbody>
</table>
UNIT 1
REVIEW AND ASSESS 1

Teaching objectives
• to revise concepts and skills learnt in the previous year
• to revise ordinal and cardinal numbers
• to practice sequences as taught earlier
• to recall shapes learnt earlier
• to recall concepts of money, length, and weight

Learning outcomes
Children should be able to:
• demonstrate an understanding of the concepts learnt in the previous year
• work out sums based on the concepts without help

UNIT 2
NUMBERS

Teaching objectives
• to revise ordinal and cardinal numbers, and number names
• to introduce place value
• to teach number names for 3-digit numbers
• to explain symbols depicting ‘greater than’, ‘less than’, and ‘equal to’
• to reinforce the concepts of ascending and descending order
• to introduce the concept of fractions
• to practise reading and writing fractions

Learning outcomes:
Children should be able to:
• write number names from 1 to 50
• Recognise, read, and write ordinal numbers
• form groups of 10s and identify place value of numbers
• arrange numbers in ascending and descending order
• read and write fractions
• Recognise fractions in real-life
UNIT 3

NUMBER OPERATION

Teaching objectives
• to teach addition and subtraction of 2-and 3-digit numbers, according to place value
• to introduce basic multiplication
• to introduce multiplication tables up to 5, and of 10
• to teach basic division

Learning outcomes
Children should be able to:
• add and subtract 2-and 3-digit numbers using place value
• recite from memory multiplication tables up to 5 and the 10’s table
• do simple multiplication using tables
• do simple division using tables
• solve word problems involving all four mathematical operations

UNIT 4

MEASUREMENT: LENGTH, WEIGHT, AND CAPACITY

Teaching objectives
• to introduce measurement of length, using the metric system
• to introduce measurement of weight, using the metric system
• to introduce capacity, using the metric system
• to encourage children to use the above measurements in real-life situations

Learning outcomes
The children should be able to:
• demonstrate an understanding of the concepts of length, weight, and capacity
• use metric units of length, weight, and capacity in daily life
• measure real objects using everyday instruments
• compare the weights, lengths, and capacities of different objects
• solve problems using these concepts
UNIT 5

TIME AND DATE

Teaching objectives
• to explain how to tell the time by looking at a clock
• to introduce the concepts of a.m. and p.m.
• to explain the division of one hour into halves and quarters of an hour
• to estimate the times taken to complete routine activities
• to practice reading dates from a calendar
• to explain the lunar and solar calendars

Learning outcomes
Children should be able to:
• read different times on a clock
• differentiate between a.m. and p.m.
• differentiate between the lunar and solar calendars
• read dates from a calendar
• name the months of the lunar calendar

UNIT 6

GEOMETRY

Teaching objectives
• to revise 2D shapes previously learnt
• to teach 2D shapes through practical activities
• to introduce new geometric terms
• to explain the difference between straight and curved lines
• to introduce vertical, horizontal, and oblique lines
• to work out simple problems involving measurements
• to introduce geometrical patterns involving shape, size, and orientation

Learning outcomes
Children should be able to:
• recognise 2D shapes and identify them in their surroundings
• use terms associated with shapes correctly
• identify straight and curved lines
• recognise vertical, horizontal, and oblique lines
• draw lines of a given length using a ruler
• make or complete geometrical patterns according to size, shape, or orientation
• recognise and name 3D Objects (cubes, cuboids, cylinder, cone, sphere)
UNIT 7

REVIEW AND ASSESS 2

Teaching objectives
• to revise the concepts learnt throughout the year
• to recap place value
• to revise ascending and descending orders
• to revise fractions
• to solve problems using the four operations i.e. addition, subtraction, multiplication, and division
• to revise measurement and capacity
• to tell the time using a.m. and p.m.
• to recap horizontal, vertical, straight, and curved lines
• to identify geometrical patterns
• to recognise three-dimensional shapes

Learning outcomes
The children should be able to:
• identify the place values in given numbers
• write numbers in ascending and descending orders
• demonstrate an understanding of fractions
• solve problems using the four operations i.e. addition, subtraction, multiplication, and division
• demonstrate an understanding of measurement and capacity
• tell the time using analogue and digital clocks
• identify horizontal, vertical, straight, and curved lines
• draw a geometrical pattern
• identify three-dimensional shapes in real-life