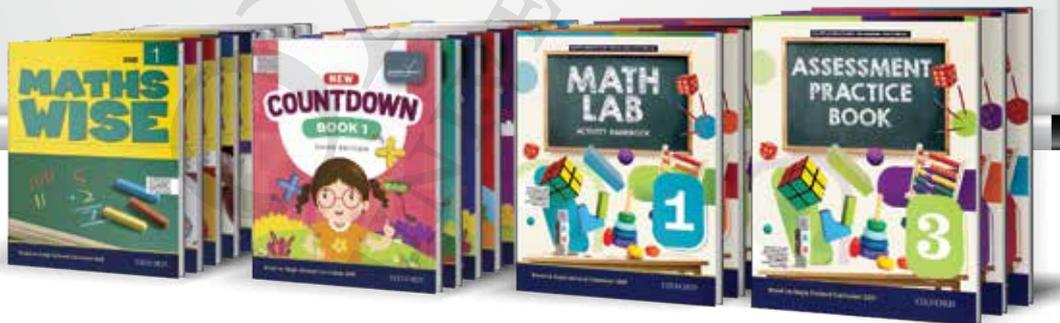


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TEACHER'S MANUAL

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

1



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Our Core Philosophy

This Teacher's Manual has been designed to promote good teaching practices for teachers to implement the SNC/ NCP 2020. 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. Therefore, teaching mathematical concepts with real-life context and providing hands-on experience facilitates the learning process, so long as the context is comprehensible to the class. Pupils should be able to find solutions to real-life situations based on what they have learnt in class. This series engages pupils by providing interactive hands-on activities, as well as individual exercises. Each unit in the book ends with a class discussion, inviting pupils to share their perspective, and all concepts are supported by real-life tie ins. This approach begins by each pupil having 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 learnt. The heavy focus on inquiry-based learning, demonstration approach, and cooperative learning allows the teacher to expose the class to different teaching styles, which 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 along 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 for teachers regardless of what series they use.

The Teacher's Manual supports a meaningful and holistic approach to teaching the strands of mathematics. The build-up of concepts throughout this series is progressive and thorough. 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, in the form of games, standard and non-standard materials, and resources, are implemented through activities. The Teacher's Manual facilitates teachers to implement this aspect of the series proficiently. It also 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:

- **Aligned with SNC/ NCP 2020** – SLOs listed at the start of each unit, as well as next to each activity in the margins.
- **Unit Guides** – Detailed lesson plans for each lesson 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 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 connections are necessary for pupils to really appreciate the math that they are learning. This will help you start a conversation at each unit is 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 connection, 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 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/ NCP's "Role of a Teacher".

A user-friendly guide to the SNC/ NCP 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 a solid foundation would be very helpful for later years.

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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 are unable to comprehend ideas so complex because they are 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, like they are looking for reasons to leave the class. It might look like they would prefer anything to try to learn the material. They may also appear to be lazy or naughty, but the fact is, these children are just looking for an escape from a stressful situation. They do not ask for help or guidance because they do not believe 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 the anxiety associated with math 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 is why it is important to never present the subject as something that students should worry about. Do not tell your students that the next unit is difficult. Instead, give them the lesson, and let them ask questions so they know that it is not a big deal to ask for 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 do not tend to volunteer, check their written work to see how they are performing. If they are doing well, then they are simply not comfortable speaking up in front of their classmates and maybe just need a confidence boost. If they are not performing well, then you are more 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 will not 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 are trying to explain. Keep in mind that anxieties are impacting students’ comprehension skills, so your approach must be something that helps students feel like there 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, such 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 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 might 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 would not be able to 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.

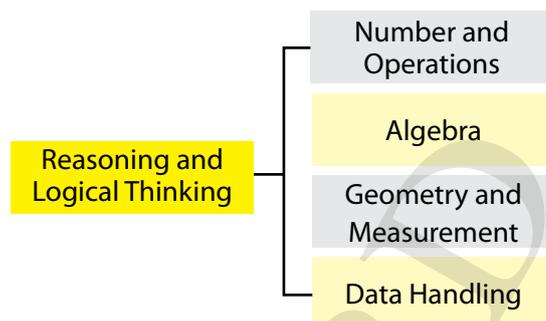
The instructions given in class should always be clear, and if possible, consistent. All students should understand what is expected of them, and this should be repeated as often as it seems necessary. Furthermore, instead of just verbally communicating them, also put them up in the room so that students 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.

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Single National Curriculum/ National Curriculum of Pakistan 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.



Key Learning Strands	Standards
1. Numbers and Operations	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> 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 Mathematics Curriculum Standards and Benchmarks – SNC/ NCP 2020

The Standards for Mathematics are further sub-divided into the following Benchmarks for Grade I – V.

Standards	Benchmarks Grade I – III	Benchmarks Grade IV – V
<p>Numbers and Operations</p> <ul style="list-style-type: none"> • identify numbers, ways of representing numbers, comparing numbers and effects of operations in various situations. • compute fluently with fractions, decimals and percentages • examine real-life situations by identifying mathematically valid arguments and drawing conclusion to enhance mathematical thinking 	<p>The students will be able to:</p> <ul style="list-style-type: none"> • identify, read and write whole numbers up to 10,000 • read and write Roman numbers up to 20 • identify and differentiate even and odd numbers up to 99 • arrange, compare numbers up to 3 digits using symbols (<, > or, =) • identify and recognise place values up to 5-digit numbers • represent and identify the given number on number line • round off a number to the nearest 10 and 100 • add, subtract numbers up to 4 digits • develop multiplication tables up to 10 • multiply number up to 2 digits with 1-digit numbers • recognise and use of division symbol, divide up to 2-digit numbers by 1-digit number • solve real-life situations involving addition, subtraction, multiplication, and division • recognise fractions and different forms of fractions with the help of objects and figures 	<p>The students will be able to:</p> <ul style="list-style-type: none"> • read and write whole numbers up to 1,000,000 (1 million) in numerals and words • add and subtract numbers of different complexity and of arbitrary size • multiply and divide numbers, up to 6 digits, by 2 or 3-digit numbers and by 10,100 and 1000 • solve real-life situations involving operations of addition, subtraction, multiplication, and division • recognise and differentiate between factors and multiples of two or three 2-digit numbers • find highest common factor (HCF) and least common multiple (LCM) of two, three, or four numbers, up to 2-digits • solve real-life situations involving HCF and LCM • recognise and compare like and unlike fractions • arrange, convert and simplify fractions • add, subtract, multiply and divide fractions • solve real-life situations involving addition, subtraction, multiplication and division of fractions

Standards	Benchmarks Grade I – III	Benchmarks Grade IV – V
	<ul style="list-style-type: none"> • express and match fractions in figures and compare fractions with same denominators using symbols $<$, $>$, or $=$ • identify and write equivalent fractions for a given fraction • add and subtract two fractions with same denominators 	<ul style="list-style-type: none"> • apply unitary method for solving real-life situations • identify and recognise decimal numbers • convert decimal numbers into fractions and vice versa • add and subtract numbers up to 3 decimal places • multiply and divide decimal numbers with whole numbers • round off decimal numbers up to specified number of decimal places • solve real-life situations involving decimal numbers (up to 3 decimal places) • convert percentage to fraction and to decimal and vice versa
<p>Algebra</p> <ul style="list-style-type: none"> • 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 mathematical thinking 	<ul style="list-style-type: none"> • develop the concept of equality using addition and subtraction of numbers • identify and complete geometrical patterns on square grid according to attributes like shape, size and orientation 	<ul style="list-style-type: none"> • develop the concept of equality using addition, subtraction, multiplication, and division of numbers • identify and describe repeating pattern using relationship between consecutive terms and generate number patterns

Standards	Benchmarks Grade I – III	Benchmarks Grade IV – V
Geometry and Measurement <ul style="list-style-type: none"> • 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 mathematical thinking 	<ul style="list-style-type: none"> • use language to compare heights/ lengths, masses and capacity of different objects • read, recognise and use units of length (kilometre, metre and centimetre), mass (kilogram and gram) and capacity (litre and millilitre) and time (minute and second) • add and subtract in units of length, mass, capacity and time for solving real-life situations • use solar and Islamic calendar to find a particular date/ day • recognise and identify two- and three-dimensional figures • determine perimeter of square, rectangle, and triangle • identify and differentiate straight line and curved line • identify and draw points, lines, line segments, and rays • identify and describe symmetrical shapes 	<ul style="list-style-type: none"> • convert standard units of length, mass, capacity, and time • solve the real-life situations involving addition and subtraction of units of distance/ length, mass, capacity, and time • distinguish parallel and non-parallel lines • identify, classify and construct different types of angles • describe and classify 2-D figures and 3-D geometrical objects • determine perimeter and area of square and rectangle • describe and complete symmetric figures with respect to given line of symmetry and point of rotation

Standards	Benchmarks Grade I – III	Benchmarks Grade IV – V
Data Handling <ul style="list-style-type: none"> • collect, organise, analyse, display and interpret data/ information • examine real-life situations by identifying mathematically valid arguments and drawing conclusion to enhance mathematical thinking 	<ul style="list-style-type: none"> • read, interpret and represent data using Carroll diagrams, picture graphs and tally charts 	<ul style="list-style-type: none"> • read and interpret bar graphs, line graphs and pie charts • represent real-life situations using pie chart • find an average of given quantities in the data • draw and read simple bar graphs both in horizontal and vertical form • solve real-life situations using simple bar graphs

Note: Lifted from SNC/ NCP document. To learn more about the SNC/ NCP go to mofept.gov.pk, choose curriculum, then SNC/ NCP, the Pakistan National Curriculum. Click on maths 2020 to open the document.

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, ...).
- xi. 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:

1.1 Ordinal Numbers

1.2 Numbers up to 100

Allocate realistic time frame/number of periods to teach each topic as per requirement.

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 are 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 may be new include the word thousand, and all the ordinal numbers after tenth. 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 is the biggest number they can think of. Some of them will repeat what they have 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 is the biggest number they have learned in class is. The answer should be 100. Label the number line with 0 on the left, 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 numerals are read. 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..."

SLOs1.1
i
iii
v**Activity 1**
5 min*This pairs with Math Lab pages 33 and 35*

To make the pupils comfortable with the numbers, write the numbers 1 to 9 on the board in words and numerals. Read the numbers to the class to get pupils familiar with the order. Then, using dot cards, hold them up, one at a time, and let the class answer in unison for the first 3 to 5 tries. If they seem comfortable, move on to individual answers. If they are stuck, count the number of dots out loud while using the numbers on the board as a point of reference.

Let's Pause

It may help to hand the students the dot cards and let them count themselves. If they are getting stuck here, pair the struggling pupils with the pupils who understand better and give each pair some dot cards. Ask them to count the dots together and tell them they can refer to the numbers on the board if they are having trouble remembering the numbers. Do not move forward before all pupils are comfortable with 1 to 9.

1.1
ii
iv
vi**Activity 2**
4 min

With the numbers and words still up on the board, to introduce 0 as a number, take note of things around the class that there are less than 10. For example, if there are 5 windows, ask pupils, individually, how many windows are in the room, and then have them write 5, in words, and numerals. When they are comfortable with the activity, ask them about an object that there are none. Try to incorporate something funny that would make them laugh. Like, "how many swimming pools are in the class?". They might be confused about the question initially but will eventually answer that there are none. Ask about a few more things that are not present, and then explain the concept of 0. Add it to the numbers on the board.

Let's Pause

Ask the pupils to explain to you the difference between 0 and 1. Highlight the fact that 0 comes before 1 and ask them if they think 0 is a number.

Assign textbook questions here so that pupils can firm up their knowledge of 0 to 9.

1.1
vii
viii**Activity 3**
7 min

Distribute numeral cards and word cards for numbers 0-9 giving each pupil one face down on his or her desk. Be sure that there is a corresponding word card for each number card. Tell the pupils that when you say go, they must turn their card face up, and find a pupil with the matching number/word. Once they have, as a team, they must gather that number of objects. Give them examples of objects they can find beforehand, like their own books or stationary. Encourage some healthy competition so that they try to work as quickly as possible.

At the end, ask the pupils to line up in order of the numbers they have in front of you. First in ascending order, and then in descending. Explain that pupils with the same number should be in the same place in the line.

Let's try it

Find 10 objects in the class that there are under 10. These could be desks, bulletin boards, even walls. Tell the pupils to be ready with their pencils and notebooks, and as you read out objects, they should write down the number, in words and numerals. Have them swap work at the end and give them the right answers so that they can do peer review.

SLOs

1.1

ix

1.2

i

ii

ix

Activity 4

10 min

This pairs with Math Lab page 31

Draw a number line on the board and ask the pupils to help number it, but not in order. Ask them to go up to the board and write numerals. Leave 2, 5, and 7 blank, and ask pupils to write numerals, but instead of telling them the number, physically point to the blank spot. Once the number line is full, repeat the activity by having the pupils write the numbers in words this time.

At the end of this, extend the line a little at the end, and ask the pupils if they know what number should come after 9. Write the numeral, and word 10 on the number line, and use this opportunity to explain that it is a 2-digit number. Explain that having more digits than the other numbers on the line makes 10 bigger by default, and that 0 to 9 are the only single digit numbers, with all subsequent numbers having multiple digits.

Let's Pause

If the class is having trouble with fill in the blank number activities, use real-life objects. Have the pupils count with you as you place objects (any class objects) in a set. Count from 0 to 9. Then, remove all the objects and start again. Count out loud, 0, 1, 2... As you add the third object, remain silent, and then say 4 as you add the fourth. Ask the class what number you missed out. Some pupils might find this easier to understand while some might prefer the number lines. The former should be taught how to count on their fingers as they will most likely find it easier to get used to counting that way.

Sharpen these skills by having pupils count backwards and in parts. They will have understood the concept of backwards and forwards with the number line, so write on the board, 2, _____, 4 or 7, _____, 9. If they are having trouble, use real-life objects as examples.

1.2

i

ii

xii

Activity 5

15 min

Use drinking straws or pencils to represent tens. Count ten straws/pencils in front of the students and tie those ten straws/pencils with a rubber band. Tell students that this is 1 ten. Show them the number card of 10, telling them that this is 1 ten. Along with 1 ten pick up one more straw/pencil and keep it with the ten saying that this is 10 (pointing towards 10) and this is 1 (pointing towards the single straw/pencil). Now say that '10 and 1 make 11. Let students repeat after you. Make one more set of ten straws/pencils, keep both sets together and tell students that these are 2 tens. Show them the number card of 20 with it. Similarly make tens till 90 and show them along with the cards. Have them write down all these numbers in numerals, and in words as they learn them. Write the spellings on the board.

SLOs

1.2
iii
iv

Activity 6
10 min

Sort the class into small groups. Provide eighteen sets of tens (made up of pencils/ straws) to the students along with 45 loose pencils/ straws. Also provide them the number cards from 21 to 29. Let them arrange the number cards from 21 to 29 in sequence on the floor. Now guide them to put the required numbers of bundle of tens and loose straws/ pencils next to the number cards.

Refer to If they are 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	If pupil is below 3 use Math Lab
	Number of Pupils						

1.2
iii
iv
xii

Activity 7
15 min

Repeat activity 3, but instead of 0-9, use cards for 0, 10, 20, 30, 40, 50, 60, 70, 80, 90, and 100. Before starting, lay out some objects in packs of 10. These can be colour pencils in boxes, or even pens bound together with a rubber band. Make sure there are more than enough for each pair to pick up the right amount.

At the end, ask one pair to volunteer. Ask them to come to the front of the class and write their number in numerals and alphabets. Then use this number, for example, 30 to explain the numbers between 30 and 40. Help the volunteer pupils to write 31-39 on the board (words and numbers) and explain that this applies to all multiples of 10. Then invite the pupils who had the number cards for 10 and have them write out 11 to 19 numerically. Explain that while the same rules apply to 20-90, 11 to 19 are slightly different as they are written as one word. One by one, invite each group to write down their numbers, and have the other pupils make note of the numbers and spellings.

Let's try it

Ask the pupils, if you need 30 markers, how many packets of 10 should you buy from the store. Have them write down the correct answer in their notebooks. Continue asking them until you have been through all the multiples of 10, but not in order. At the end of the exercise, ask them to write down the words in front of the numbers.

Let's Pause

Enunciate each number clearly in class so that the pupil can sound it out and remember the spelling.

SLOs1.2
x**Activity 8**
5 min

Make groups of three to five pupils. Provide up to twenty-five playing blocks to each group with different numbers written on each block with a permanent marker, for example, 33, 50, 41, 90, 86, 77 etc. (take 10 to 15 blocks at least). Ask them to build a tower with those blocks in ascending or descending order.

Give the pupils two days to prepare for a spelling test where they will have to spell some of the numbers from 0 to 99. Tell them they can find the correct spellings in Math Lab. For the actual test, choose 20 numbers at random so that it does not take more than 7 minutes.

1.2
v
x
xi
viii**Activity 9**
25 min

This pairs with Math Lab pages 7 and 8

Put numeral cards from 0 to 100 in a bowl and allow pupils to pick out one each. Knowing that many numbers will be left over in the bowl, ask the pupils to line up in ascending order as well as they can, leaving some space in between. Then allow them, while in line to pick more cards out of the bowl, and then pass them up or down the line depending on where they are missing from and placing them in a stack in between. Continue this activity until the bowl is empty, and in the end, have the pupils read all the cards in front of them, as well as their own to make sure there are not any mistakes. Read the numbers at the end yourself. This activity can be done in two parts, with 0-49, and 50-99 if the number of pupils is very low. At the end, shuffle the cards, and ask them to rearrange themselves in descending order.

1.2
vi
vii
viii**Activity 10**
5 min

This pairs with Math Lab pages 33 and 35

Ask pupils to come to the board one by one and write any two-digit number on the board. One by one, go through the numbers, and explain place value. For example, for 37, explain that 3 is in the tens and 7 is in the ones. Explain that the placing of the digit is the way of recognising this. Do not erase the board until after the Let's try it.

Let's try it

Read out a series of two-digit numbers and ask pupils to only make note of the digit in the tens. Read out at least ten numbers and pause to have them peer review so you know they are up to speed. Then repeat the activity, but this time ask them to identify the digit in the place value of the ones. Connect this idea to decomposing numbers, and ask them, individually, to decompose all the numbers on the board.

SLOs

1.2
xiv
xv
1.3
i
ii
iii

Activity 11

10 min

This pairs with Math Lab pages 9, 10 and 36, 37

Divide the class into 10 groups. Ask each group to pool all their pencils/pens in the middle and count how many they have in total and send one group member to the front of the class to write, in words, their total. Ask them then, that if the group with the most pencils was first, and the group with the least was last, then assign each group an ordinal number. Then tell them to do the same in reverse, i.e. if most was last and least was first. Write the ordinal numbers on the board as they say them (numerals and words) and ask them to revise them at home.

Let's try it

Write ten random numerals under 100 on the board. Ask the pupils to copy them down, from smallest to biggest, marking them as 1st, 2nd, 3rd, etc. Once they are done, erase the board, and write down ten more numbers so that they can repeat the exercise. Have them repeat the exercise six times but take a pause after the third time, allow them to peer review, so that if any pupils are getting the answers wrong, you can explain the concept of ordinal numbers again however, be sure to ask the pupils about exactly what is confusing them.

Assign textbook questions relevant to place value and decomposition for revision.

Let's talk math

Ask pupils why they think it is important to be able to count. Will it help in any way in their daily lives? If they are stuck, give them the example of knowing how many objects you have, so you will know if you lose one. Maybe point out how, if you were to go on a field trip, as the teacher in charge, you would be sure to do a head count at each stop, so you would know there was no one missing. Point out that this is much quicker than doing a roll call or checking each pupil individually. Tell them they do not have to raise their hands, but that they cannot interrupt each other. Spend 5 minutes on this discussion, and then give the class 5 minutes to write a reflective paragraph about what they thought of the unit, whether they found it easy, and if they thought it would be useful to their every day lives. Tell them that they do not have to follow these cues strictly, but they should be sure to make notes of whatever thoughts they have.

Let's get practical

Ask the pupils to create family trees on chart papers as homework. Explain in class what it should look like, and perhaps draw your own on the board so that they have a clear idea of what the expectations are. Be sure to tell them that they can go as far back as they like, but they must go to at least great grandparents. Once the charts are completed ask them to work in pairs and swap charts. Ask each pupil to take note of how many family members total on each chart, then how many men and how many women. Go through the class one by one and ask them to announce their findings. Then ask questions like, are there more men or more women. Ask random questions as well, like how many siblings did his or her grandfather have. Ask the pair to compare charts to see who has more members. Ask the class at the end to find which pupil had the most, and which one had the fewest.

Self Assessment

1.1 Numbers 0 to 9

1.2 Numbers up to 100

1.3 Comparing and Ordering Numbers

Refer to If they are 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	If pupil is below 3 use Math Lab
	Number of Pupils						

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) If Sara got 79 points in her exam, and her friends got 78, 64, and 81, is she?
 - a) First
 - b) Second
 - c) Third
 - d) Fourth
- 2) How many squares do you see? (draw 8 squares on board)
 - a) 9
 - b) 11
 - c) 8
 - d) 5
- 3) Are there more objects on the left or the right side? (place or draw 14 objects on the right and 12 on the left)
 - a) More on the right
 - b) More on the left
 - c) They are equal
 - d) Less on the right

Unit 2

Number Operations

2.1 Addition (without carrying)

- i. Compare numbers from 1 to 20 to identify “how much more” one is from another.
- ii. Recognise and use symbols of addition “+” and equality “=”.
- iii. Add two 1-digit numbers sum up to 9.
- iv. Add a 2-digit number to a one-digit number.
- v. Add a 2-digit number to 10s.
- vi. Add two, 2-digit numbers.
- vii. Recognise the use of symbol to represent an unknown such as $\square + 4 = 7$, $3 + 4 = \square$, $4 + \square = 7$ (include questions that sum up to 20).
- viii. Add the numbers (up to 20) by using real-life examples.
- ix. Construct addition sentence from given number stories.

2.2 Subtraction (without borrowing)

- i. Compare numbers from 1 to 20 and find “how many less”.
- ii. Recognise subtraction as a difference and take away, and use the symbol “-”.
- iii. Subtract 1-digit number from 1-digit number.
- iv. Subtract 1-digit number from 2-digit number.
- v. Subtract tens from 2-digit number.
- vi. Subtract 2-digit number from 2-digit number (Which result in positive).
- vii. Recognise the use of symbol to represent an unknown such as $9 - \square = 7$, $9 - 7 = \square$.
- viii. Subtract the numbers (up to 20).
- ix. Construct subtraction sentences from given number stories.

Plan Ahead:

2.1 Addition (without carrying)

2.2 Subtraction (without borrowing)

Allocate realistic time frame/number of periods to teach each topic as per requirement.

Before You Start:

Pupils should already be able to count to 100 and understand the difference between 1 and 2-digit numbers. It is also crucial that they have a good understanding of place values. The idea of part whole will help them understand addition, which will in turn help them learn subtraction.

Watch Out For:

Try to avoid giving pupils the impression that they are about to be introduced to a new concept and try to make it seem like addition and subtraction are a continuation of counting and numbers.

This Pairs with:

Math Lab 1 Page 38 to 45.

Make Sure You Have:

Objects for counting	Pair of Dice
Chalk	Post Its

If They are Struggling:

Number lines will be very helpful when understanding addition and subtraction, as well as the pupil's ages. Each birthday, their age increases by 1, and this idea can help them wrap their heads around the concept of addition since it is familiar. Also, the page numbers from their textbooks. Make them understand that adding and subtracting is just like turning multiple pages at a time. Many pupils may find it useful to count on their fingers, so show them how to do this.

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 level 4 or above, move on to the next activity.

Let's Begin

Introduce this unit as a continuation of counting. Before explaining the concept of addition, teach them how to combine two numbers. For example, ask them how many books are in one pile, and how many books are in the other pile. Then ask them how many books altogether. Show them how to count on their fingers if they do not already know and show them that they simply need to count both piles of books together. Some pupils may count the books in one go without seeing them as separate. Encourage them to count one set one at a time. Do this by asking them how many books there would be in total if you remove one pile. Without pointing out the connection, make sure they grasp the idea that two and three together will make five, so removing two will leave three remaining. Do this with a few different objects that are familiar to them but keep the numbers in single digit. You can end with the fishing game, making a story as given below: 'I had 5 fish in my fish bowl. On my birthday, my friend gave me three more fish. How many fish do I have now?' Ask the same question with different numbers of fish.

SLOs2.1
iii**Activity 1**
10 min

In a fish bowl, you will drop 5 fish and then 3 more fish. Now, count them out one by one. There are 8 fish altogether. The key word 'altogether' should be emphasised and explained here. Keep all numbers single digit. If they add them correctly, it means they have understood the concept clearly. Repeat the activity several times by calling students to perform on their own.

Let's try it

Write ten sums on the board, but in each sum, swap out a number for a question mark. They should not sum up to more than 9. Below are some examples:

$$4 + \square = 9$$

$$3 + 4 = \square$$

$$\square + 2 = 6$$

Ask the pupils to write down the completed sums in their notebooks.

2.1
i
ii
iii
iv
2.2
i**Activity 2**
15 min

This pairs with Math Lab pages 38 to 45

Set up two groups of objects and ask the pupils to make note of how many there are in each group. Then ask them how many total objects there are in both groups (the total should not be more than 20), and how many more/less there are in the one with more. After this, make groups of 3 to 4 pupils and give each group 20 objects. Ask them each to come up with three different pairs of numbers that will sum up to 20. This will familiarise them with the concept of adding. When they volunteer their answers. For example, 13 and 7, write them on the board as $13 + 7 = 20$ to familiarise them with the symbols. Make the first half of the questions with single digit numbers only, but slowly introduce 2-digit numbers.

Let's try it

Assign up to ten sums that contain a 2-digit and a 1-digit number. Here are some examples below:

$$4 + 14 =$$

$$18 + 1 =$$

$$25 + 3 =$$

$$30 + 6 =$$

Ask the pupils to write down the completed sums in their notebooks.

SLOs

2.1
v

Activity 3
10 min

Let students add sums horizontally with one tens and one ones number e.g. $16 + 3 = \underline{\quad}$. Guide them to solve the sum mentally. Ask them to keep the bigger number i.e. 16 in their minds. Then ask them to take out their fingers according to the other number i.e. 3. Now ask them to count after the number which is in mind i.e. 16. Close your fist and open your fingers one by one while counting and saying 17, 18, and 19. Say 'the answer is 19'. Discuss with the class how 10 is an easier number to add than most because when you add 10, the number in the place of the tens just goes up by one. Conduct a rapid fire round of questions making sums with 10s like ten plus six, ten plus four, ten plus eight, and slowly progress to two-digit numbers. Call on pupils to answer at random.

Ask the pupils to write down the completed sums in their notebooks.

Let's Pause

Ask the pupils what the difference is between "more and less" and "plus and minus". They should be able to work toward the conclusion that more and less are descriptions and plus and minus are actions. Encourage students to always count from the bigger number to avoid overcounting and undercounting. Make sure they realise that even if the smaller number comes first in the sum, it will make no difference if they switch them around. Also avoid chorus counting in class, and make sure pupils work individually.

Refer to If they are 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	If pupil is below 3 use Math Lab
	Number of Pupils						

2.1
v
vi
vii
2.2
ii
iii

Activity 4
7 min

After explaining the addition, subtraction, and equal to sign, write numbers on the blackboard with no plus or minus sign, like so:

$$4 \square 8 = 12$$

Then tell them to vote by raising their hands for an addition or subtraction sign. Gradually increase difficulty, but do not go over the 2-digit numbers. This will help them see addition as an increase and subtraction as a decrease. Have the pupils then rearrange these equations, for example: $4 + 8 = 12$ would change to $12 - 8 = 4$ or $12 - 4 = 8$.

Let's try it

Repeat the exercise from the previous Let's try it, but this time instead of only addition, add in subtraction as well. You may also go as high as the number 20. There are some examples given below:

$$13 - \square = 6$$

$$3 + 7 = \square$$

$$\square - 6 = 11$$

As done previously, stop after ten questions to address any confusion, and then give ten more questions.

Let's Pause

If pupils are having a hard time with subtraction, remind them that it is simply taking away. Show them how to subtract on their fingers, by counting backwards, but call it taking away. Ask the pupils to tell you real-life examples where they use addition or subtraction. Start by giving them examples in your own life. Use words like plus and minus and equals.

Assign as textbook questions here for practice.

SLOs

2.1
viii
2.2
viii

Activity 5

20 min

This activity is best done in an outdoor space. Use chalk, or tape to draw a hopscotch style line from 0 to 20, like so:

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
---	---	---	---	---	---	---	---	---	---	----	----	----	----	----	----	----	----	----	----	----

Make sure that each pupil gets a turn, if possible. If needed, have multiple hopscotch lines. Have one child stand at 0, and one child roll a die. Another child will flip a coin. Decide beforehand that it is tails for subtract and heads for add. So, if you get a 4, and a head, the child on 0 will hop from 0 to 4. If you then get a 3 and a tail, he or she will turn around and hop to 1. Before the child starts hopping, have the other children try to guess what number they will land on. If the answer ever goes above 20 or below 0, let a different child in the group start again from 0.

If the children have trouble hopping allow them to jump or walk. However, they feel comfortable.

Let's Pause

Use this opportunity to point out how the previous activity showed us that subtraction is just addition in reverse.

SLOs

2.1
ix
2.2
ix

Activity 6
6 min

Explain to the class what a number story is and give them an example of one. Then point out the addition or subtraction sentence in the number story. Explain that addition sentences are simply sums and point out the number sentence from your number story. For example, if the story was that Asad had two apples when his sister give him three more. How many apples does he have now? The number sentence would be $2 + 3 = 5$. Ask the class for volunteers to tell number stories, asking them to alternate between addition and subtraction, and ask the rest of the class to try to guess what the number sentence is. Allow the pupil who made up the story to write down the number sentence on the board after the class is done guessing.

Let's talk math

Ask pupils what they have learnt in this unit. Can they relate any of it to their daily lives? Tell them a number story and then encourage them to create their own. Allow them to move the conversation in whichever direction they please, but make sure it remains relevant to the unit, and give them cues where necessary. Ask them how they might use addition and subtraction in their daily lives from now on. Ask them if they found it hard to move from counting to addition and subtraction. Spend 5 minutes on this discussion.

Let's get practical

Link numbers to ages, and to age differences. Sort the pupils into pairs, and ask them to make note of each other's ages, and siblings' ages. To make the activity more interesting, ask them to include pets. If anyone's sibling is less than a year old, ask them to write 0. Beforehand, find out how many only children there are in the class, and bring in a bowl of chits, allowing each only child to pick out a chit. List names and ages on each chit so that they can use them to also participate in the exercise. Once everyone has all the information written down, ask them to use the age differences to make note of the addition for their own family and subtraction for their own family.

Draw an example on the board before they start, and have the pupils help fill it in. After they have individually made their calculations, have them compare answers. This will reinforce in their minds that addition and subtraction are opposites.

Pupil 1 work

	Subtraction	Addition
Mustafa is 14	- 3	1
Hina is 11	$14 - 3 = 11$	$1 + 3 = 14$
Ali is 5	$11 - 6 = 5$	$5 + 6 = 11$
Buttons is 3	$5 - 2 = 3$	$3 + 2 = 5$

Self Assessment

2.1 Addition (without carrying)

2.2 Subtraction (without borrowing)

Refer to If they are 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	If pupil is below 3 use Math Lab
	Number of Pupils						

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 is the subtraction sign?

- a) +
- b) -
- c) =
- d) None of the above

2) $12 + 5 = \square$

- a) 19
- b) 17
- c) 15
- d) 16

3) $13 - \square = 8$

- a) 3
- b) 8
- c) 7
- d) 5

Unit 3

Measurement: Length and Mass

3.1 Comparison of objects

- i. Compare the heights/lengths of two or more objects using the following terms:
 - Long, longer, longest
 - Short, shorter, shortest
 - Tall, taller, tallest
 - High, higher, highest
- ii. Compare the masses of two or more objects using the terms:
 - Heavy, heavier, heaviest
 - Light, lighter, lightest

Plan Ahead:

3.1 Comparison of objects

Allocate realistic time frame/number of periods to teach each topic as per requirement.

Before You Start:

Pupils will already be comfortable with numbers up to 100 and understand the concept of more and less. They will have learned to identify less or more in the previous unit, and find the difference.

Watch Out For:

Be sure to make pupils aware that the terms, 'heavier' and 'heaviest', are relative. Help them choose between the two by presenting them with lots of questions and activities that ask them to choose between the two. There is also a possibility that they will confuse length and height, so explain that height is always vertical. It may also be confusing that short applies to length and height.

A lot of the terminology introduced in this unit might not be familiar, like span or quarter, so be sure to explain as you go. Be very clear about non-standard units of measurement and use repetitive activities so that they can remember them.

This Pairs with:

Math Lab 1 page 46 to 47.

Make Sure You Have:

Balancing Scales	Building Blocks
500-gram Weight	String
Long and Short Pencils	A4 Sheets

If They are Struggling:

Revisit the basics here as many times as necessary. Pupils will find real-life applications of what they are using helpful while trying to comprehend the concepts. Ask them to give you examples for how one might use these methods, and how measurement could be helpful in one's life. They might need a few examples to get started. Remind them as much as possible, that this is just counting, but with a unit.

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 level 4 or above, move on to the next activity.

Let's Begin

Pupils will already know most of these keywords but might need some help distinguishing between when to use what. Start with the word long and ask them to give you examples of what they would describe as long. If they use it to describe time periods, ask them to only describe objects, or 'things they can touch'. Let them come up with at least three examples before moving on to the word short. Once again, only asking them to describe things they can touch. Move through tall, high, heavy, and light, helping if they get stuck on any. They might particularly need help with high, so give them the example of the ceiling being very high, or a bird flying high. Ask them to think of other objects that are very high up.

SLOs3.1
i**Activity 1**
5 min

Ask the pupils to think which of their classmates has the longest hair, and who has the shortest. Once this is established, explain to them that if pupil X has the longest hair, and pupil Y has the shortest, the rest of them have longer hair than pupil X, and shorter hair than Y. Then ask them to divide into two groups. Have all long-haired pupils gather on the left side of the class and all short-haired pupils gather on the right. Establish that for girls, long hair is past the shoulders, and for boys, long hair is past the collar. Use this opportunity to explain that while long and short are descriptions, longer and shorter are comparisons. Shortest and longest are also relative.

**Let's
Pause**

Explain that these words always depend on the object. Use examples like, if an arm was as long as one class wall to another, it would be very long, but if a train was from one wall to another, it would be very short. Same with heavy and light. Assure them that it is normal to find the new words confusing, but they will become more comfortable with practice, and in the mean while, they are able to ask.

SLOs3.1
i**Activity 2**

10 min

Pass around a basket of ribbons of assorted lengths, let each pupil choose and pick a ribbon from the basket. Now the pupils of each group will compare the length of the ribbons and find out the longest and shortest ribbons. Each group will show its longest and shortest ribbons. Ensure that they match up one end of the ribbons so that they are accurately comparing length.

Activity 3

3 min

Pull out some short pencils and some long (barely sharpened) pencils (no more than 5 each). Hold them up one by one in front of the class and ask them which are long or short. Once you have two sets of pencils, hold up the short ones only, and ask them which is the longest out of them. Point out that even though all the pencils are short, some of them are still longer than the others. Do the same for the long pencils.

Let's try it

Draw five sets of lines on the board. Let there be three lines in each set. Tell the pupils that the line on top is the first line, the middle one is the second line, and the bottom one is the third line. They should be drawn like so:

1) _____

The class should, in their notebooks make note of which line is the longest and shortest for each question, like so

1) First is shortest, second is longest

Make sure that it is clear which of the lines is the longest or shortest

3.1
i**Activity 4**

13 min

This pairs with Math Lab page 46

Provide the children building blocks and give them 5 minutes to make a building on their desks. When they are done, make groups of 4 to 6 and ask them to identify each others' buildings as one of the following: short, shorter, shortest, tall, taller, tallest. Based on the size of the buildings, ask them to measure with fingers, or hands and give parameters for long and short, based on the average size of the buildings. Give them another 5 minutes to do this and ask each group at the end to put forth the tallest and the shortest, so that the tallest and shortest buildings in the class can be found.

**Let's
Pause**

Ask pupils what the difference between words like long, longer, and longest is. If they do not realise on their own, point out that longer and longest are comparative words. Refer to activity 1 and explain that even if every pupil in the class had short hair, someone would still have the longest. And like with the pencils, even if all objects are short, some will still be longer.

Assign 10 to 20 minutes of textbook questions here and allow pupils to complete them as homework if they do not finish in class.

3.1
i

Activity 5
17 min

This activity can be done in the class but is best done outdoors. Tell the pupils the day before that you will be building paper planes in class, so that they can practice or research at home if they like (they do not have to). Then use some string or rope to create a line around 2.5 feet high, and have the pupils throw their planes in pairs. Tell them to try and see which one goes higher.

Tell them that any plane over the line is high, but also comment things like, "that was the highest one yet" or "that one went even higher than the last".

This will make them comfortable with the words.

After this activity, the pupils will be aware of all 4 spatial measurement words. To avoid confusion, bring them back to the class and point out random objects and ask them what words would be appropriate to describe them. For example, is the window tall, or high? Is the pile of books long or tall?

Let's try it

Pupils should now be completely comfortable with terminology. Read aloud sentences with a blank. Ask the pupils to silently make note of the missing word. Give them the following word bank on the board:

long short tall high

Remind them that some of the sentences will have tall and short, or long and short as answers. In this case, they should write both.

Some examples of sentences are given below:

How _____ has that bird flown

That tree is so _____

This wire is very _____

The ceiling is so _____

The basketball net is too _____

The pole is very _____

Her hair is very _____

Answer

high

tall/short

long/short

high

high

tall/short

long/short

Assign the pupils 15 minutes of homework from the textbook. Solve three of the homework questions, of varying difficulty, on the board so that they are less likely to make mistakes.

Let's Pause

The difference between tall and high can be confusing. For objects which are at a distance from the ground we use high, like for planes and birds. For objects that begin at the ground and go up to a certain level, we use tall, like for a tree, and for people. Tall is more a measure of vertical length, while high is a description of position. For example, a tree is tall, but a tree top is high. A mountain might be called high, but this will generally be in reference to its peak.

Refer to If they are 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	If pupil is below 3 use Math Lab
	Number of Pupils						

SLOs

3.1
ii

Activity 6
7 min

This pairs with Math Lab page 47

Have an assortment of fruits available in the class, and have the pupils sort them by type. Then place them in the balancing scales. Place pieces of fruit in each side to demonstrate that the heavier side will always go down, while the lighter side will go up. Weigh the fruits one by one against each other to figure out which one is the heaviest and the lightest. Tell the pupils to make a list of all the fruits from heaviest to lightest.

Then introduce a 500 gram weight. Explain that the weight is heavy, without getting into the specifics of how much it weighs. Put the weight on one side of the scale and add pieces of fruit one by one to the other side. For example, if you have apples, since one apple will surely be less than 500 g, it will stay up. This shows that one apple is light. When you eventually have enough apples to outweigh the weight, tell them that that number of apples are the heavy when put all together. Continue adding apples to demonstrate how the scales will continue to tip, meaning that the sides with the apples are getting heavier.

Let's try it

Explain the concept of true and false to the pupils. Tell them you will read out a series of sentences, and they must make note of which ones are true or false, by noting down the question number, and a T or F. Make sure every pupil has heard the sentence before moving on to the next one. There should be at least three sentences using each of the following key words: light, lighter, lightest, heavy, heavier, heaviest. Here are some examples below:

Two elephants are heavier than one elephant. (true)

Three apples are heavier than four apples. (false)

An elephant is lighter than a cat. (false)

Balloons are very heavy. (false)

Out of a bowling ball, a tennis ball, and a ping pong ball, a bowling ball will be the lightest. (false)

Out of a lemon and a watermelon, the lemon will be the lightest. (true)

Stop halfway through for peer review, that if there are any mistakes, the misunderstanding should be cleared up before resuming the activity. Make sure that each keyword has been mentioned at least once before the peer review. After the entire exercise has been completed, and the pupils are comfortable with true and false, then you can add in a few bonus questions with the keywords learnt in activity 1 to 3.

Let's talk math

Ask the class if they ever used the keywords they learnt in this unit prior to it. Then ask them if what they learnt will affect the way that they use them. Have them discuss amongst each other what they have learnt about when to use what words. Ask them if they have been using any of them incorrectly previously. Also, discuss the fact that it can be confusing how to know which word to use at times. Ask them to discuss what they found confusing about this unit. The goal here is that they will start explaining to one another or sharing tips for how to remember things.

Let's get practical

Ask pupils to bring their favourite toy to class. Remind them at the time that it should not be too fragile as it will be used in class activities. In class, let them choose a partner and swap toys. Hand out chart papers and pencils, and have each pupil lie their toy down flat in the centre of the paper and mark the top and the bottom. Ask them each to think up a creative non-standard unit of measurement that is appropriate for the size of the toy. For example, a toy that is less than 5 inches tall could be measured with pencils. A taller one could be measured with a pencil case. Show them how to make markings as they measure and allow them to explore the class to look for objects to use as measuring tools. Once they have measured and made note of the measurement, ask them to come to the class one by one with their partner's toy and use the scales to weigh it. Put fruits or books on the other side of the scales, so that they can note down that their toy weighs the same as X books or fruits. After this is complete, ask them to discuss amongst each other which toy was the heaviest, the tallest, the shortest, and the lightest. For the toys that do not fall into any of these categories, ask the pupils to read out the details and ask the class to discuss whether they think they are light, heavy, tall, or short.

Self Assessment

3.1 Comparison of objects

Refer to If they are 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	If pupil is below 3 use Math Lab
	Number of Pupils						

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) When measuring a carpet, which words are correct to use?
 - a) Long
 - b) Tall
 - c) High
 - d) Fat
- 2) If box A has 3 apples, box B has 8 apples, and box C has 10 apples, box C will be?
 - a) Light
 - b) Heavier
 - c) Heaviest
 - d) Lighter
- 3) What words would be correct for describing the height of trees?
 - a) Long and short
 - b) Tall and short
 - c) Heavy and light
 - d) Big and small

Unit 4

Money

4.1 Pakistani Currency

- i. Identify Pakistani currency coins (Rs 1, 2, 5, and 10).
- ii. Identify Pakistani currency notes (Rs 10, 20, 50, and 100).

4.2 Equivalent Sets of Money

- i. Match a group of coins/notes to an equivalent group of different denominations.
- ii. Add and subtract money using the prices of objects (transactions) (e.g. toys).

4.3 Comparing Money

- i. Recognise money change (up to 100) to its equivalents/denominations.
- ii. Determine if enough money is available to make a purchase (up to 100).
- iii. Add different combinations of coins/notes (to make sum up to 100).

Plan Ahead:

4.1 Pakistani Currency

4.2 Equivalent Sets of Money

4.3 Comparing Money

Allocate realistic time frame/number of periods to teach each topic as per requirement.

Before You Start:

Pupils need to be completely comfortable with numbers from 0 to 100 and know how to add and subtract. Since they will be learning how to know whether a certain amount of money is enough to make a purchase, so they should easily be able to identify more and less.

Watch Out For:

Although all the mathematical concepts introduced in this unit are the same as the previous units, pupils might be intimidated by the new unit. Help them understand that they should treat the numbers just as they would if there was no unit.

This Pairs with:

Math Lab 1 page 46 to 50.

Make Sure You Have:

At least one of each banknote
As many coins as possible
Fake currency (if necessary)

Class objects (books, stationary, toys)
Colour pencil
A4 papers
Matchsticks/Toothpicks

If They are Struggling:

First ensure that pupils have not missed out or forgotten the previously learned concepts. If they have, revise them quickly with the entire class. Do shorter versions of some of the exercises from unit 1 and 2 on the board, and have all pupils participate. Make sure they know that these are the same concepts that are being applied to money. For example, finding denominations of notes and coins is the same as finding out which two numbers need to be added to equal a certain number as in unit 2.

If this is not the issue, focus more on the activities of this unit, as it is all about getting familiar with the knowledge. 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 level 4 or above, move on to the next activity.

Let's Begin

Hold up each piece of currency in front of the class and ask them to try to name it. If they cannot, which might be the case, especially for the coins, tell them what they are. Make drawing of each banknote and coin on the board, so the pupils can check it if they forget. Point out how each banknote or coin will always have its value in numerals written on it, but they still look quite different from each other. At this point pass the currency around the class so that every child gets to hold them in their hands and examine them close up. Ask them why they think all the banknotes and the coins were not made identical if one could simply read the numbers to see which was which. The most important reason is that when one is paying for something, there is not always time to stop and read each individual coin or banknote. If the pupils are not coming to this conclusion on their own, drop some hints. Ask them to think about when they have seen their parents paying for things. Do they stop and read every note? And would it take longer if they did? What would happen if each person had to stop to read their currency when they came to the till. Would the line be much longer?

SLOs

4.1
ii

Activity 1
10 min

This pairs with Math Lab page 48

Set out currency in the front of the class, and hold them up each, asking the pupils to identify them. After that, ask them to make rough drawings of each banknote on A4 paper using colour pencils. This will help them recognise the banknote without reading the number, by looking at the colour. Help cut up the papers to separate the banknotes. Ask them to partner up, and show their partner their banknotes one by one, while covering the number. The partner will try to guess which banknote they are being shown based on colour and design. Let the pairs discuss briefly and identify differences in the notes.

Assign some exercises from the textbook here that will help familiarise pupils with the currency.

SLOs4.1
i**Activity 2**
10 min*This pairs with Math Lab page 48*

Depending on how many coins are available, break the class into groups giving each group a set of coins, and toothpicks or matchsticks. Ask them to arrange them from smallest to largest (in value) and trace them each out on their notebooks in that order. Then let each one of them choose a side of each coin and draw them in the circle they traced. If gold, silver, and bronze colour pencils are not available have them write down the colour.

Let's try it

Hide the coins and notes, and have the pupils copy off the board. Write colours on one side, and values on the other. Have them match colours and values.

Let's Pause

There was a 10-rupee coin in circulation between 2016 and 2018, but it is no longer in use. This unit should include all the coins in circulation, and all notes in circulation up to 100. You can ask pupils to ask their parents if they have any old currency at home that they can bring in to show the class.

4.2
i
ii
4.3
i
ii
iii**Activity 3**
20 min*This pairs with Math Lab pages 49 and 50*

Give pupils ten random numbers to pupil and ask them to make equivalent numbers using banknotes and coins. For example, 25 would be $20 + 5$ and 60 would be $50 + 10$. Then divide the class into groups of 4 to 6 pupils and tell them that you are having a competition. Keep score on the board of who is answering questions correctly. Then announce a number and provide a selection of coins and banknotes. Each group will have to try and figure out how many possible combinations of coins and banknotes there can be to produce that number. Make sure there are never more than 8 different combinations. The first group in the class to come up with the answer and present it to the rest of the class will win that round. Make sure that you group the pupils who have trouble with more confident pupils so that they can learn from each other. Below are some examples of questions:

Get 10 rupees using 2 and 5 ($2 + 2 + 2 + 2 + 2$ and $5 + 5$)

Get 100 rupees using 20 and 50 ($20 + 20 + 20 + 20 + 20$ and $50 + 50$)

Get 40 rupees using 10 and 20 ($10 + 10 + 10 + 10$ and $20 + 10 + 10$ and $20 + 20$)

Get 60 rupees using 10 and 20 ($10 + 10 + 10 + 10 + 10 + 10$ and $20 + 20 + 10 + 10$ and $20 + 10 + 10 + 10 + 10$ and $20 + 20 + 20$)

Be sure to have the correct answers ready beforehand so that the game can move as quickly as possible.

Let's try it

Have pupils solve word problems individually. Here are some examples:

- 1) If Sheeza has Rs 50, and apples cost Rs 20, how many apples can Sheeza buy?
- 2) Faisal is selling a cake for Rs 60. A customer gives him two 50-rupees notes. How much change does Faisal have to return?
- 3) Alina only has 20-rupees notes. She wants to buy a book that costs Rs 75. How many notes should she give the shop keeper, and how much change will he return?
- 4) Kamila has three 20-rupee notes, three 5-rupees coins, and five 2-rupee coins. What notes will she use to pay for a pencil that cost Rs 27?
- 5) Mehrunnisa is selling brownies for Rs 8 each. A customer buys two brownies with a 20-rupee note. How many 2-rupee coins should Mehrunnisa give the customer as change?

Let's Pause

Figuring out the denominations of money might be easier to teach if you refer to addition and subtraction. Show pupils that breaking down money is just like creating your own addition sums. The Math Lab 1 activity on page 45 might help pupils connect the concept.

Assign questions from the textbook that should be completed as homework if not finished in class.

Let's talk math

Ask the class how confident they feel handling money now. Remind them that money needs to be handled with care, and they should always double check the amount before paying someone, because even adults can make mistakes. Ask them if this unit reminded them of what they learnt in any of the previous units, and if they say no, prompt them to link the decomposition of currency to addition and subtraction. Prompt their discussion further by asking what would happen if one did not know how to properly add money together to come to a specific total. Remind them that they, not only would not be able to pay people properly, but they would also not know if someone has given them the wrong amount of money.

Let's get practical

Give each pupil a random amount of fake currency, in notes and coins, and ask them to count it. Then divide the class into two groups: Buyers and sellers. Give the sellers at least four objects and their prices to sell. Then ask the buyers to use their fake currency to "buy" objects. The sellers should be sure to give back the exact change. The students should know beforehand that they do not actually get to keep the objects. Be sure to give the buyers bigger notes, and the sellers plenty of small change. The buyer and seller should help each other figure out their money. Once a buyer has money remaining, but not enough money to make a purchase, he or she should combine with another buyer so that they can pool their money to continue to shop. Likewise, sellers should give their change to one another when they run out of objects. No one should have more than 100 rupees, and no object should cost more than 50.

Self Assessment

- 4.1 Pakistani Currency
- 4.2 Equivalent sets of money
- 4.3 Comparing Money

Refer to If they are 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	If pupil is below 3 use Math Lab
	Number of Pupils						

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) If you want to buy a cupcake that costs Rs 80, how many 20-rupee notes should you give the shopkeeper.
 - a) 3
 - b) 4
 - c) 2
 - d) 8
- 2) Which note is purple?
 - a) A 20-rupees note
 - b) A 10-rupee note
 - c) A 100-rupee note
 - d) A 50-rupee note
- 3) Which of the following makes up Rs 70?
 - a) $50 + 20 + 20$
 - b) $20 + 50 + 10$
 - c) $10 + 10 + 50$
 - d) None of the above

Unit 5

Time

5.1 Time

- i. Recognise the hour and minute hands of an analogue clock.
- ii. Read and tell time in hours from the analogue clock, for example 2 o'clock.
- iii. Read and tell time in hours from the digital clock.

Plan Ahead:

5.1 Time

5.2 Date

Allocate realistic time frame/number of periods to teach each topic as per requirement.

Before You Start:

A lot of pupils may already have knowledge about this unit, but it is important to teach as if the entire class is unfamiliar with the subject. Pupils will be especially hesitant about asking questions if they think that they are too far behind.

Watch Out For:

This unit requires a lot of memorisation. Pupils may find it difficult to keep up, so repetition will be helpful. While learning how to read digital clocks, be sure to place a lot of emphasis that if the time is 07:00, the first 0 is to be ignored. Be sure to keep checking in to ensure that the entire class is following, so that you can go back as soon as someone is stuck.

This Pairs with:

Math Lab 1 page 51 to 59.

Make Sure You Have:

Chart paper	Analogue Clock
Butterfly pins	Post its
A4 Sheets	Bowl
Glue sticks	Chits
Digital clock	Calendar page
Strips of paper	Flash cards

5.2 Date

- i. Name in order days of the week.
- ii. Identify which day comes after/before a particular day.
- iii. Name (orally) the solar months of the year.
- iv. Name (orally) the Islamic months of the year.

If They are Struggling:

Since this unit involves a lot of rote learning, memory tricks and repetition will be useful. More focus should be on the activities than the exercises so that the pupils do not feel like they are being given too much information to process. Also, taking 5 minutes at the start of each class to go over what was learnt previously will 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. However, do allow the class to collectively ask questions. If all pupils are at level 4 or above, move on to the next activity.

Let's Begin

Start this unit by asking the pupils what time they wake up. It is possible that not all of them will know, but some might. Then ask them about what time they go to sleep. Discuss the fact that every part of their day starts at a certain time. School starts at a set time, math class starts at a set time, and school ends at a set time. Ask them what it would be like if there was no time. How would people know when to wake up, and when to get to school. Lead them to the conclusion that time is a way of organising ourselves, and coordinating. Ask them examples of other things that people do at a specific time. After this, bring up the fact that the "time of day" is not the only thing people use to organise themselves. Ask them if they can think of any other way that people know when to do things. Give them a minute to guess, and if they do not, say the days of the week, and/or the months of the year. Ask them which days they do not come to school. Explain that these are all different ways one can measure and organise time.. Explain the difference between solar months and Islamic months, explaining that the school follows the solar months, which is how they know when to have summer holidays, but the Islamic calendar is what is used to figure out when Islamic holidays are. Use the example of Ramadan and explain that it is the ninth month of the Islamic calendar. Allow the pupils to ask questions here, as they might find the concept of two calendars confusing and might wonder why we do not only follow one. Remind them that we follow the Islamic calendar to track Islamic events, and we follow the solar calendar because it is important for us to move with the rest of the world. Explain that many countries and religions have their own calendars, but they also make use of the solar months.

SLOs

5.1
i
ii

Activity 1 15 min

This pairs with Math Lab pages 51 to 54

Show pupils an analogue clock and explain what the minute hand and the hour hand is. Ask them how they think they can differentiate between the two. If they do not realise themselves, point out that one of them moves much faster. Then give them a chart paper and instruct them to do the following: Draw a circle (not too large) – cut it out – keep the remaining chart paper (for activity 2)– write the numbers of a clock – Draw the minute hand pointing to 12 – cut the hour hand out of the remaining chart paper – make a small hole in the centre of the circle and the base of the hour hand – use the butterfly pin to attach the hour hand to the clock as it would attach in the real clock. Help them as they go, and if possible, make one with them, so they can watch you if they are confused. Use this clock to show them how to tell time to the hour.

Let's try it

Read out a time (without minutes) and ask the pupils to arrange their hour hands to reflect that time, and then raise them simultaneously. Look around to see if they have all been arranged correctly, and if not, explain the clocks again using one of the fake clocks as a sample. If pupils are still confused, make this a group activity.

SLOs

5.1
iii

Activity 2
15 min

This pairs with Math Lab page 57

Give each pupil an A4 paper and using whatever scraps of the chart paper are left from the previous activity, ask them to cut out 14 strips. Give them a rough way to measure the length of the strips, like one handspan. They may need extra chart paper. After they have everything prepared, show them how to read a digital watch, either by drawing on the board, or by using a real one. Then ask them to each pick a chit out of a bowl. Write a time on each chit in hours, like 9 o'clock, and ask them to paste their strips onto the A4 sheet to resemble a digital clock showing that time. Since the time is in hours, ask them to draw on the zeros the minute side, as well as the colon in between.



As they work, move through the class to make sure that all the pupils are on the right track. Ask each one to come to the front of the class one by one and hold up their digital clock. Ask the rest of the pupils to raise their hands to answer what time it says.

Let's try it

Divide the class into 6 teams. Hold up your digital clock and show the class various times, calling upon the first pupil who raises his or her hand. The one to get the right answer will earn a point for their team. Do this 12 times so that there is no repetition.

Let's Pause

The analogue clock was invented in 1656 and the digital clock was invented in 1956. Ask the pupils which one they think is better. Start a class discussion about which one is easier to read, and discuss the advantages and disadvantages of each.

Refer to If they are 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	If pupil is below 3 use Math Lab
	Number of Pupils						

Assign 20 minutes of textbook work here that should be completed as homework, if not finished in class.

SLOs5.2
i
ii**Activity 3**
20 min

This pairs with Math Lab page 57

After explaining the days of the week in order, divide the pupils into groups of 5 to 6. Ask each group to come up with a song to help them recall the order. Some may simply sing the days in a rhythm, while some may come up with lyrics to go in between. Move through the class as they work and encourage them to be creative. Any originality should be rewarded and encourage them to share ideas. Tell them that at the end, each group will sing their song for any of their other teachers who will be available. When making the groups, be sure to group the more confident pupils with the less confident pupils. Whichever group has the best song will teach their song to the rest of the class.

Assign 15 minutes of textbook questions as homework

5.2
ii**Activity 4**
20 min

Display three flash cards with days' names and ask them to call out the names of the days which are missing. Display the names of the days in order. Show them a calendar explaining how the days are displayed in each month and how they can find the corresponding day for a particular date. Now put the enlarged page of the calendar on the board and ask different questions. For example, which day comes after Tuesday, what is the day on 25th of the month, what is the day before 7th of the month?

5.2
i**Activity 5**
10 min

Provide students with slips of paper and let them write the days of the week on each slip. Once they are done writing, provide them a strip of paper. Let them paste the names of the days on that strip with the help of glue then joining the ends of each strip to make a ring and demonstrate the cyclic nature of each week. The same activity can be repeated for months.

5.2
iii**Activity 6**
10 min

This pairs with Math Lab page 59

After telling the pupils the solar months in order, and orally going through them a few times to familiarise them, ask 12 pupils to volunteer. Write a month each on a post it and stick it on each volunteers' forehead. This way, everyone will know what day they have except for the pupil. Request 2 more volunteers and ask them to arrange the 12 pupils in a line in the correct order, without saying aloud what months they each have. Once they are arranged, check if they are done, correctly, and one by one, ask each pupil to look around and guess which month they have on their foreheads. Repeat this activity once with different pupils.

Do 10 minutes of textbook questions in class so pupils have the solar months learned before moving on to the Islamic months.

SLOs5.2
iv**Activity 7**
15 min

Repeat Activity 4 with the Islamic months of the year but be sure to shuffle the groups. Group pupils who did well previously with pupils who did not. Here are the months of the Islamic calendar, in order, for your reference:
Muharram, Safar, Rabi-ul-awwal, Rabi-ul-Sani, Jammadi-ul-Awwal, Jammadi-ul-Sani, Rajab, Sha'ban, Ramadan, Shawwal, Zul-Qadah, Zul-Hajjah.

Do 10 minutes of textbook questions in class so pupils get comfortable with the Islamic months.

Let's try it

This exercise will be a rapid-fire round. Tell the pupils that you will be calling out either a day of the week, or a month (solar or Islamic), and they must raise their hands to tell you the name of the day or month that comes after. So, if you shout out "Wednesday", a pupil should raise their hand to say "Thursday". For the first few rounds, let them answer as a class so that they can get used to the activity. Remind them that they should not worry about getting it wrong because it is not a competition. Before starting, go through the orders once more with the class.

Let's talk math

Refer to Let's Begin and ask the pupils why they think there are so many different units of time. Let them discuss it, and if they need it, prompt them by pointing out that each unit of time measures a different part. Ask them to discuss which one they think is the most important, reminding them that there is no right answer, but they should be able to explain their reasoning. Talk about the different uses of all these measures of time. We discussed in Let's Begin that we use time to synchronise ourselves as communities, so that we can be more organised, but what else is time used for. Drop hints until the class concludes that units of time are also used record events and when they happened. Ask them what would be lost if we stopped using time entirely.

Let's get practical

Ask each pupil to find out what time (in hours), what day of the week, and what month (solar and Islamic) they were born. Ask them to pair up. Each pupil should then choose either an analogue or a digital clock and draw their time of birth onto their notebooks. They should then give their partner the following speech:

"I was born at _____ (hold up clock to show time)

I was born on the day in between ____ and ____.

The Islamic month was the one after _____.

The solar month was the one before _____.

Their partner should make note of their information, and then say it back to them allowing them to confirm, and then repeat the activity, allowing the other partner to present. Start this activity by giving a and allowing them to figure out your months, day, and time of birth.

Self Assessment

5.1 Time

5.2 Date

Refer to If they are 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	If pupil is below 3 use Math Lab
	Number of Pupils						

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 time is not shown on any of these clocks (draw three analogue clocks on the board showing 8, 12, and 3 o'clock).
 - a) 3
 - b) 8
 - c) 1
 - d) They are all shown
- 2) What time is not shown on any of these clocks (draw three digital clocks on the board showing 9, 1, and 11 o'clock).
 - a) 1
 - b) 11
 - c) 9
 - d) They are all shown
- 3) What day comes after Wednesday?
 - a) Tuesday
 - b) Friday
 - c) Thursday
 - d) Monday

Unit 6

Geometry

6.1 Two Dimensional (2-D) Shapes

- i. Recognise and identify shapes of similar objects in daily life.
- ii. Identify the following basic shapes:
 - Rectangle
 - Square
 - Circle
 - Triangle
- iii. Match similar basic shapes in daily life.

- iv. Distinguish basic shapes by considering their attributes (sides).
- v. Classify 2-D shapes according to number of sides and corners.

6.2 Patterns

- i. Identify the next shape in the patterns with 2 or 3 elements.
- ii. Extend a given pattern of 2 or 3 elements.

6.3 Position

- i. Identify whether an object is placed:
 - inside or outside
 - above or below
 - over or under
 - far or near
 - before or after a given object.

Plan Ahead:

6.1 Two Dimensional (2-D) Shapes

6.2 Patterns

6.3 Position

Allocate realistic time frame/number of periods to teach each topic as per requirement.

Before You Start:

Pupils may already be familiar with some shapes from previous grades, so ask them to tell you what shapes they know about so that you are aware of the starting point. Since they have not previously learnt patterns, only sequences, linking the two might make it a more understandable concept. Explain that the patterns are like sequences, but with the additional challenge of identifying the sequence.

Watch Out For:

Pupils may have trouble differentiating between squares and rectangles. Since most of the real-life examples of these shapes will be three dimensional, they may also struggle to see a 2-D shape in a 3-D shape. At this point you should explain that the 2-D shape you are looking for is only one of the sides of the 3-D shape, without getting into the details of what a 3-D shape is.

Also, when starting patterns, use verbal cues to help pupils understand what they should be looking for. As the class progresses, help less and less.

This Pairs With:

Math Lab 1 page 60 to 68.

Make Sure You Have:

Foam sheets	Objects or pictures that can be used as examples of shapes
Scissors	A4 sheets
Basket	Small objects that can be thrown
Chits	

If They are Struggling:

Encourage pupils to use their sight and their touch to identify shapes. Highlight the characteristics of each shape verbally and allow them to try and apply these descriptions to the shapes before them. They will also benefit from being asked to observe the similarities and differences between shapes on their own. When working with patterns, have them describe what they see out loud, as verbalising will help sharpen their observations, and remind them that all their observations are valuable.

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 level 4 or above, move on to the next activity.

Let's Begin

Ask the pupils if they know what a shape is. Allow them to have a class discussion for a couple of minutes to compare ideas, as they will likely have some prior knowledge of shapes. Then, ask them if they can name any. Ask them to raise their hands, and when you call on them, have them name their shape, and draw it on the board. If they make any mistake, help them correct it. Do not add any shapes to the board even if the ones taught in the unit are missing. Once they have put all the shapes they know on the board, ask them if any of these shapes look like anything that is found in real-life. Be sure to use the words "look like" so that they know you are not looking for exact matches, but rather resemblances. Encourage them to be creative with their examples, and make sure they know they are not limited to objects only in the class. If they are stuck, give them some interesting examples to get them going. If there is a triangle on the board, ask if any of them have a cat at home. Then ask, what shape do his or her ears look like?

SLOs6.1
i**Activity 1**
8 min*This pairs with Math Lab pages 51 to 54*

Show cut-outs of 2-D shapes to the students in turn, asking students to describe them in their own words. Introduce any vocabulary that they do not use. Encourage them to hold each shape and run a finger along the outer edge, counting the sides and then the vertices. Name each shape and compare their properties. Let them observe similar shapes in various orientations/environment.

6.1
ii
iv
v**Activity 2**
15 min*This pairs with Math Lab pages 60 to 63*

Draw all four shapes on the board and write their names below. Give pupils a very basic description and be sure to point out that the difference between a square and a rectangle is that a square has equal sides. Give each pupil a piece of foam paper and a scissor, and ask them to choose any shape they like, and cut it out. Then ask some of them why they chose that shape. This will lead to the children describing the shapes. They might say "I like the circle because it's different" at which point you should ask what makes it different, or they might say "I like the triangle because it is the only one with three sides". Make note of all the differences they point out on the blackboard. Do not initially tell them that you are looking for differences, just let them tell you what stands out to them. At the end of this activity, ask them to copy these down, making sure the number of corners and sides are mentioned for each shape. Keep the foam shapes for later.

Let's try it

The following exercise is to be done in silence. Tell the pupils that you will be reading out some characteristics of each shape, and they should make note of which shape they think you are talking about. So, if the first thing you say is "This shape only has no corners", they should write down circle. If you say "this shape has two longer and two shorter sides" they should write rectangle. Be sure to use number of corners and sides as characteristics and tell the class beforehand that square and rectangle might both be the right answer for some questions.

Let's Pause

The square and the rectangle are both quadrilaterals, meaning they have four sides. The circle is the only shape out of the above that is not a polygon because it is curved. Explain to the pupils that counting a shape's sides and corners is always crucial when identifying it. Tell them that comparing the length of its sides, as one does to tell the difference between a square and rectangle is secondary, and only needs to be done if two shapes have the same number of sides and corners.

Assign at least 5 minutes of classwork from the textbook.

SLOs

6.1
i
iii

Activity 3
20 min

Take the class to an area where there are plenty of identifiable 2-D shapes, if there are not in the class. Be sure to explain to them beforehand how to spot a 2-D shape on a 3-D shape. For example, a book can be a rectangle, and the rim of a glass can be a circle. If necessary, add more objects to the play area that they can use. Then make groups of 5 to 7 pupils and ask them all to play. I spy, with shapes. So, if a pupil says, "I spy, with my little eye, something triangle shaped", the other pupils in his or her group will have to guess which triangular object they are talking about. These can even be pictures, if objects are not available. A poster of a slice of pizza could be identified as a triangle. Tell them that it is against the rules to use the same object that another group member has previously used.

Let's Pause

If the pupils are having trouble distinguishing between squares and rectangles, remind them about how they learnt to measure with non-standard units. If they want to be sure, they can use their hands and figures to ensure something really does have equal sides before calling it a square.

Refer to If they are 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	If pupil is below 3 use Math Lab
	Number of Pupils						

6.2
i
ii

Activity 4
15 min

This pairs with Math Lab pages 65 and 66



Ask the pupils which shape they think should come after the last triangle. Be clear that you are asking which shape should logically come after, and not which shape they personally feel should follow. After they say circle, draw another pattern on the board alternating any 2 shapes, and ask them to add 4 more shapes. Once they get comfortable with the concept, explain to them that completing the pattern is all about identifying what rules are already in place. The next pattern you give them should still only involve 2 shapes, but the pattern should be slightly more complicated, and longer. Perhaps something like this:

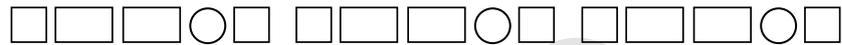


Instead of immediately asking them what comes next, first ask them if they can identify the rules of the pattern, and then ask them to add six more shapes. Gradually increase the number of shapes, and the difficulty. Once they are comfortable with having up to 3 shapes in one pattern, give them each an A4 sheet and ask them to draw two of their own patterns.

Tell them they must use 2 to 3 shapes, and they must draw the first 25 shapes of their pattern, leaving space for 10 more shapes to be added. Once they have done this, shuffle the worksheets so they can solve each other's puzzles. Make sure they put their initials on the sheets before you shuffle, so that if a pupil gets stuck, the creator of the pattern can help.

Let's try it

Draw patterns on the board, and let the pupils copy them down and continue them. Here are some examples of patterns you can use:



SLOs

6.3
i

Activity 5
10 min

This pairs with Math Lab pages 67 and 68

Place a basket in the middle of the class and give pupils small objects that they can throw into it. Ask every pupil to take turns throwing the objects. Make sure they are not heavy or bulky so that no one gets hurt. After every object is thrown, ask the class, if it is inside or outside the basket? Did it go above or below the top of the basket? Is it far or near? Let each pupil have a turn before picking up the scattered objects so that you can discuss their positions as compared to each other. Are they far or near each other? Did any of them land on a desk, and become above the rest? This activity will help pupils understand spatial positions as a concept.

Let's try it

Write the following words on the board; inside, outside, above, below, over, under, far, near, before, after. Ask the pupils to help you write what they mean on the board. Help them if they get stuck by pointing out examples. After all the meanings are written, ask for one example for each word in a real-life situation. For example, when you stand at the front of the class, the front row of desks comes before the second, or the desks are under the ceiling. Have them copy this down and come up with their own personal examples for each word.

**Let's
Pause**

The words above and below may seem interchangeable with over and under, and in some cases, they might be. However, there are some differences. If something is touching or covering another, you use over and under: pour the cream over the pie. We also only use these in reference to numbers, like there are over a hundred pages in this book, as opposed to there are above a hundred pages in this book. Above and below are generally used to indicate objects that are on a higher or lower level, like her office is six stories above the ground.

Assign 20 minutes of textbook questions, asking pupils to do at least 5 minutes in class and take the rest home as homework.

Let's talk math

Ask the pupils if they thought this unit was different from the other units. Lead them to the realisation that they barely used numbers throughout this unit. Ask them if they think maths must involve numbers. Explain at this point that shapes and patterns are also parts of math and remind them that they do involve numbers even if numbers are not the focal point of the unit. Explain to the class that math is a way of understanding the world, and since shapes and patterns can be seen everywhere, they will naturally be studied in math. Allow 5 minutes for this discussion.

Let's get practical

Fill the basket from Activity 4 with chits, each of which will have a square, circle, rectangle, or square drawn on it. Ask each pupil to pick out a chit and identify the shape on it. Ensure that there is an equal number of each shape, if possible. Let each pupil pick out the foam shape to match their chit (make extra in advance if necessary), and tape them to the back of their shirts. Tell them that they are now in teams based on shape.

Lead them outdoors and tell them the rules of the game. You, the teacher, will shout call the name of one of the four shapes. All the pupils will proceed to run from that shape, in a tag style game, until the teacher says stop. At this point all shapes will freeze where they stand. They will be able to move, but only where they stand. Those who were tagged will have to step to the side and will be given 1 minute, on a timer, to try to use any 5 of the keywords (inside, outside, above, below, over, under, far, near, before, after) to describe any of their surroundings. If they can do it in one minute, they may rejoin the game, if not, they must wait till the next try. After they have all had a chance, restart the game by calling out a different shape name that everyone will have to run away from. If the pupils are struggling to use the keywords, and not being able to rejoin the game, give them some ideas while they their peers chase each other.

Self Assessment

6.1 Two Dimensional (2-D) Shapes

6.2 Patterns

6.3 Position

Refer to If they are 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	If pupil is below 3 use Math Lab
	Number of Pupils						

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 is the difference between a square and a rectangle?
 - a) A rectangle has three sides while a square has four
 - b) A square is longer on one side while a rectangle is equal on all sides
 - c) None of the above
- 2) What are the next shapes in the following pattern?
○ ○ □ ○ ○ □ ○
 - a) ○ □ ○
 - b) □ ○ ○
 - c) ○ ○ □
 - d) None of the above
- 3) Fill in the blank. All the pupils are _____ the ceiling.
 - a) Under
 - b) Below
 - c) Both

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NEW

COUNTDOWN

BOOK 1

Lesson plans to be used in conjunction with the
New Countdown book series.

Features of the Lesson Plan

The lesson plan contains the following features. The headings through which the teachers will be led are explained as follows:



Suggested Time Frame

Timing is important in each of the lesson plans. The guide will provide a suggested time frame. However, every lesson is important in shaping the behavioural and learning patterns of the students. The teacher has the discretion to either extend or shorten the time frame as required.



Learning Curve

It is important to highlight any background knowledge of the topic in question. The guide will identify concepts taught earlier or, in effect, revise the prior knowledge. Revision is essential, otherwise the students may not understand the topic fully. The initial question when planning for a topic should be how much do the students already know about the topic? If it is an introductory lesson, then a preceding topic could be touched upon, which could lead on to the new topic. In the lesson plan, the teacher can note what prior knowledge the students have of the current topic.

Each topic is explained in detail by the author in the textbook supported by worked examples. The guide will define and highlight the specific learning objectives of the topic. It will also outline the learning outcomes and objectives.



Real-life Application

Today's students are very proactive. The study of any topic, if not related to practical real-life, will not excite them. Their interest can easily be stimulated if we relate the topic at hand to real-life experiences.



Frequently Made Mistakes

It is important to be aware of students' common misunderstandings of certain concepts. If the teacher is aware of these they can be easily rectified during the lessons. Such topical misconceptions are mentioned to support teachers.



Summary of Key Facts

Facts and rules mentioned in the text are listed for quick reference.



Suggested Activities

This teaching guide provides you enough hands on activities for making your lesson plan more interesting and engaging. These activities will have more impact on students' learning.



Model Lesson Plan

Planning your work and then implementing your plan are the building blocks of teaching. Teachers adopt different teaching methods/ approaches to a topic.

A model lesson plan is provided in every unit as a preliminary structure that can be followed. A topic is selected and a lesson plan is written under the following headings:

Topic

This is the main topic/sub-topic.

Duration

The suggested time duration is the number of periods required to cover the topic. Generally, class dynamics vary from year to year, so flexibility is important.

The teacher should draw his/her own parameters, but can adjust the teaching time depending on the receptivity of the class to that topic. Note that introduction to a new topic takes longer, but familiar topics tend to take less time.

Specific Learning Objectives

This identifies the specific learning objective/s of the sub-topic being taught in that particular lesson.

Key Vocabulary

List of mathematical words and terms related to the topic that may need to be pre-taught.

Resources: Teaching and Learning Aids (Optional)

This section includes everyday objects and models, exercises given in the chapter, worksheets, assignments, and projects.

Strategy

Starter: Engagement Activity

The lesson can begin with something interesting, such as telling a story, relating a real-life experience or an everyday event which may or may not lead to the topic; but is interesting enough to capture the attention of the students. Involving students in a discussion to find out how much knowledge they have of the topic being taught is also a good strategy. Teachers can use their own creativity to come up with ideas to create a sense of fun.

Main Developmental Activity

Learning needs to start with practical activities, therefore the main developmental activity is the first step that leads to actual learning, which in turn leads to the required outcome of the lesson. This activity can be planned as individual work, pair or group work as per requirement. Working individually creates self-confidence where the child enjoys a sense of self-achievement, whereas pair and group activities create a sense of discovering and learning together.

These activities enhance concentration and improve retention of memory. Through these activities the teacher can build understanding of concepts in a fun-filled way. It is easier for students to grasp the concepts and then move from abstract to concrete.

Written Assignments

Finally, written assignments can be given for practice. It should be noted that classwork should comprise sums of all levels of difficulty, and once the teacher is sure that students are capable of independent work, homework should be handed out. For continuity, alternate sums from the exercises may be done as classwork and homework.

Supplementary Work (Optional): An activity or assignment could be given. It could involve group work or individual research to complement and build on what students have already learnt in class.

The students will do the work at home and may present their findings in class.

Wrap up

At the end of each sub-topic, a wrap up should be done using various strategies. For example, a quick question and answer session involving the whole class, challenging students with a question to check their understanding of the concept taught.

1

Whole Numbers



Suggested Time Frame

8 to 10 periods



Learning Curve

In the previous class, the students have learnt to count and write numbers up to 50 in words and numerals. They learnt to identify the numbers before, between, and after the given numbers. They can also compare and order a given set of number. The concept of 0 as a place holder is brought in at this level.

In Unit 2, they will learn counting, reading, and writing numbers up to 100. The number sequence revises the learning of ascending order, descending order, greater than, smaller than, and use of symbols (<) and (>) with two digit numbers. Earlier, students have learnt skip counting in 10s. In this unit, they reinforce their knowledge of skip counting and count in 2s beginning with an even number and then with an odd number.

They will learn

ordinal numbers up to 10.



Real-life Application

We use numbers in time, date, year, and months. Numbers are used at home, in school, in the playground, and for the addresses of the houses. They are found on phones, TV channels, and in books as page numbers. Doctors use numbers in their medicine doses and results of laboratory tests. In fact, they play a major role in our lives. Engineers use them in the planning of buildings, bridges, high scrapers, and different types of machines.



Frequently Made Mistakes

- Get mixed up when converting ones into tens and vice versa
- Skip the numbers while counting the objects.
- Get mixed up in ascending and descending order.



Summary of Key Facts

- Numbers can be represented in words and figures.
- A number is a mathematical term used to count, measure, estimate, and label.
- Zero is defined as a number.
- The actual value of numbers is determined by their placement in a place value chart.
- Numbers can be compared, and ordered in ascending and descending manner, and can be backwards.
- There are symbols to show greater and smaller numbers.
- Ordinal numbers are used in positioning objects.



Model Lesson Plan

Topic

Comparison of two-digit numbers

Duration

80 minutes

Specific Learning Objectives

By the end of the lesson, students shall be able to:

- compare two or more sets of objects in terms of their number.
- differentiate between the terms greater than, smaller than, and equals to.
- identify more, less, or equal numbers in a set of numbers.
- identify greater and smaller numbers on a number line.
- use symbols for greater than ($>$) and smaller than ($<$).

Key Vocabulary

count, match, compare, group, greater than, smaller than, more, less, and number line

Resources

- A basket full of pebbles of equal size
- A puppet crocodile with open mouth
- A number line on the board
- A number square on the board

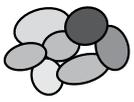
Strategy

The students should have a prior knowledge of the relationship between numbers and quantities. They already learnt the concept of bigger and smaller to compare the size of objects.

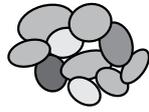
Now, give them a verbal description of bigger and smaller numbers relating to the quantities with the help of materials like beads, pebbles, or small stones.

Engagement Activity (10 minutes)

Heap two different numbers of pebbles or beads on the table. Ask them to identify the greater quantity without counting. Obviously the bigger heap will have the greater number of pebbles.



7 pebbles



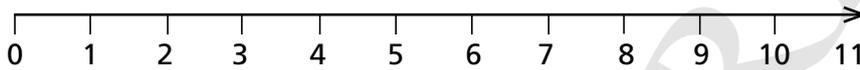
10 pebbles

The bigger heap has the greater number of pebbles; i.e 10 is greater than 7

Explain the idea using a number line.

Main Developmental Activity (40 minutes)

Draw a number line. Taking different numbers on the number line, tell the students that a number closer to zero is smaller than a number farther from zero. Give the students a few examples on the number line, like 7 and 11.



7 is closer to zero as compared to 11 which is farther away from zero. Hence, 11 is greater than 7 or 7 is smaller than 11.

Give similar examples to enhance students' understanding.

A number strip can also be used in place of a number line.

At this stage you can introduce the symbols of greater than ($>$) and less than ($<$) by using a common yet interesting activity of a hungry crocodile. The open mouth of hungry crocodile is always towards the greater number. Therefore, $7 < 11$ or $11 > 7$

2

Addition



Suggested Time Frame

8 periods



Learning Curve

The students already have the concept of addition by making one more and two more through counting of objects. They can do single digit addition through pictures and numbers. They can perform single digit addition using number line also. They have the idea of addition with 0. They are able to make stories of 10. They are familiar with the symbols of + and =.

In unit 3, students will practice using symbols of addition and equality. At this level they will learn to add two-digit numbers with one-digit numbers and addition of two-digit numbers with 10s. They will learn addition of 2 two-digit numbers and three two-digit numbers. They will identify the missing numbers that sum up to 20. They will be guided to develop mental maths strategies and encouraged to solve real-life problems involving addition.



Real-life Application

Basic addition has been with us from infancy. Addition is the term used to describe adding two or more numbers together. The skill to 'add up' is important in all aspects of life. We can use addition to solve subtraction problems because subtraction is the inverse operation to addition. As students build understanding about addition, it is important that they associate their knowledge with daily life experiences like:

- number of family members and friends
- number of toys, dresses, books, shoes, and different objects around them
- counting the small amount of money they have as their savings
- using their fingers to add and subtracting two numbers



Frequently Made Mistakes

- Write numbers incorrectly.
- Unable to represent numbers along a straight line, vertically under appropriate place value.
- Write wrong numbers as a result of carelessness.



Summary of Key Facts

- Numbers can be compared using operation of addition.
- Symbols used for addition and equality are + and = respectively.
- Number line can be used for comparing and adding the numbers.
- Addition equations are constructed to find the total or missing number in an addition sum.
- Numbers are commutative with respect to addition i.e. numbers can be added in any order.
- When we add 0 to any number, the number remains the same.
- When 1 is added to any number, the sum is the next number.



Model Lesson Plan

Topic

Addition of two-digit numbers

Duration

80 minutes

Specific learning objectives

By the end of the lesson, students shall be able to:

- add two-digit numbers with 10s.
- add 2 two-digit numbers without carrying forward.

Key Vocabulary

add, compare, vertically, horizontally, group, up to, how many, altogether, more, sum, answer, abacus

Resources

- Fishing game (prepared by the teacher by cutting out the fish from chart paper, sticking a jam clip at one side of the fish and a rod tied with a magnet at one end)
- A fish bowl

Strategy

Teaching addition to small student follows the following pattern:

- Concrete objects
- Pictures only
- Pictures and numbers
- Numbers only

Once the students are able to deal with numbers, they move from horizontal calculation to vertical calculation and then to story sums and word problems.

Students love stories. If the real-life situations are told to them as stories, they pick them with better understanding level. They also love to make their own stories.

Engagement Activity (10 minutes)

You can start with the fishing game, making a story as given below:

'I had 5 fish in my fish bowl. On my birthday, my friend gave me three more fish. How many fish do I have now?' Ask the same question with different numbers of fish.

Main Developmental Activity (40 minutes)

In a fish bowl you will drop 5 fish and then 3 more fish. Now you will count by taking them out one by one with the help of a magnetic rod. Now there are 8 fish altogether. The key word 'altogether' should be emphasised and explained here. Numbers will be chosen according to age level. If they sum them correctly, it means they have understood the concept clearly. Repeat the activity several times by calling students to perform on their own.

Adding two-digit numbers with 10s can be easily taught by using some straws. Make two bundles of 10s with straws along with some loose straws. Now write $10 + 12$ on the board. Place one bundle of ten straws on the table. Take another bundle and add two more to make it 12.

Now you have two tens and two ones making the sum 22. Write a few sums on the board.

$12 + 14$, $10 + 9$, $10 + 11$, and $15 + 16$

Divide the class into four groups. Call the groups one by one to find the sums using straws.

3

Subtraction



Suggested Time Frame

8 to 10 periods



Learning Curve

The students have learnt the concept of one less through objects. They have learnt single-digit subtraction through pictures, numerals, and on a number line. They have been given the concept of subtraction with zero. They are familiar with the use of symbols – and =.

In this unit they will learn to find how much a number is smaller than another number. They will learn to subtract one and two-digit numbers without borrowing. They will be able to find a missing number in a subtraction sum.



Real-life Application

Subtraction is a part of our daily life. We use subtraction when dealing with money, travelling, cooking, and many other daily experiences. Some real-life experiences include:

- going to the shop and buying something
- borrowing or lending something
- giving discounts
-



Frequently Made Mistakes

- Writing down the wrong numbers or perform the wrong operation, as a result of carelessness.
- Make error in recalling basic number facts.
- Do not know how to proceed and provide random responses.



Summary of Key Facts

- Subtraction is removing some objects from a group.
- If zero is subtracted from a number, the result does not change.
- Any number subtracted from itself results in zero.
- For subtraction we count back.



Model Lesson Plan

Topic

Subtracting tens from two-digit numbers without borrowing

Specific Learn Objectives

By the end of the lesson students will be able to:

- Subtract tens from two-digit numbers.
- Subtract a two digit number from another two-digit number.

Duration

80 minutes

Key Vocabulary

subtract, minus, take away, smaller or greater, compare

Resources

Grid chart 1 to 99, objects in group of tens

Strategy

Engagement Activity (10 minutes)

Display an empty number grid chart 1 to 99 on the board. Ask the students to count the numbers backwards from 99 to 1 and keep on filling the grid.

Main Developmental Activity (40 minutes)

Now the teacher moves step by step from 10 and goes up to 20 and its family from 20 to 29, followed by 30 up to 39, and so on till 99. All this facilitates working with subtraction sums.

Take three bundles of 10 straws each and ask them how many straws they are, as they have already learnt counting in tens. Now take one bundle away and ask how many bundles are left. There will be two bundles left. Tell them it makes 20. Explain the same result on number grid by colouring numbers 1 to 30. Show them that 30 makes three groups of 10s. Now cross out the numbers counting backwards from 21-30. Tell them that left over numbers are 1-20 i.e. two groups of tens. Tell them that subtracting tens from tens is as easy as subtracting 2 one-digit numbers. We only have to write zero on the ones place.

After repeating the subtraction of tens several times, you can proceed to the subtraction of two-digit numbers.

Start with the same straws, this time you will take some loose straws also to make numbers with tens and ones. Suppose you take one set of two tens and two loose straws making 22 and another set of one tens and one loose straws making 11. Now colour 1-22 on the number grid. Cross out 11 grids counting backwards from 22. The remaining grids will be the result.

Subtraction can be done on an abacus also. Suppose 25 is subtracted from 47. Display 47 on abacus putting 7 beads on the ones place and 4 beads on the tens place. Now take out 5 beads from ones place and 2 beads from tens place leaving 2 beads on the ones place and 2 beads on the tens place making 22.

A great deal of physical subtraction of two-digit numbers is required with all the aids (using the objects in groups of 10 and ones) before working in the notebook.

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4

Measurement

Comparison



Suggested Time Frame

2 periods



Learning Curve

The students already know differences through simple vocabulary, defining the differences, such as long and short, fat and thin, and big and small.

Here, they carry on this visual concept to order or sequence for example, big, bigger, biggest; thin, thinner, thinnest; and so on. They learn to place these objects in order of size, based on the order of numbers learnt in previous classes. They learn to identify the sizes as which will come first then next and so on.

Students' activities during the day are also placed in order, for example, wake up, brush the teeth, take a bath, put on clothes and leave for school. On return from school, the order is different; change clothes, wash hands, say a prayer, have lunch. Let us take an example of an activity, like going to the market to buy a pair of shoes, get into the car, drive to the market, look for shoes, choose shoes, pay money, get into the car, and get back home. Such activities help understand situations in everyday life.



Real-life Application

Students will be able to compare the size, length, height, heaviness, and lightness of the objects which we use in daily use.



Frequently Made Mistakes

- Get confused when ordering the three sizes of the objects.
- Error with the concept of long and tall.



Summary of Key Facts

- The size of objects is termed as big, bigger, and biggest.
- The vertical distance between two points is known as height.
- The horizontal distance between two points is known as length.
- The quantity of liquid a container can hold is known as its capacity.



Model Lesson Plan

Topic

Putting things in order

Duration

80 minutes

Specific Learning Objectives

By the end of the lesson the students will be able to compare objects to identify light, lighter, and lightest.

Key Vocabulary

mass, heavy, light, lighter, lightest

Resources

Objects of different weights

Strategy

Engagement Activity (10 minutes)

Ask them to mention biggest fruit among, a mango, an apricot, and a water melon.

Main Developmental Activity (40 minutes)

Show them a school bag and a book and ask which one is light? The book is light and school bag is heavy. They will differentiate between light and heavy. Now ask them to mention any object which is lighter than the book. Suggest a few objects, like a pencil, a pen, an eraser etc.

Suppose they select a pencil, now ask another object lighter than a pencil, say they select an eraser. Now ask them to arrange the selected objects in order; heavy, light, lighter and lightest as below:

School bag, book, pencil, eraser

Suggest a few more objects to arrange in ascending order of mass as given below.

- a car, a bus, and an airplane
- sacks of sugar of mass 1 kg, 2 kg, and 3 kg
- a tennis ball, a football, and a basketball
- 10 pebbles, 20 pebbles, and 30 pebbles all of same size

Length, Mass, and Capacity



Suggested Time Frame

6 to 8 periods



Learning Curve

Students have learnt about tall and short; long and short; long, longer, and longest etc. They are also familiar with many words in their daily life, such as length of cloth, height of a child, distance from home to school, etc. which mean the measurement of length. Now they will learn about the actual measurement tools like metre rule measuring the length in metre.

In their everyday life, students are familiar with many words, such as heavy bag, light bag, so many kilos of fruit or vegetables, etc. which indicate weight. Slowly, they discover that the lighter object is not necessarily the smaller one.

Students get a fair idea about capacity by playing with different containers, filling them with sand, clay, and water. Vocabulary, such as full, empty and half-full, is applied to various containers. A bucketful of water, a spoonful of medicine, a cupful of hot chocolate, etc. are the phrases give space students are familiar with in their daily life. Situations, such as the petrol tank of the car gets 20 litres of petrol in it, the bathtub is filled with 50 buckets of water, and the bottle has 1 litre of soda, are discussed. Also, comparative capacities, such as 'will a narrow, tall glass hold more water than a flat, wide one?' are also discussed. With practical work, student understand that the word capacity refers to the amount of liquid a container can hold.

Measurements play an important role in our lives. People use units of measurement frequently in daily life. For example, cooking, taking medicines, purchasing cloths, weighing the grocery, measuring liquids like juices, milk, and oil etc.



Summary of Key Facts

- There are different properties of things that can be measured, such as distance, weight, temperature, volume, and capacity etc.
- Units for length are km, m, cm, and mm.
- Units for weight are kg, g, mg.
- Units for capacity are l, ml.



Frequently Made Mistakes

- Get confused when selecting an appropriate unit of measurement.
- Have improper hand control in measuring wavy lines.
- Make errors when in measuring objects.



Model Lesson Plan (Length)

Topic

To measure curved lines

Duration

60 minutes

Specific learning objective

By the end of the lesson, students should be able to measure the length of a curved line using a string.

Key vocabulary

curve, straight, string, measure, and piece

Resources

Metre rule, pieces of strings, cards with a rainbow drawn on it.

Strategy

Engagement Activity (5 minutes)

Ask the students to measure their hand span with a ruler.

Main developmental Activity (30 minutes)

Reinforce the concept of measuring a straight line with a ruler or metre rule. Now draw a curvy line on the board and try to measure it with a ruler. The students will see that it is not possible with a ruler only. Tell them that to measure a curved line, we need a string and a ruler. Take a piece of string and measure the curved line by putting the string along the curved line. Put one end of the string on one end of the line moving along the line take the string to the other end of the line. Mark the string at this end. Now measure this length with a ruler. The length of the string will be the length of the curved line.

5

Money



Suggested Time Frame

4 periods



Learning Curve

Students get their first idea of money from their shopping expedition with adults. They realise that in exchange of currency notes and coins, they are able to buy a whole lot of things. In this unit, they will identify the coins and notes. They will learn about the different denominations of Pakistani currency. They will also learn to add and subtract the money.



Real-life Application

Money is used in all aspects of life. It is used when shopping and paying for things, such as rent, medicine, fees, utility bills, food, phones, and school supplies. Other applications of money include:

- Counting the total value of items
- Investing in business
- Phones
- Using in market to pay for different objects

A play shop could be set up for the student where they buy play products (such as plastic fruits and vegetables, toys, books, pencils, crayons, pencil boxes, etc.) using play money.



Summary of Key Facts

- Money is used to pay for goods and services.
- Money is usually in the form of coins and bank notes.
- Different countries use different currencies.
- Paper money was made in China over 1000 years ago.



Frequently Made Mistakes

- Get confused when working with different denominations of currency.



Model Lesson Plan

Topic

To determine whether enough money is available to make a purchase.

Specific Learning Objective

Students will be able to exchange sufficient currency for purchasing different goods.

Duration

80 minutes

Key Vocabulary

currency, notes, coins, denomination, price, price tag, shopping, buying and purchase

Resources

Objects with price tags, fake notes, a shopping area arranged by the teacher

Strategy

Engagement Activity (10 minutes)

Call students together. Ask them to think about times they have received money. Students may talk about birthday or holiday gifts. They may also mention allowances. Try to guide the conversation to a time when someone was providing a good or service. Ask students to think about different goods and services people pay for, like hospitals, playlands, garbage collectors, guards, etc. Help students to think about all the different ways people spend their money.

Main Developmental Activity (30 minutes)

Explain to students that one thing people need to buy is food. People go to a grocery store or farmer's market to buy this food. Today, students will be using some fake currency to purchase some food in the class market.

Next, ask a student to go shopping with you. Show students some items with price tags. Ask the student which two items you should buy. Guide the students through the process of adding the prices together and locating the correct amount of money.

Pretend to be the store owner. Help the students to practise the conversation of asking how much something costs, paying for it, and getting any change. There can be a situation when a student does not have enough money to buy the desired items. Guide the students to understand that she/he can not make a purchase.

Repeat this process with students several times until the class seems to understand the pattern of choosing items, determining the proper amount of money, and paying for the items.

This process should be repeated several times with different students taking turns as the storekeeper and shopper. Whenever possible, allow fellow students to assist with corrections or provide information when some students are stumped.

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6

Time



Suggested Time Frame

4 to 5 periods



Learning Curve

Students have learnt about hour and minute hand on an analogue clock. They can tell o'clock and half past time. Now they will learn to read time from a digital clock.

In the previous grade, they have learnt the names of the months and number of days in each month. Now, they will learn to interpret the information from a calendar by finding the name of the day on a particular date, and vice versa using a calendar.

Students get an opportunity to interact with clocks and time from early years. They see it at their home, in school, and at shopping places etc. They are familiar with school time, home time, lunch time, bed time, and play time etc. Along with learning to read time they will also learn the importance of time in their lives. They will be able to manage different events and practice to be regular and punctual.



Real-life Application

Knowing about the names of the days of the week can be useful in various ways in our daily life. We can be more organised to plan our work for the days ahead. All types of appointments, occasions, and functions are mentioned with date and day.



Frequently Made Mistakes

- Get confused in hour hand and minute hand.
- Make errors in matching the dates and the days.



Summary of Key Facts

- The units of time are hour, minute, and second.
- Time is different in different parts of the Earth.

- There are twelve months in a year.
- All months have 30 or 31 days except February which has 28 days and every 4th year 29 days which is called a leap year.



Model Lesson Plan

Topic

Time

Duration

40 minutes

Specific learning Objective

They will be able to identify the day which comes after and before a particular day, using a calendar.

Key Vocabulary

calendar, week, days, and dates

Resources

Enlarged page of calendar, flash cards with names of the days, current year calendar

Strategy

Engagement Activity (10 minutes)

Tell them that tomorrow you have an appointment with your dentist. Ask them what day it would be tomorrow? If you receive a correct answer appreciate them and tell them that names of the days play an important role in our daily life.

Main Developmental Activity (20 minutes)

Display three flash cards with days' names and ask them to call out the names of the days which are missing. Display the names of the days in order.

Show them a calendar explaining how the days are displayed in each month and how they can find the corresponding day for a particular date.

Now put the enlarged page of the calendar on the board and ask different questions. Like, which day comes after Tuesday, What is the day on 25th of the month, what is the day before 7th of the month?

Shapes



Suggested Time Frame

4 to 6 periods



Learning Curve

In previous years, students have built a well-developed base of several shapes i.e cube, sphere, cone, cuboid, ovoid, cylinder, square, rectangle, triangle, circle, pentagon, hexagon, and octagon. They can identify the shapes, name them, and relate them with real-life objects, and match the shapes with their names. In Book 1, they will be introduced to octagon, nanogon, and decagon identifying their number of faces. They will learn about pyramid and prism through solid models. They will know about the base and number of faces of the pyramid and prism. They will also have basic information about the edges and the vertices of 3-D shapes.



Real-life Application

- Shapes are everywhere. All the solid things have some particular shape: Shapes in nature: sun, moon, stars, planets, and orbits.
- Shapes in daily life: books, table plate, bottle, a piece of cheese, pizza, biscuit, and ice-cream



Frequently Made Mistakes

- Confuse 2-D and 3-D shapes.
- Make mistakes in finding the number of sides and corners.



Summary of Key Facts

- 3-D shapes have faces, edges, and vertices.
- 2-D shapes have edges and corners.
- 2-D and 3-D shapes can be linked to each other.



Model Lesson Plan

Topic

Pyramid and prism

Duration

80 minutes

Specific learning Objective

The student will be able to identify:

- square based pyramid
- triangular prism
- about edges and vertices

Key Vocabulary

pyramid, flat, base, triangular, prism, edge, and vertex

Resources

Wooden shapes

Strategy

Engagement Activity (10 minutes)

Revise the names of 3-D shapes and their link with 2D shapes.

Main developmental Activity (40 minutes)

Show them wooden shapes of a square based pyramid and triangular prism. Show their faces and repeat their names. Differentiate between a pyramid and a prism.

Tell them that a solid object with two identical ends and flat sides is called a prism. Show them the prism in the book on page 145.

Tell them that a pyramid has a base which can be square or a triangle and an apex. Square based pyramid has a square base. Show them the square based pyramid in the book on page 145.

Make them recognise the edge and vertex by touching the shape.

Position



Suggested Time Frame

3 Periods



Learning Curve

Students have learnt many positional words in previous years. They can identify the position of the objects that are up/down, inside/outside, above/ below, before/after, and over/under. Now they will learn to identify the position regarding left and right.



Real-life Application

- Knowledge of positional words brushes up a child's ability to give and follow directions.
- Positional words describe the location of an object.



Frequently Made Mistakes

- Students tend to make following mistakes frequently:
- Get confused in differentiating right and left position.
- Make mistakes in identifying before and after position.



Summary of Key Facts

- Positional words describe arrangement in an order (e.g. first, second, third).
- The position of an object is also referred to as ordinal numbers.
- Positional words tell the location of an object.



Model Lesson Plan

Topic

Positional words

Duration

40 minutes

Specific Learning Objectives

By the end of the lesson, students will be able to use positional words to describe positions of objects.

Key Vocabulary

position, below, above, beside, between, inside, outside, in front of, behind

Resources

Students will bring their favorite toys which are easy to handle for them to handle.

Strategy

Engagement Activity (5 minutes)

Ask the students to name some words that tell where an object is or its position.

Listen for the responses and record them on the board. Tell students that today we will be working with words that tell position or where something is located.

Main Developmental Activity (30 minutes)

Ask the students to take out their toys and tell them they are going to play a game with the toys. Tell the students you are going to give them a set of instructions and they are to follow by putting their toys in the identified position.

Give these directions to students one at a time and allow them to complete the following actions

- Place your toy below your chair.
- Place your toy above your desk.
- Place your toy beside your book.
- Place your toy inside your bag.
- Place your toy outside your bag.
- Place your toy between your desk and your neighbor's desk.
- Place your toy in front of your friend sitting beside you.
- Place your toy behind your chair.

During this time, observe the students' actions and repeat instructions as needed.

Ask the students how positional words help them to find something. Make a list of positional words taking feedback from the students.

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MATHS WISE 1

Lesson plans to be used in conjunction with the
Maths Wise book series.

Teaching objectives

- to revise counting from 1 to 10
- to introduce a number line for counting
- to reinforce counting from 1 to 20
- to introduce the value of 0
- to introduce the concept of place values of 1s and 10s
- to introduce the numbers from 1–99 in figures and words
- to count in 10s and simple number sequences
- to introduce counting in ascending and descending order from 0 to 20
- to introduce ordinal numbers
- to reinforce the concepts of more and few
- to introduce counting in 2s

Learning outcomes

Children should be able to:

- use a number line accurately to count from 0–20
- write numbers from 0–99 in figures and words
- distinguish between sets of ten and those less than ten
- complete numeral sequences of 3 consecutive numbers
- arrange numbers correctly in ascending and descending order
- use ordinal numbers in everyday life and label up to 10 items arranged in a series
- demonstrate an understanding of more and few in everyday situations
- use a number line accurately to count from 0–20 in twos

Teaching materials:

- dice
- beads of 4 different colours
- rods to thread beads on
- lengths of string to make bracelets
- packs of straws
- 10 empty boxes
- 10 balls
- blocks with 1 to 20 written on them.
- Thermocol balls
- pencils and pencil boxes
- ping pong balls

Learning activity

Lesson 1: Number Names; Number Pyramid

40 minutes

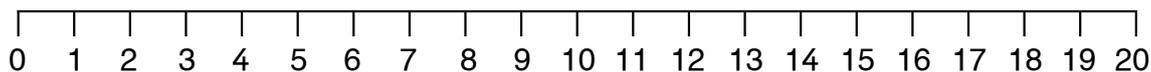
This lesson is a revision of concepts taught earlier. Give the children a lot of practice counting different objects. The children can count individually or in groups.

Task: Children attempt pages 2 and 3.

Lesson 2: Use of the number line; Numbers 1–20

40 minutes

Ask the children to count from 1–20 orally then draw a number line from 0–20 on the floor as shown:

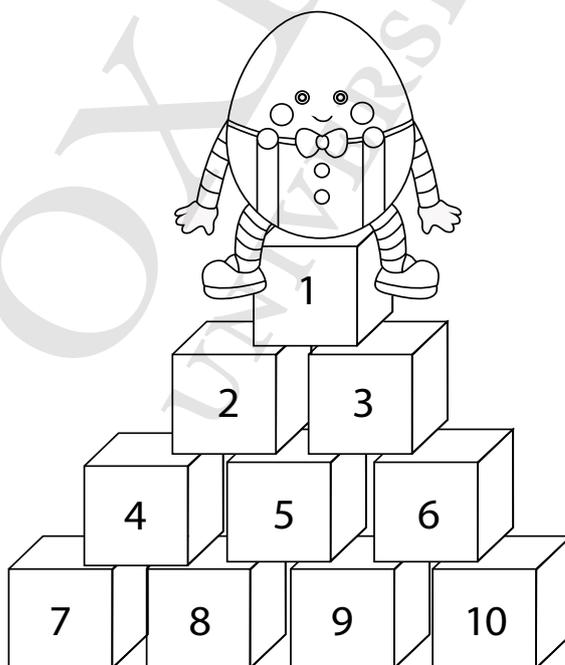


The children can play hopscotch on the number line. Call out instructions like ‘Start from 0 and move 3 steps forward. Which number do you land on?’ They call out their answers and spell out the number names. This will help revise number names and their spellings too.

Play the game ‘You Can Count on the Number Line’. The game will help to recall number names, counting, and addition.

Pair the children and give one of them a dice. The second student should stand on the number line. Ask the first child to roll the dice and call out the number on the dice. The second child moves that many places on the number line. Every time he or she lands on a new number, he or she calls out that number name. Next, they switch places and the exercise is repeated.

Seat the children in groups and give them blocks with 1 to 20 written on them. Ask them to arrange the blocks into a pyramid, first with the largest number on top, and the second time with the smallest number on top. Once they have done this, ask them questions based on the formation. For example, if Humpty Dumpty sat on the top number and fell off to HIS right, which numbers would he bounce off?



Task: Children attempt pages 4 and 5.

Lesson 3: ZERO is a hero. It can do many things; Concept of Ones

40 minutes

Explain that the value of zero is 'nothing'. Give several examples to make the concept clear. Use a set of beads with large holes and thin rods which will go through the holes in the beads. Put 10 beads on each rod. Use 5 beads of each colour, e.g. 5 red and 5 green.

Ask each student to show 5 beads. He may show any combination of colours, for example, 4 red beads and 1 green bead; 2 red beads and 3 green beads; or 5 reds beads only; or 5 green beads only. The object here is to show 'a total of 5 beads'. Ask, 'How many beads will be left if you take 5 away?' The answer is, '0'. An abacus could also be used.

Task: Children attempt page 6.

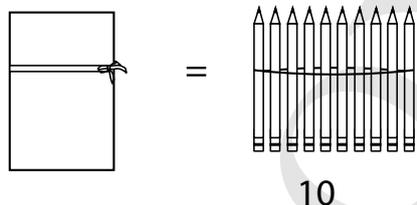
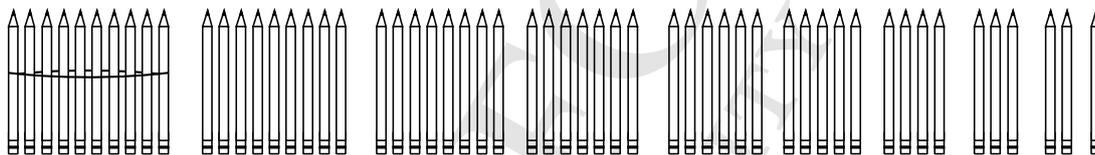
Lesson 4: 0 as place value; understanding 10

40 minutes

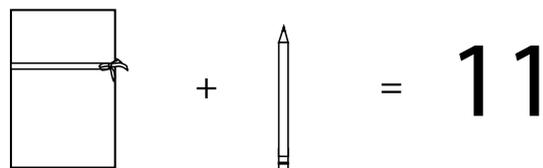
Place value is a crucially important concept introduced at this point, a clear understanding of which is essential in a child's progress in learning mathematics. It is worthwhile allocating plenty of time and activity-based practice to consolidate this concept.

Start this lesson by telling the children that we have 10 fingers to count on and 10 is 1 more than 9, 2 more than 8, 3 more than 7 and so on. Also, 10 take away 3 is 7, or 10 take away 8 is 2....

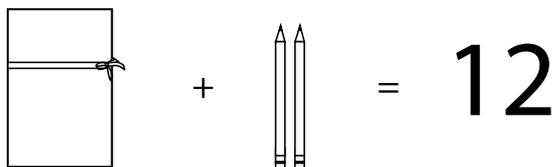
Work with pencils; put 1 pencil in an empty pencil box, then another one, and another, till there are 10 pencils in the box. The box is full; it cannot hold any more pencils. Then, explain that they are looking at 'One box of 10 pencils'.



Talk about the number 11.



11 pencils indicate one full box of 10 pencils and 1 single pencil. Explain that 11 is 1 more than 10. The pencil box is full. NO MORE PENCILS CAN GO INTO IT, so the extra pencil has to be placed beside the box. Then, place another pencil near the box.



'What do you have?' The answer will be 12 pencils. Explain that 12 means one group of 10 and 2 single pencils.

In a similar manner, work slowly with the numbers 13, 14

11 = 1 box of 10 ONES + 1 single

12 = 1 box of 10 ONES + 2 singles

13 = 1 box of 10 ONES + 3 singles

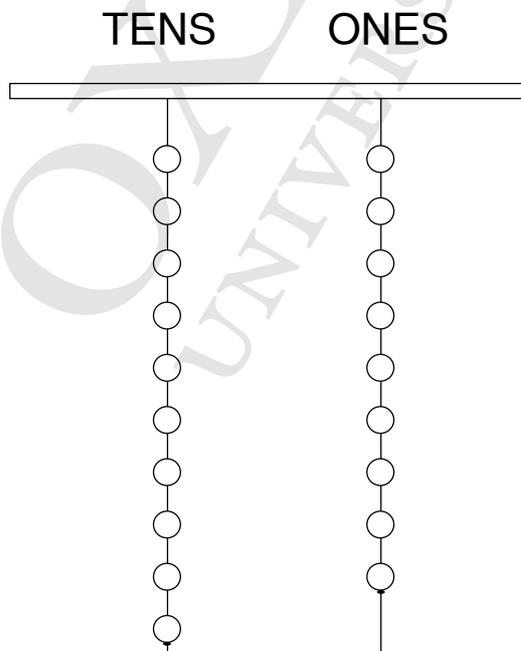
and so on.

Start with numbers from 11 to 19. You may wish to use other simple aids such as flowers in bundles of 10, packets of biscuits with 10 biscuits in each, or 10 beads in a bracelet (knot the thread, so that no more beads can go on to it). Repeat the exercise with all these numbers.

Once this concept is clear, draw a picture of a box, on the board, with '10' written on it and next to it, write 'single pencils'.

Ask the children to call out the number names and put the numbers in the right columns. Once the children are comfortable with the idea, go back to 10, and explain that 10 means 1 ten and NO ones, or ZERO ones.

You can use a rod to thread beads on, with U and T written on it, as shown here:



Give the children thermocol balls or beads. Call out a number and ask them to make bracelets containing that number of balls, with one restriction, no more than 10 balls in a bracelet. Tie a knot on the thread once the 10 beads are threaded. Help the children with tying knots.

Once the children are comfortable with the idea, move on to 20's and 30's, using 2 or 3 full boxes containing 10 pencils each, as necessary.

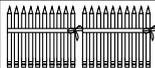
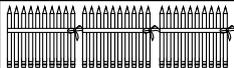
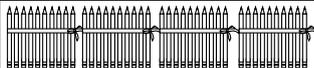
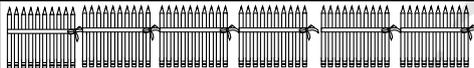
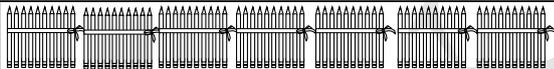
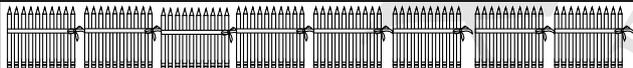
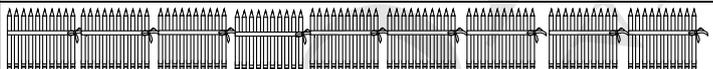
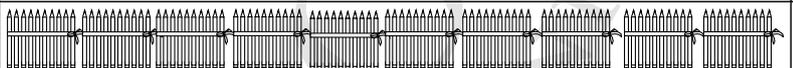
Task: Children attempt pages 9 to 13.

Lesson 5: Write the numbers shown on each abacus.

40 minutes

At this stage, the children already know the number names to twenty. They are also aware of place values and how to read them. Teaching number names can become monotonous. To avoid this, it is always better to include some hands-on activities to make the lesson interesting. The children follow your lead initially; once they know the pattern, they will be able to carry-on, on their own.

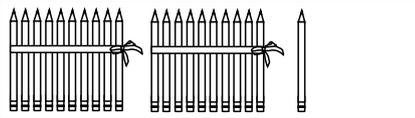
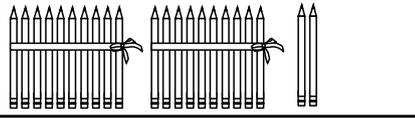
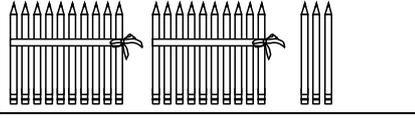
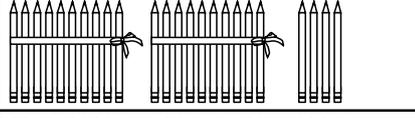
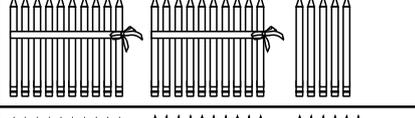
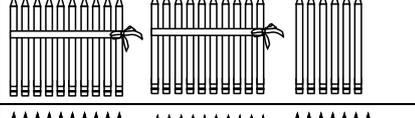
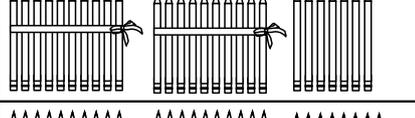
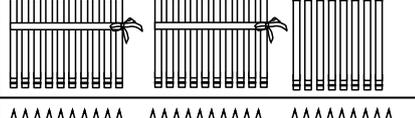
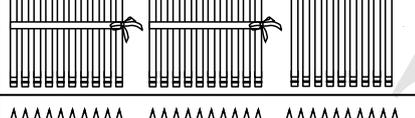
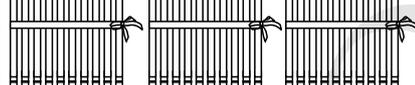
Start the lesson with a revision activity. Put the children in groups and give them some straws. Ask them to tie 10 straws together. Now call out the number names as shown:

	1 group of 10	10	ten
	2 groups of 10	20	twenty
	3 groups of 10	30	thirty
	4 groups of 10	40	forty
	5 groups of 10	50	fifty
	6 groups of 10	60	sixty
	7 groups of 10	70	seventy
	8 groups of 10	80	eighty
	9 groups of 10	90	ninety
	10 groups of 10	100	one hundred

When you get to '10 groups of 10', tie a ribbon around '10 bundles of 10 straws' and write '100 : a hundred' on a tag.

Spend plenty of time on these number names before you move on. Do each group of tens on different days.

Follow the pattern given below:

	2 groups of 10 and 1	21	twenty- one
	2 groups of 10 and 2	22	twenty-two
	2 groups of 10 and 3	23	twenty-three
	2 groups of 10 and 4	24	twenty-four
	2 groups of 10 and 5	25	twenty-five
	2 groups of 10 and 6	26	twenty-six
	2 groups of 10 and 7	27	twenty-seven
	2 groups of 10 and 8	28	twenty-eight
	2 groups of 10 and 9	29	twenty-nine
	3 groups of 10	30	thirty

Repeat the exercise with groups of 30, 40, 50 ... 90.

Task: Children attempt pages 14 to 22.

Lesson 6: Add TENS and ONES.

40 minutes

Use an abacus to show different numbers. Ask the children, 'What is the number?' When they call out the number name, ask them to spell it.

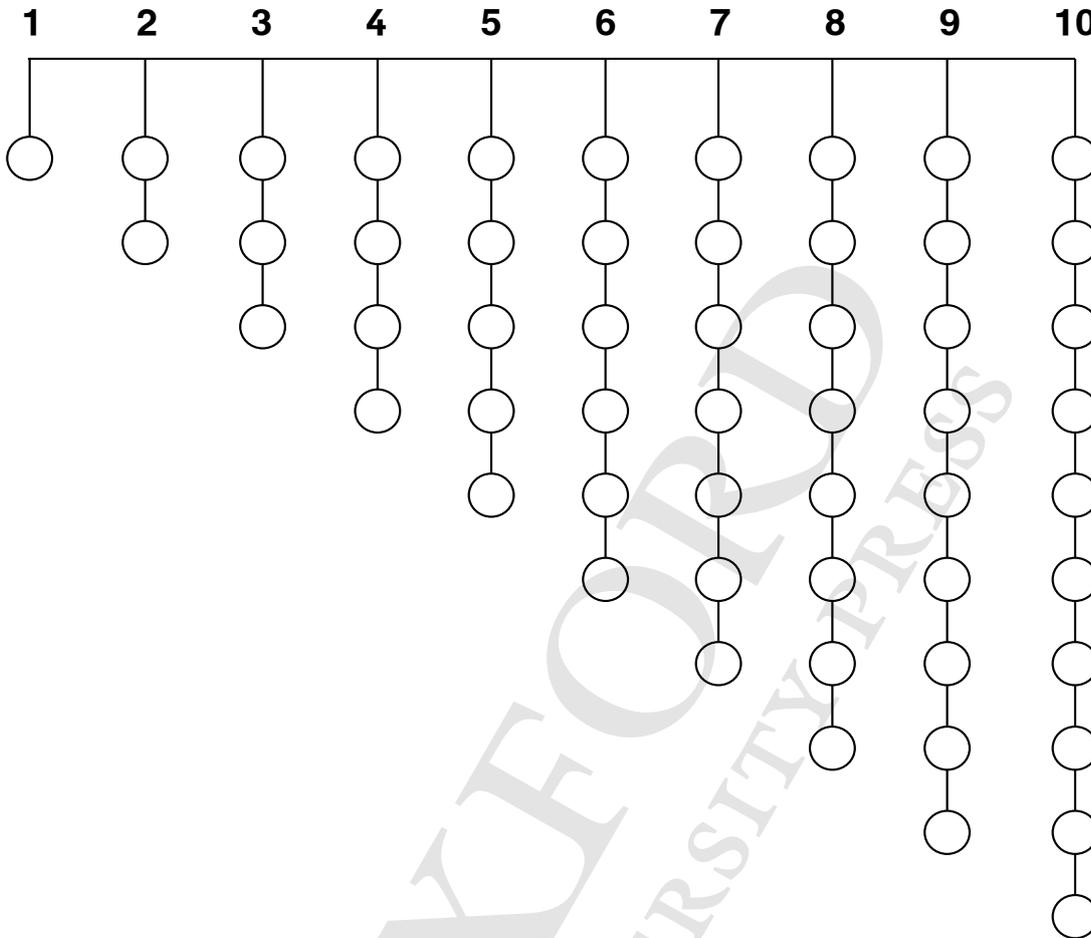
Give each child an abacus. Call out a number and ask them to show it on their abacus. Call out numbers such as '2 tens and 3 ones', and many more like this.

Task: Children attempt page 25.

Lesson 7: Use the number line..., Ascending and descending order.

40 minutes

The children are familiar with the number line; use it to introduce the idea of sequencing. Display a large number line in the classroom. Below each number hang a string of ping pong balls to represent the number. This set-up provides a quick reference to the numbers as well the quantities they signify.



Talk about ascending and descending order. Ask the children to stand in a row in ascending order of height, from the shortest to the tallest; then, in descending order from the tallest to the shortest child.

The number line with balls hanging at each point is of great use in teaching ascending and descending order. Associate this with going up and down the stairs.

Task: Children attempt pages 28 to 33.

Lesson 8: Positions

40 minutes

This is a good point to introduce ordinal numbers. Ask the children to stand in a line, for example,

- 'Shiraz first.'
- 'Ali second.'
- 'Mariam third.'
- 'Sara fourth.'

Place various toys in rows on the table, counting 1, 2, 3, 4, and 5.

Ask the children questions like: ‘Which toys are in the fourth row?’ and ‘Which toys are in the fifth row?’ Ask questions about the classroom such as, ‘Who is sitting in the first row on the left?’ and other similar questions.

Show the children a picture of the solar system. Ask them questions like, ‘Which planet is second closest to the Sun?’



Looking at a shelf of books in the classroom (or in the library) pose questions like, ‘Which is the fourth book from the left on the second shelf from the top?’ ‘Which is the first book from the right on the second shelf from the bottom?’

Tell the children the story of ‘*Grandma lost her spectacles.*’ At the end of the story ask the children to recall where she looked for her glasses first, second, and last. Take the children into the playground and let them have a race. Then ask them to say who came first, who was second, and so on.

In the playground lay out 10 empty boxes in a row; spread some small balls out too. Children take turns to play this game. Instruct them to pick up one ball and put it in the first box, when you blow the whistle. At the second whistle, 2 balls in the second box, and so on.

Children match 1st with FIRST, 2nd with SECOND, and so on. For added interest, spell FIRST as STRIF, SECOND as DONSCE and THIRD as DIRTH ...

first	5 th	thneves
second	4 th	eitigh
third	1 st	thinn
fourth	9 th	dirth
fifth	10 th	thoruf
sixth	8 th	donsce
seventh	3 rd	strif
eighth	7 th	thent
ninth	6 th	thixs
tenth	2 nd	thiff

Task: Children attempt pages 34 and 35.

Lesson 9: More or Few**40 minutes**

This concept has already been introduced so the children should be familiar with it. Show them objects in sets and ask them which set has more and which has fewer. Give them plenty of practice before attempting pages 34 and 35.

Task: Children attempt pages 36 and 37.

Lesson 10: Skip counting in twos**40 minutes**

Start with a number line in the playground. A child stands on 0 on the number line, skips one number, and puts his or her foot on 2, then 4, 6, and so on. The phrase 'alternate numbers' can be introduced. Another child starts with number 1, and goes on to 3, 5, 7, and so on.

Then, use a number line on the floor of the classroom. Use a soft toy rabbit for the children to practise skip-counting in 2s. Place the toy on 0. Which number does it land on next? Repeat the exercise, starting at different numbers each time.

The children can play a game of Chinese whispers. They sit in a circle. Tell them the way this game is played, and ask them to remember the number which each one whispers. One child whispers a number in the ear of the child sitting next to him. The second child whispers the next 'alternate' number (skip counting by 2) in the ear of the student sitting next to him, and so on. At the end of the first round, the children call out the number each one had called. You will be able to see who was correct.

A game of Buzz is fun too, where children count from 0 to 50 and say 'buzz' instead of every second number.

0 BUZZ 2 BUZZ 4 BUZZ 6 BUZZ 8 ...

OR

1 BUZZ 3 BUZZ 5 BUZZ 7 BUZZ 9...

OR

23 BUZZ 25 BUZZ 27 BUZZ 29 BUZZ ...

Number the stairs in a flight from 1 to 10. Children jump on the stairs, skipping a step, and land on the alternate number. They call out the number on the step they land on.

Task: Children attempt pages 38 to 42.

Additional resources

At the end of the guide is additional worksheet 1. Use that for reinforcement.

UNIT 2

NUMBER OPERATIONS

Teaching objectives

- to introduce the +, −, and = signs
- to explain adding of three or more numbers
- to practice subtraction of simple numbers
- to explain number families
- to use number lines for subtraction of numbers up to 20

Learning outcomes

The children should be able to:

- identify the +, −, = signs and explain what they signify
- add and subtract 1-digit and 2-digit numbers using a number line, and vertical, and horizontal settings
- recognise members of a number family
- use a number line to add 3 numbers

Teaching materials:

- number line
- beads, wooden blocks, coins, toys, cubes, pyramids
- abacus
- weighing scale (up to 10 kg)

Learning activity

Lesson 1: Add one more.

40 minutes

Hang up cut-outs of the symbols in the class room. Explain/elicite what the symbols represent, how they work, and what the end results are.

PLUS used to be written as P long ago, and now we use the sign '+'; it means addition.

MINUS used to be written as M long ago, and now the sign is '−', meaning take away, or subtraction.

EQUAL TO is denoted by '='

IMPORTANT: It is important that the children understand that in our natural number series 1, 2, 3, 4, 5, 6 ...

- the number on the right of any two consecutive numbers is always 1 more than the number on its left.
- the number on the left is 1 less than the number on the right.

For example, in 8 and 9,

9 is 1 more than 8

8 is 1 less than 9

Task: Children attempt page 44.

Lesson 2: Addition

40 minutes

Work out fun problems in the classroom, for example:.

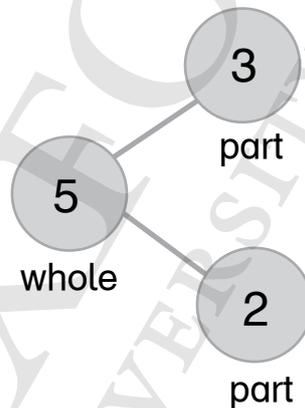
- 4 chalks in the box and we add 3 more: $4 + 3 = 7$.
- A dog has 2 bones on one day, and 1 on the second day. How many bones does he eat?
- Tara wears 2 rings on her thumb and the little finger; then 3 more rings on the three middle fingers. How many rings is she wearing?

Explain these facts:

- 1 If you add (+) two numbers, the answer is ALWAYS more than either of the TWO numbers.
2. If you subtract (–) one number from another, the answer will be smaller than the larger number.
3. Numbers are equal (=) when they represent the same quantity.

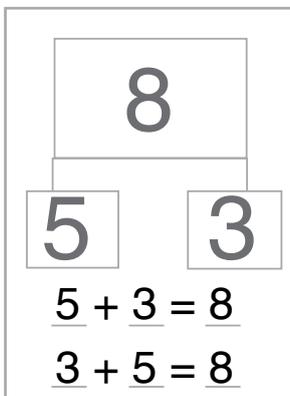
Once again, review the concepts of simple addition and subtraction on the number line and using solid objects. Use beads and an abacus.

Explain, also, that numbers such as 2, 3, and 5 belong to a number family.



This means that $2 + 3 = 3 + 2 = 5$

The class works out and notes down the number family equations (new word) like this, in small boxes in their note books.



Task: Children attempt pages 45 to 48.

Lesson 3: Adding three or more numbers

40 minutes

The children enjoy using their fingers to add or subtract small numbers. Encourage this at the beginning.

You could also play a game of adding the correct symbol. Arrange a few beads as shown below and ask the children to fit in +, -, or =.

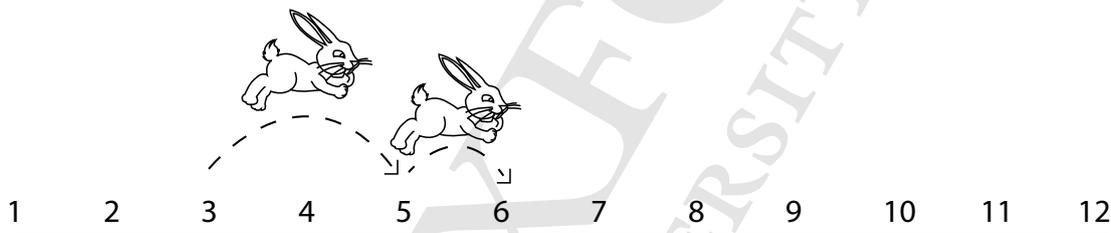
Place '+' or '-' in the box, as per the instructions on the right.

	= ? Answer is more than 3
	= ? Answer is less than 4
	= ? Answer is more than 3

Also, try this: With no instructions, the children can use a '+' sign, a '-' sign or '=' and find different answers

Introduce addition and subtraction of 3 numbers using practical problems and the number line.

This can be easily worked on a number line. A toy rabbit starts at 3, and jumps 2 steps, rests a while and moves 1 jump more. Where does he land?

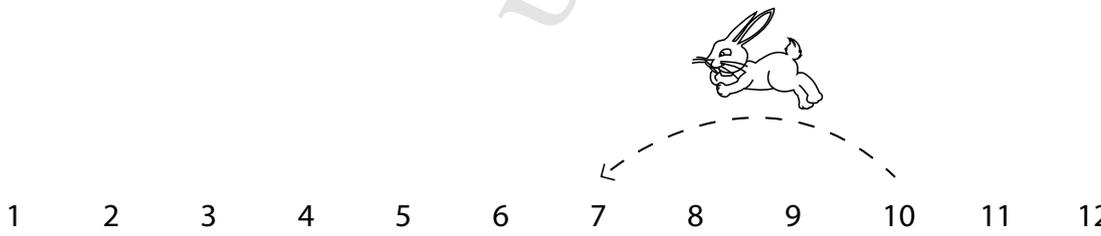


$3 + 2 = 5$; $5 + 1 = 6$

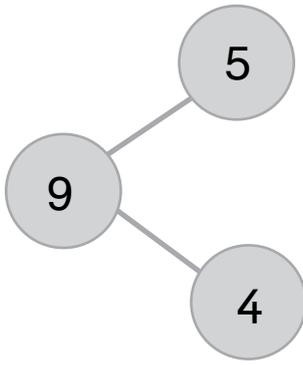
Task: Children attempt page 49.

Lesson 4: Subtraction

40 minutes



The number family



Use a number line to explain subtraction as well. Place the toy rabbit (used in addition) on number 10, and move it 3 steps back. He arrives at 7. This can be shown as $10 - 7 = 3$

Now give the children different questions; they move the rabbit to the left, from different points on the number line, and they find the number where the rabbit lands each time.

Work on more practical situations in the classroom. There are 10 pails in the garden, but only 7 spades. How many pails will have no spades? Work this on a number line as well.

5 friends went for a picnic, they had 7 chicken sandwiches. How many sandwiches were left after each one had eaten one?

A weighing scale is an ideal way to see actual addition and subtraction happening, automatically. Get books or stones, each weighing 1 kg. Place one stone in the pan at a time, and see how the screen shows 1 kg. Add more stones, one at a time: the addition is shown on the scales. Take away one stone at a time for subtraction.

Two stones show 2 kg; add three more stones: the scales will show 5 kg. There are ten stones in the pan; the screen will show 10 kg. Take away three stones, one at a time, and see the subtraction actually happen.

Task: Children attempt pages 50 to 54.

Lesson 5: Numbers 11 to 20; Numbers on a Dice

40 minutes

Hang a number line on the wall or draw one on the floor. Now tell the children a story:

It was Easter. Winnie the Pooh and his friends Tigger and Eaglet were hunting for Easter eggs. Pooh found three eggs under the old tree. Tigger found two more beside the fence. Eaglet found another four eggs behind the bench. They put all the eggs in a basket. How many eggs did they collect all together?

As you narrate the story place a counter on 3. Then as Tigger finds 2 **MORE** eggs, move the counter 2 places to the right. Explain the significance of MORE. Then, move the counter 4 places to the right when Eaglet finds 4 **MORE** eggs. Then, ask the children to call out the number on which the counter comes to rest. That is the total number of eggs in the basket. Explain the significance of the word **TOTAL**. Is the TOTAL number of eggs more than those Pooh, Tigger, and Eaglet found in the garden?

Put up the words MORE and TOTAL on the soft board.

Repeat the exercise with Eaglet and Tigger, using different coloured counters for each character. Create more characters to give the children some more practice. Now ask the children who collected most eggs? Encourage the children to draw their conclusions by looking at the final positions of the different counters.

A weighing scale, once again, is very useful to show instantly that 9 is more than its components (6 and 3, 5 and 4, or 1 and 8). Similarly, demonstrate subtraction.

You could organize an egg hunt for the children in the garden once they are familiar with the idea of addition.

Organize a shopping spree in the classroom. Identify some objects to be sold and assign a price to each of them. For example: an apple could cost 3 counters and 2 more counters. Give each student a shopping list and some counters. Each student has a turn to go to the shop to buy his/her articles and pay the shopkeeper using the counters. The student has to call out how much each article costs and how much he spends in total. He should also call out how much he has left. Repeat the game several times to reinforce the concepts of addition and subtraction.

Once the children are confident with addition problems work with further problems of subtraction by saying, for example, 'Pooh has 2 eggs. He breaks 1 egg. How many are left?'

'Ahmed has Rs 10; he buys a chocolate for Rs 6. How much money will the shopkeeper return to Ahmed?'

Ahmed now has Rs 4 left. Is the amount of money Ahmed has now MORE or LESS than he had before he went shopping?

Task: Children attempt pages 56 to 59.

Additional resources

At the end of the guide are additional worksheets 3, 4, and 5. Use them for reinforcement.

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UNIT 3

MEASUREMENT: LENGTH AND MASS

Teaching objectives

- to introduce the concepts of measuring height, length, and mass
- to use comparative and superlative forms of adjectives and revise opposites
- to talk about relative sizes

Learning outcomes

Children should be able to:

- use vocabulary correctly to describe relative sizes
- talk about opposites and weight, length, and height

Teaching materials:

- toy rabbit
- small and large objects
- thick and thin objects
- rough and smooth objects
- musical instruments
- pebbles of different sizes

Learning activity

Lesson 1: Opposites

40 minutes

To start off, use a vertical number line on the wall, and show how 'more than' and 'less than' works on a vertical number line (going up and down). The simplest method is to get a long ruler and mark 0, 1, 2, 3 ... starting from the floor. Rabbit can hop 1 up or hop 1 down to find bigger or smaller numbers.

The control panel in a lift is another example. The children can see 4 turning into 5 and then 6, and so on. Or vice versa, 6, 5, 4, 3, 2, 1, 0.

This unit introduces comparison of size, height, and weight using real life examples. Vocabulary for comparison is taken to the superlative degree. The concept of matching according to size is reinforced using everyday experiences.

To introduce opposites, show a small piece of chalk and a large duster. The table is high and the bench is low. The board is big and the exercise book is small. Woollen fabric is thick and rough, and silk is thin and smooth.

Task: Children attempt pages 60 and 61.

Lesson 2: Comparisons

40 minutes

Compare the sizes of trees and bushes in the playground. Collect a basket full of pebbles. Ask the children to sort these according to size, and arrange them in order of size from small to big.

Talk about familiar objects in the classroom. Use comparative terms to describe them: a brick is heavier than a pencil box. A pin is lighter than a pencil box. Let the children feel the weight of each of the articles as you compare them.

Again, activity with a weighing scale is useful to explain the terms 'heavy and heavier'. A stone is heavy; put it on the scale: it weighs 1 kg. A bigger stone is heavier; put it on the scale: it weighs 2 kg. (Don't use fractions of weights yet: choose books and stones with weights of 1 kg or 2 kg)

Compare lengths: a short eraser, a long pencil; a short eraser, a longer cane, and the bamboo pole is the longest. Ask the children to stand in a line according to their heights. Now use the comparative words to compare the heights of different children.

Compare sizes: a cat is small, a mouse is smaller than a cat, and a snail is the smallest of the three. Again, an ant is smaller than a snail. An elephant is big, a dog is smaller, and a mouse is smaller than a dog. An elephant is the biggest of the three, and the mouse is the smallest of the three. An elephant is big, but a dinosaur is bigger than an elephant.

Task: Children attempt pages 64 to 68.

Additional resources

At the end of the guide are additional worksheets 6 and 7. Use them for reinforcement.

UNIT 4

MONEY

Teaching objectives

- to explain the concept of barter
- to introduce currency
- to explain that every item has a monetary value
- to add notes and coins

Learning outcomes

Children should be able to:

- identify all notes and coins of Pakistani currency
- add the values of coins and notes accurately
- demonstrate an understanding of 'enough' by comparing amounts of money with a given value

Teaching materials:

- notes and coins of Pakistani currency
- notes and coins of other currencies
- different objects with price tags on them

Learning Activity

Lesson 1: Coins have been used...

40 minutes

It is important that the children are confident in using numbers, counting up to 100, and addition and subtraction of smaller numbers.

Ask if they have used notes and coins to buy ice cream and toys when shopping with adults. Explain that in exchange for coins and notes, they can buy various items of their choice. They should handle paper notes and plastic coins and see what is written on both sides. Discuss the writing and the pictures which have been depicted on the notes and coins of Pakistani currency.

For further practice, set up a small shop in the classroom.

Barter Shop: Talk to the children about the barter system. Since there was no form of money in the olden days, people exchanged goods. For example, a man with cows could exchange milk for eggs; or someone who needed a lamb, might give eggs and milk to his friend for a few days.

At this shop, they can exchange goods. For example, a student gives 4 pencils in return for a pen; he or she exchanges a crayon box for 3 erasers; 1 puzzle box for 1 doll; 2 bracelets for 5 clips; 2 toy cars for a cricket, a Ludo and a pen for a scrabble board; and similar items which would be used by a 6/7 year olds.

Talk, in simple terms, about the problems that might have arisen with the barter system, and the need for a standardized monetary system.

Task: Children attempt pages 70 to 73.

Lesson 2: Coins have been used... (contd.)

40 minutes

A General Store: Lay out on a table various items of everyday use, each with a price tag. Show the children real coins and currency notes that are in daily use. Explain what each is called, and its value. They could draw or trace each coin to get the feel of the edges. Give them photocopied worksheets of the outlines of the notes and coins to colour and add detail.

Give each child some coins and notes. Ask them to use their money to buy an article from the table.

Talk about the value of each denomination with respect to what it can buy. Will Rs 5 be enough to buy two balloons? Will Rs 10 be enough to buy a box of colour pencils?

Also ask, 'Is this enough money to buy this article?'

Some children may have trouble handling notes and coins. Hold his or her hand initially if counting notes is a problem.

Task: Children attempt page 78.

Lesson 3: Coins have been used... (contd.)

40 minutes

Revise the values of notes and coins by asking children to identify different notes and coins. Ask them to suggest what each could buy.

In a craft class, the children might enjoy designing their own currency notes, with a picture of their favourite sporting personality or a cartoon figure. Display their work in the classroom.

CURRENCY	WHAT YOU CAN BUY WITH IT
1 rupee coin	1 sticker
5 rupee coin	a pencil
5 rupee coin	An eraser
10 rupee note	a ruler
20 rupee note	a box of crayons
50 rupee note	a toy truck
100 rupee note	a story book
500 rupee note	a dress or a pair of shoes

Task: Children attempt pages 75 to 77.

Lesson 4: Shopping

40 minutes

Refer to lesson 2 for the shopping activity which could be repeated here.

Make a special board game for the children. Each student is given his or her share of money in different denominations of domestic currency. The children take turns to play. Each child rolls the dice and moves his counter according to the number he rolled. He has to perform the action suggested in the box he lands on. For example, if he lands on a square that says, 'Buy a doll for Rs 45.', he then has to use his money to pay Rs 45 to the general store to buy a doll.

Task: Children attempt pages 79 and 80.

Additional resources

At the end of the guide is an additional worksheet 8. Use it for reinforcement.

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UNIT 5

TIME

Teaching objectives

- to explain analogue time
- to explain digital time
- to teach division of time into days, weeks, months, and years
- to teach the names of the days and month

Learning outcomes

Children should be able to:

- read time on the clock
- read, write, and sequence the days of the week
- read, write, and sequence the months of the year

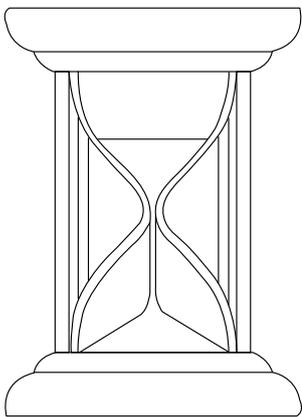
Teaching materials:

- analogue clock with movable hands
- different types of clocks
- calendar
- pictures of different seasons
- cardboard circles, lollipop sticks, split pins

Learning activity

Lesson 1: Analogue Time

40 minutes



Although analogue time as a concept might be difficult for the children to understand, they will have played with clock faces in the introductory level. They still need to differentiate it from the digital time. Illustrations of both analogue and digital clocks are given in the book.

At this stage the idea is not to teach the children to read time in hours, minutes, and seconds: it is more useful to introduce the units of time: a year, an hour, a week, a day, a minute, and a second.

Before clocks were invented, time was told by looking at a sundial, an hourglass, a candle clock, a water clock, or an incense clock. The word clock comes from 'clocca', meaning a bell. Other time telling devices are called 'timepieces'.

A story of how man told the time of day when the Sun was his only guide can be told. Man observed the shadows at sunrise, sunset, and throughout the day to work out the time.

Task: Children attempt pages 82 and 83.

Lesson 2: Make a clock face.

40 minutes

Talk about how people told the time before they had clocks. Discuss particular times of a year such as New Year's Day, and refer to months (birthdays), days (regular daily activities such as clubs), hours (school timetable): minutes and seconds can be observed on a clock with a second hand, or counted.

Telling the time will come gradually and naturally since time is such an essential part of our lives.

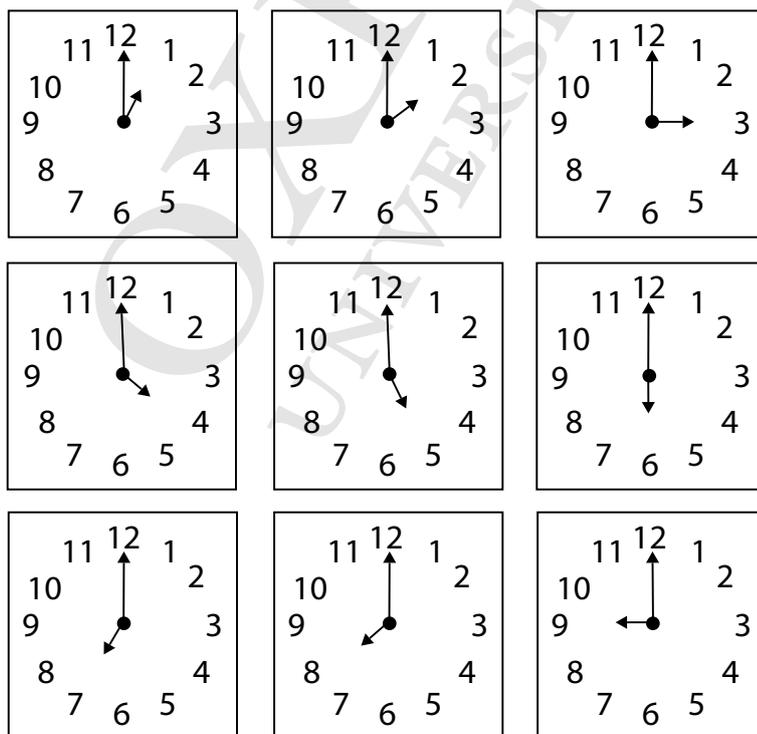
Why do we need to tell the time? Observation of daily activities is a valuable learning tool. Children often refer to times

- to wake up
- to leave for school
- to eat lunch
- to play
- to have dinner
- to go to bed.

In Maths Wise 1, the lesson starts with hours, but it is a good idea to give the children a practical concept of 1 second, 1 minute, and an hour. Someone says, 'I will be back in a minute.' Does he really come back in a minute? Let them observe this on a clock with hour and minute hands. Each tick or movement of the second hand indicates 1 second. This concept can also be demonstrated on electronic clocks which show hours, minutes, and seconds to give the children a concept of 1 second and 1 minute. Ask children to clap their hands to 1 second, 5 seconds; and keep quiet for 1 minute.

Give each child a cardboard circle, 1 short and 1 longer lollipop stick, and a split pin. Show them how to make their own clock and how to mark the numbers on the face of the clock. Explain that the small hand of the clock shows the number of hours, and the longer one indicates the minutes.

Task: Children attempt pages 84 to 86.



Lesson 3: Digital Time

40 minutes

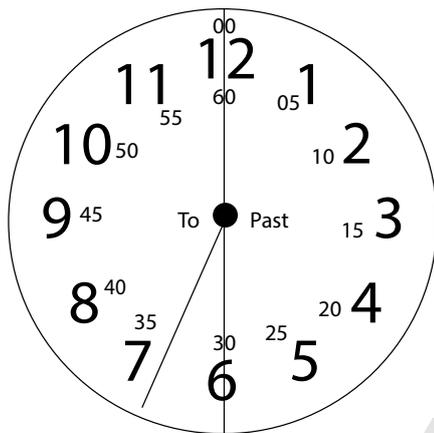
Talk about periods of time: ask if doing homework takes 20 minutes or one hour? How long does the journey to and from school take? How long is father or mother out of the house when they go to work? How many minutes does it take to fry an egg or make a toast? Only a very basic introduction is necessary at this level.

Start with a simple exercise. Ask the children to count slowly from 1 to 10. Now ask them to count and clap their hands once between each number. Ask which exercise took more time. Then, ask them to count from 1 to 10 as 1 Mississippi, 2 Mississippi. Explain that it took about 10 seconds to do that.

How long will counting to 60 in this manner take? Explain that it will take 'one minute'. Now ask them what other activity they can do in a minute. List their suggestions: wash their hands, dial a number on the mobile phone, write numbers 1 to 10 or turn 10 pages of a book, walk up to the board and back to their seat. Let them judge for themselves. Divide the children into 2 groups. As one group counts to 60, the other group tries out the activities they suggested.

Show the children different instruments (or pictures of them) that measure time such as a sun dial, sand clock, wall clock, wrist watch and digital display clocks. Show them how each instrument measures the same span of time in different ways. Show them the times when some daily activities take.

Introduce a rhyme to help them remember:



60 seconds make a minute,

60 minutes make an hour;

24 hours make a day,

Enjoy every second, be happy all day.... Hooray!

7 days make a week,

30 days a month,

12 months in a whole year,

Spend them well, my dear.

Task: Children attempt page 87.

Lesson 4: Days of the week

40 minutes

Explain the fact that a birthday, Christmas, New Year, and all National Days happen only once a year.

The names of the days of the week usually come naturally to children. Introduce them to the days of the week with simple sentences:

Mother Teaches Waheeda The Fancy Sewing Stitch OR

Mom Trains Wendy To Fry Sweet Slices

Ask children to make their own sentences.

Talk about their activities in school or after school on different days of the week. Help them draw up a timetable. You can introduce a fictitious character, Chirpy Charlie, and ask them to create a routine for him for all seven days of the week.

Task: Children attempt pages 88 to 91.

Lesson 5: The months of the year

40 minutes

Introduce the months of the year by asking the children to look at a paper calendar or a calendar on a computer screen. An interesting exercise would be to make a chart of their birth months. Also encourage them talk about the season at the time of their birthdays.

Task: Children attempt pages 92 to 93.

Lesson 6: The names of the months

40 minutes

Ask the children to do 'a months of the year' puzzle. The names of the months are written in order, 1 to 12. Fill in the full name of the month. Join the number which stands for the month to the name of the month.

J _ _ _ _ R _	8
F _ B _ _ _ _	10
M _ _ C _	12
A _ _ I _	1
M _ _	2
J _ N _	9
J U _ _	11
A _ G _ _ _	6
S _ _ _ _ M _ _ _	7
O _ _ _ B _ _	3
N _ V _ _ _ _	4
D _ _ _ M _ _ _	5

Every day, write the date on the board in big, bold numerals; by copying this, the children will learn to write the dates accurately in their books.

Task: Children attempt pages 94 to 96.

Additional resources

At the end of the guide is an additional worksheet 9. Use it for reinforcement.

UNIT 6

GEOMETRY: SHAPES, PATTERNS, AND POSITION

Teaching objectives

- to explain basic 2-D and 3-D shapes
- to explain simple patterns and sequences
- to familiarise children with relative positions in everyday life, such as inside or outside, left or right, before or after, and up or down

Learning outcomes

Children should be able to:

- identify and name familiar 2-D and 3-D shapes
- complete sequences of shapes
- draw circles, squares, and rectangles of different sizes
- recognise the relative positions of two objects

Teaching materials:

- nets of shapes
- pair of scissors
- glue
- objects of different shapes
- an assortment of segments of circles in assorted shapes and sizes
- paint
- beads, strings
- wooden stick
- different lengths of rope

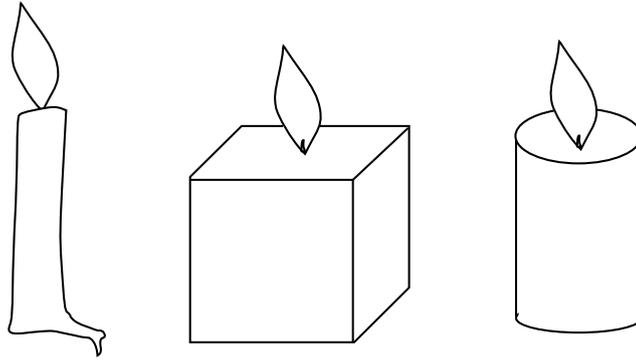
Learning Activity

Lesson 1: Shapes

40 minutes

This can be a very exciting lesson since children encounter so many objects of different shapes, in everyday life. Where did these shapes come from? Do they exist in nature? Spheres, circles, cones (a cone of light or some flower buds), and ovals appear in nature.

Candles and chocolates come in all shapes and sizes... spherical, cylindrical, conical, pyramid shaped, and others.



The children play with solid 3D shapes in the class. Talk about 2D and 3D shapes and how they are different. A 2D shape is a flat surface; you can feel it with your palm but you cannot put your hands round it as with a cube of sugar or a cell phone. It is important to explain that the surface of the paper is a 2D shape, not the paper itself.

The children learn to count the faces, edges, and corners of a cube or a cuboid, as they play with these solid objects.

Now ask them to draw the shapes in their exercise books, in different sizes with actual objects or a ruler and a pencil. Once they are comfortable with drawing a square and a rectangle, encourage them to make different patterns with them.

Collect various wooden blocks in different shapes. Keep them on your table.

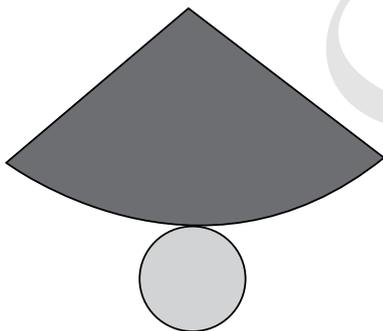
Put another set into a bag. Each student comes up to the desk, and is asked put his or her hand in the bag and take out a particular shape. For example, if Hasina takes out a prism, she must name it and match it to the one on the desk.

A similar exercise with 2D shapes is also useful.

Task: Children attempt pages 98 and 99.

Lesson 2: Shapes: a cone

40 minutes

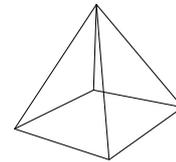
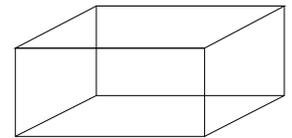
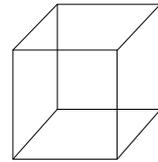


Put together ice cream cones, party hats, conical straw hats, tops of well sharpened pencils, lampshades, candles, and paper cones. Pictures of inverted cones such as mountain tops, pine trees, and traffic cones are also useful.

The children paint the surface of a small paper cone, and roll it on a piece of paper. They observe the shape of the painted area. It should be a part of a circle.

Then they dip base of the cone in paint ... an impression is formed on paper: it is a circle. The pointed end of the cone is dipped in paint, and an impression is formed on the same paper. The children see a point.

Working in reverse, prepare an assortment of segments of circles in assorted shapes and sizes. The



children fold them into cones and stick the edges with strong glue. Then they cut circles to fit the open end of the cone. They fill the cones with some pebbles, fit the cap into the top; and take the cone home to show to their siblings.

Task: Children attempt page 99.

Lesson 3: Shapes: a pyramid

40 minutes

Start the lesson by showing the children various types of boxes in the shape of a cube, a cuboid, pyramid, and a prism.

Some chocolates are prism shaped.

Give them square and rectangular pieces of paper and ask them to associate them with different objects and shapes that they see in 3D objects around them such as a duster, a desk (without its legs), a chalk box, a cylindrical bottle, a conical glass, a can of juice, a tetra pak of buttermilk, a book.

Give them paper squares, rectangles, and triangles to fold in different ways. Ask questions such as: How can you make a square from a rectangle? Can you make 2 squares from a rectangle? Can you make 2 triangles out of a square or a rectangle?

Tessellation sheets with triangles, squares, and cuboids can be worked on.

Task: Children attempt page 101.

Lesson 4: Shapes: a cylinder

40 minutes

Make a collection of cylindrical shapes, (TUBE may be an easier word to remember.) such as candles, cylindrical glasses, vases, bottles, juice cans, lampshades, pencils, crayons, a length of garden hose, and drinking straws.

Paint the curved surface of any of these objects. Carefully roll it on a sheet of paper. What shape do you get? Yes, you get a rectangle.

Dip the two ends in paint and make impressions on the paper. What shapes do you get? You get two circles of the same size. Repeat the exercise with a different cylinder.

Discuss how a cylinder could be covered with coloured paper. After some discussion, the conclusion will be: one rectangle and two circles.

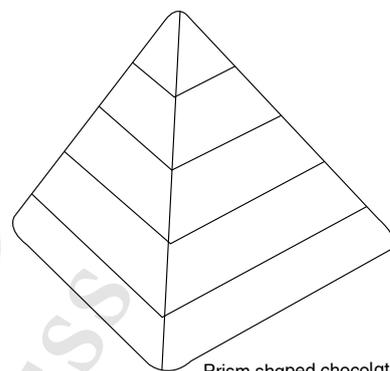
Task: Children attempt page 102.

Lesson 5: Shapes: circles

40 minutes

Ovoid and sphere: The children should be familiar with spherical and ovoid objects such as balls, eggs of different sizes, assorted balloons and an assorted collection of beads. They should feel the curved surfaces of these.

Each student makes a sphere and an ovoid (roughly resembling an egg) from play dough. Ask them to flatten these shapes out to see what 2D shapes they get. A sphere will flatten into a circle, and an ovoid will flatten in the shape of an elongated circle.



Prism shaped chocolate



Give the children beads of the above shapes and some string. Show them a pattern of shapes on the board ... 3 balls and 2 ovoids, or 4 ovoids and 1 ball ... and ask them to string the beads in that order on their individual strings.

This activity may also be turned into a fun game. Divide the children into 2 groups and they create different patterns for beaded strings.

The children are familiar with circles, pupils of our eyes and the eyes of all animals, rings on the finger, bangles, rims of cups, glasses, bottles and caps of bottles, tyres, a steering wheel in a car, a bus or a lorry, and the shape that the fan appears to make when it is rotating fast.

Fix a wooden stick in the centre of the garden, or in a large bucket of sand. Tie one end of a rope to the stick and tie the other end loosely around the waist of a volunteer. He or she walks away from the stick until the string is pulled tight, without pulling the stick out of the ground. The student stands at a point, which may be marked with a flowerpot, and starts walking around the stick, till he or she comes back to the original point. As the student walks, mark the path with a chalk. What shape is the path? It is a circle. Repeat the exercise with another volunteer and a different length of rope.

Stick a drawing pin in a soft board on the wall and tie a short length of string around it. Tie the other end around a pencil, and move the pencil around the pin. What shape do you get? It is useful to discuss the shape of a bangle or a tyre ...it has one 'round' edge, therefore, it can roll on the ground.

Discuss points such as:

- Is the Sun a circle? Is the Moon a circle? They are 'balls', but from a long distance, they appear to be circles.
- Place various spheres under a ceiling light: the shadows appear to be circular.
- Why are tyres circular? (Tell them an interesting story about how early man saw the trunk of a tree roll downhill, before he invented the wheel.)
- The cap of a bottle is always circular; can it be a square? Can a wheel be a square?
- Can you make a circle from matchsticks?
- How many sides does a circle have?
- Find circles and triangles in the letters of the English alphabet and the numerals.

Encourage them to feel the flat surfaces of cubes and cuboids, which are different from the curved SINGLE surface of a ball.

Task: Children attempt page 103.

Lesson 6: Shapes

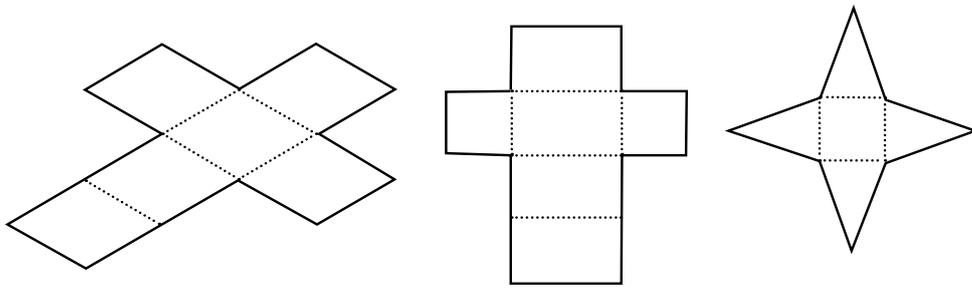
40 minutes

Ask the children to separate the objects in a basket of variously shaped 3D solid blocks into different groups of spheres (balls), cubes, cuboids, prisms, and pyramids.

It will be useful to show on a screen pictures of objects of the various shapes, such as the Pyramids in Egypt and the Louvre pyramid in Paris, or make colourful charts.

Make a collection of hollow 3D shapes, such as boxes of all kinds. Open up the sides of the boxes and lay them flat on a table to show what 2D shapes have gone into making the 3D shapes. Ask the children questions.

How many flat shapes do the following have?



Lesson 7: Patterns

40 minutes

Ask the children how many patterns can they make with 2 squares? 2 triangles? Let them colour the patterns and display them in the classroom. Give them different numbers of squares and triangles to make patterns.

Task: Children attempt pages 104 to 106.

Lesson 8: Positions

40 minutes

Organize a treasure hunt with the children in the playground. Lay out some 3D shapes at different places. Blindfold a volunteer and ask the other children to call out instructions to the blindfolded child to help him find the shapes.

Place the shapes so that the children have to use the prepositions inside and outside (a bin), on or under (a bench), or to the left or right of (a pillar).

This exercise covers two concepts: comparative locations, and names of solid objects.

An assorted basket of wooden 2D shapes which the class works with, counting the number of sides and vertices.

Put a few questions to the class about digital numbers and ask them to

- 1) Write a number with
 - a) a triangle (4)
 - b) an oval (0)
 - c) one circle (6, 9)
 - d) two circles (8)
- 2) Write a capital letter of the alphabet with
 - a) a triangle (A)
 - b) an oval or a part of an oval (C, D, G, O, Q)
 - c) parallel lines (E, H, M, N, U, Z) (for later)

Task: Children attempt pages 107 and 108.

Additional resources

At the end of the guide is an additional worksheet 10. Use it for reinforcement.

UNIT 7

REVIEW AND ASSESS

Teaching objectives

- to revise the concepts learnt throughout the year

Learning outcomes

Children should be able to:

- use number lines
- understand place value
- add tens and ones
- write numbers in ascending and descending order
- use ordinal numbers correctly
- identify number operations and their signs
- compare lengths and mass
- identify local currency and be familiar with its value
- demonstrate an understanding of time using clocks and calendars
- identify basic shapes and their properties

Teaching materials:

- additional worksheets

Learning Activity

Lesson:

The review and assessment can take place over a couple of days. If required, several lessons can be spent on revision. Worksheets and interactive games can be used for assessment.

Do the worksheets to review the concepts taught throughout the year.

Task: Ask the children to attempt pages 110 to 114.

Additional resources

At the end of the guide are additional worksheets 11 to 15. Use them for reinforcement.

Worksheet 1

Count and write the missing numbers.

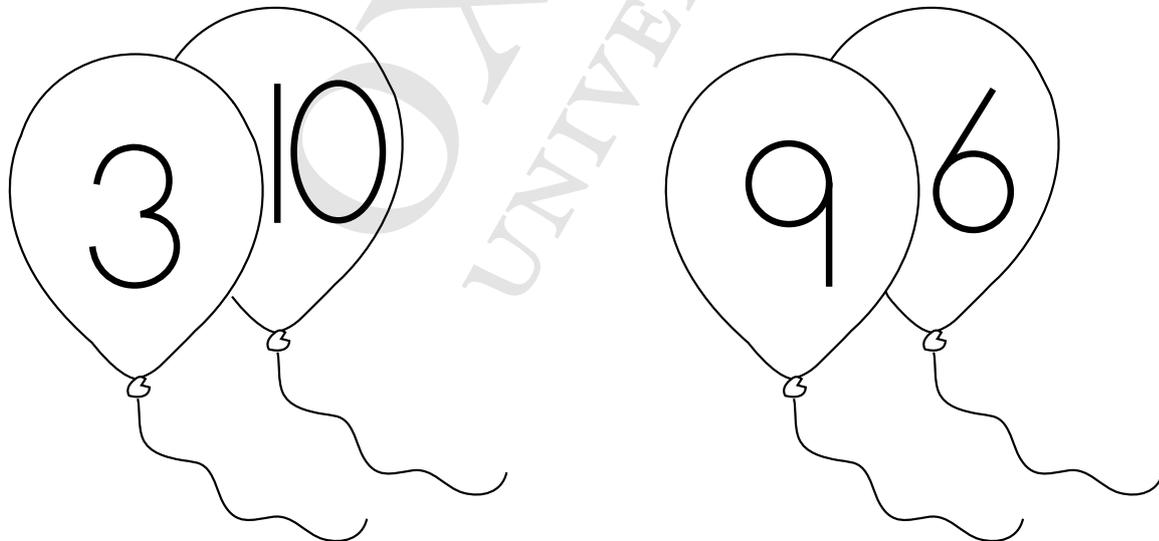
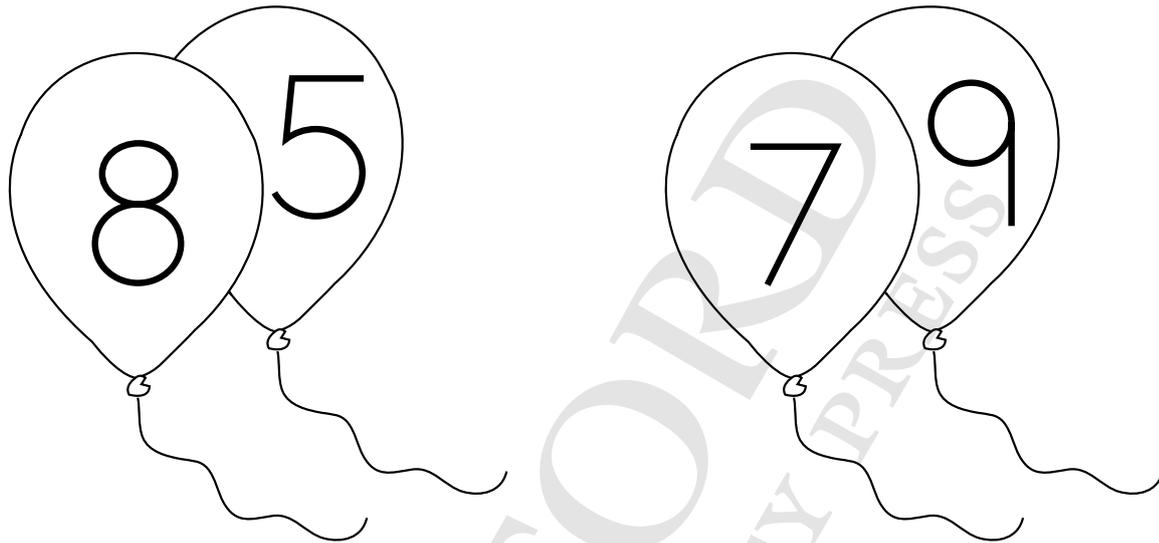
1		3	
	6		8
9		11	
	14		16
17		19	
	22		24
25		27	

Photocopiable material



Worksheet 2

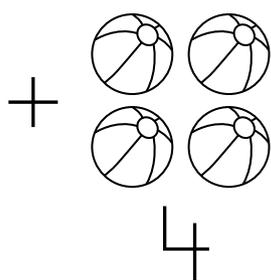
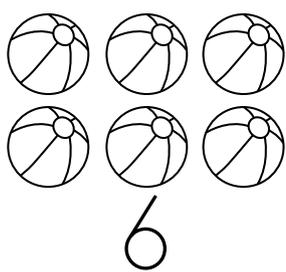
Colour the balloon with the larger number.



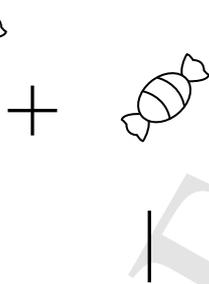
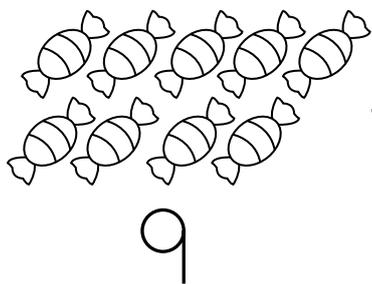
Photocopiable material

Worksheet 3

Addition



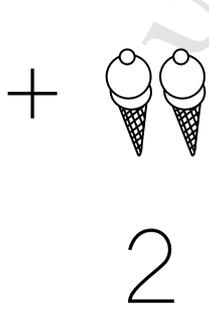
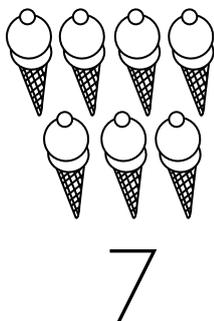
$$\begin{array}{r} 6 \\ + 4 \\ \hline \end{array}$$



$$\begin{array}{r} 9 \\ + 1 \\ \hline \end{array}$$



$$\begin{array}{r} 5 \\ + 2 \\ \hline \end{array}$$



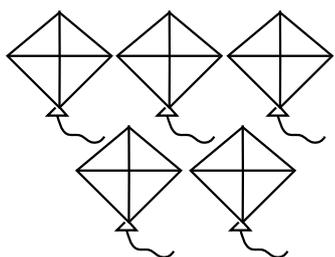
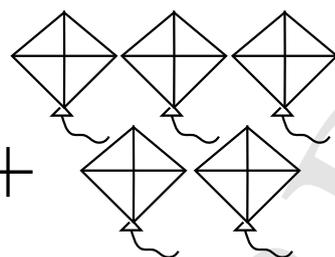
$$\begin{array}{r} 7 \\ + 2 \\ \hline \end{array}$$

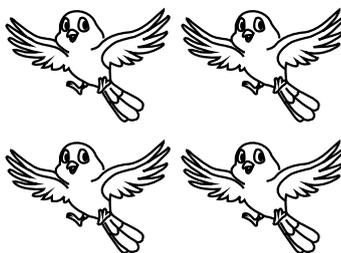
Photocopiable material

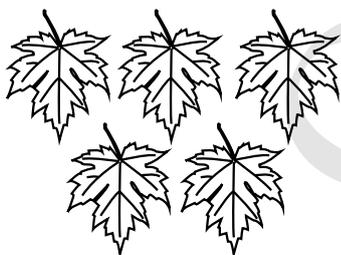
Worksheet 4

Addition

Circle the correct answer.

 $+$  $=$ 10 12 14

 $+$  $=$ 5 6 7

 $+$  $=$ 5 6 7

 $+$  $=$ 10 11 12

Photocopiable material

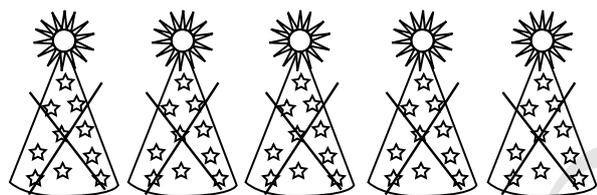
Worksheet 5

Subtraction



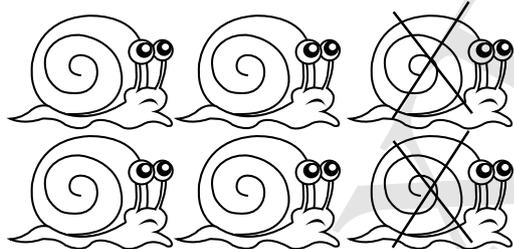
$$7 - 2$$

$$\begin{array}{r} 7 \\ - 2 \\ \hline \end{array}$$



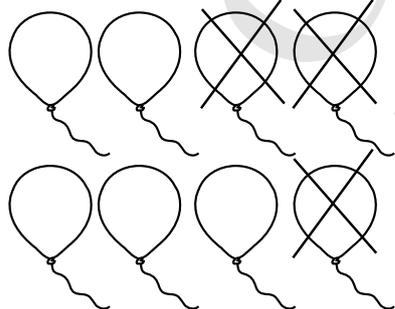
$$5 - 5$$

$$\begin{array}{r} 5 \\ - 5 \\ \hline \end{array}$$



$$6 - 2$$

$$\begin{array}{r} 6 \\ - 2 \\ \hline \end{array}$$



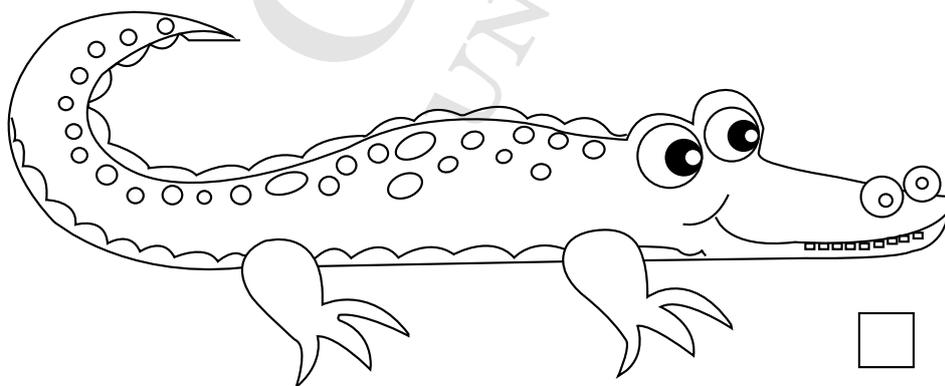
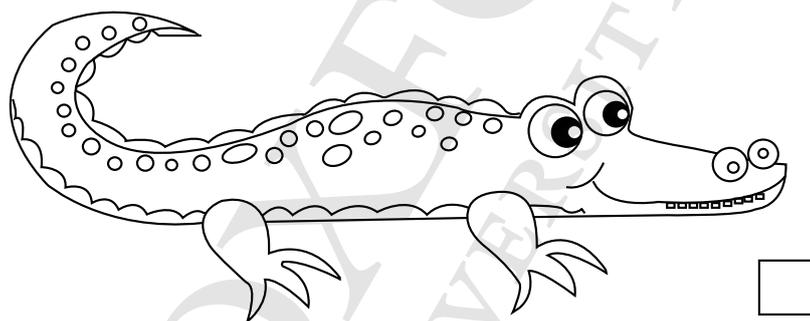
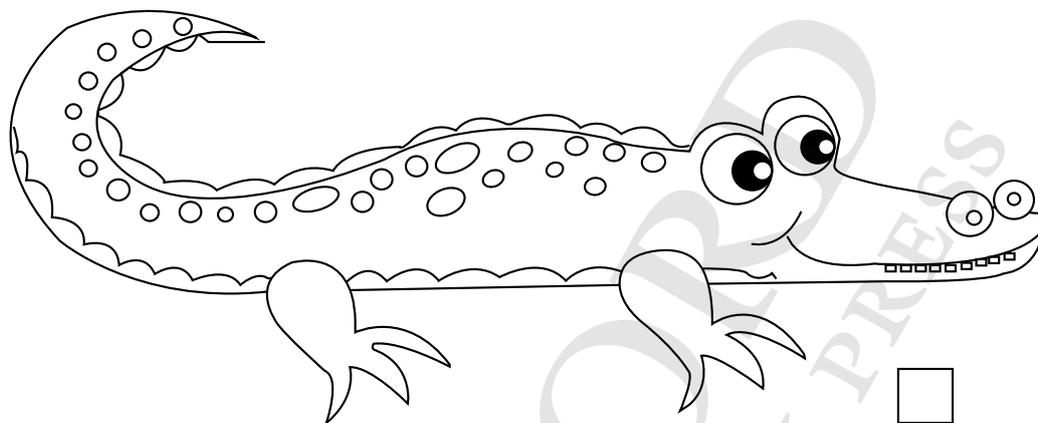
$$8 - 3$$

$$\begin{array}{r} 8 \\ - 3 \\ \hline \end{array}$$

Photocopiable material

Worksheet 6

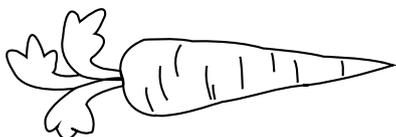
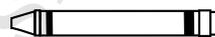
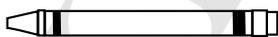
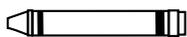
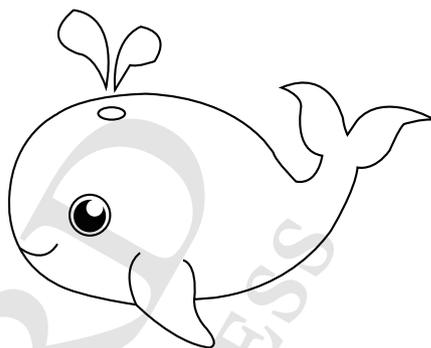
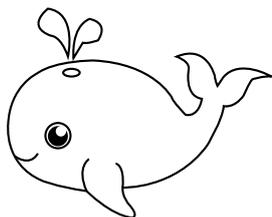
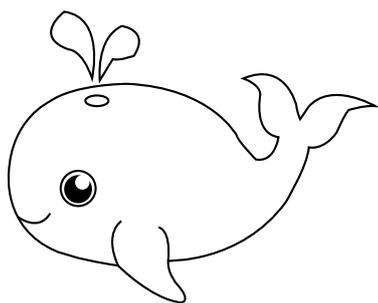
Tick ✓ the longest.



Photocopiable material

Worksheet 7

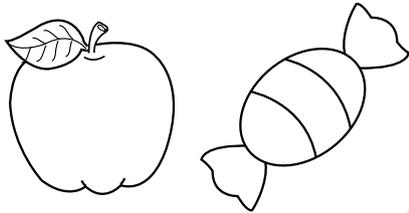
Number the pictures from the smallest to the largest.



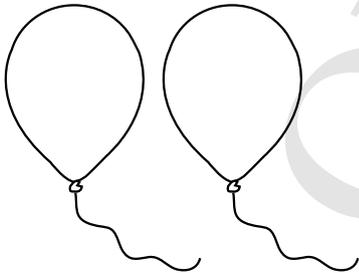
Photocopiable material

Worksheet 8

Match the prices to the correct amount.



40 20



30 20



50 25

Photocopiable material

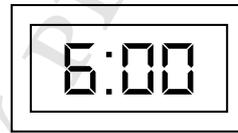
Worksheet 9

What time is it?

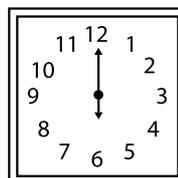
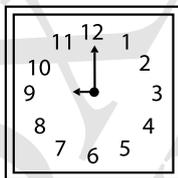
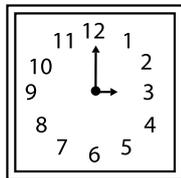
Which of these clocks show the time as 11 o'clock?



Which of these clocks show the time as 8 o'clock?



Which of these clocks show the time as 6 o'clock?



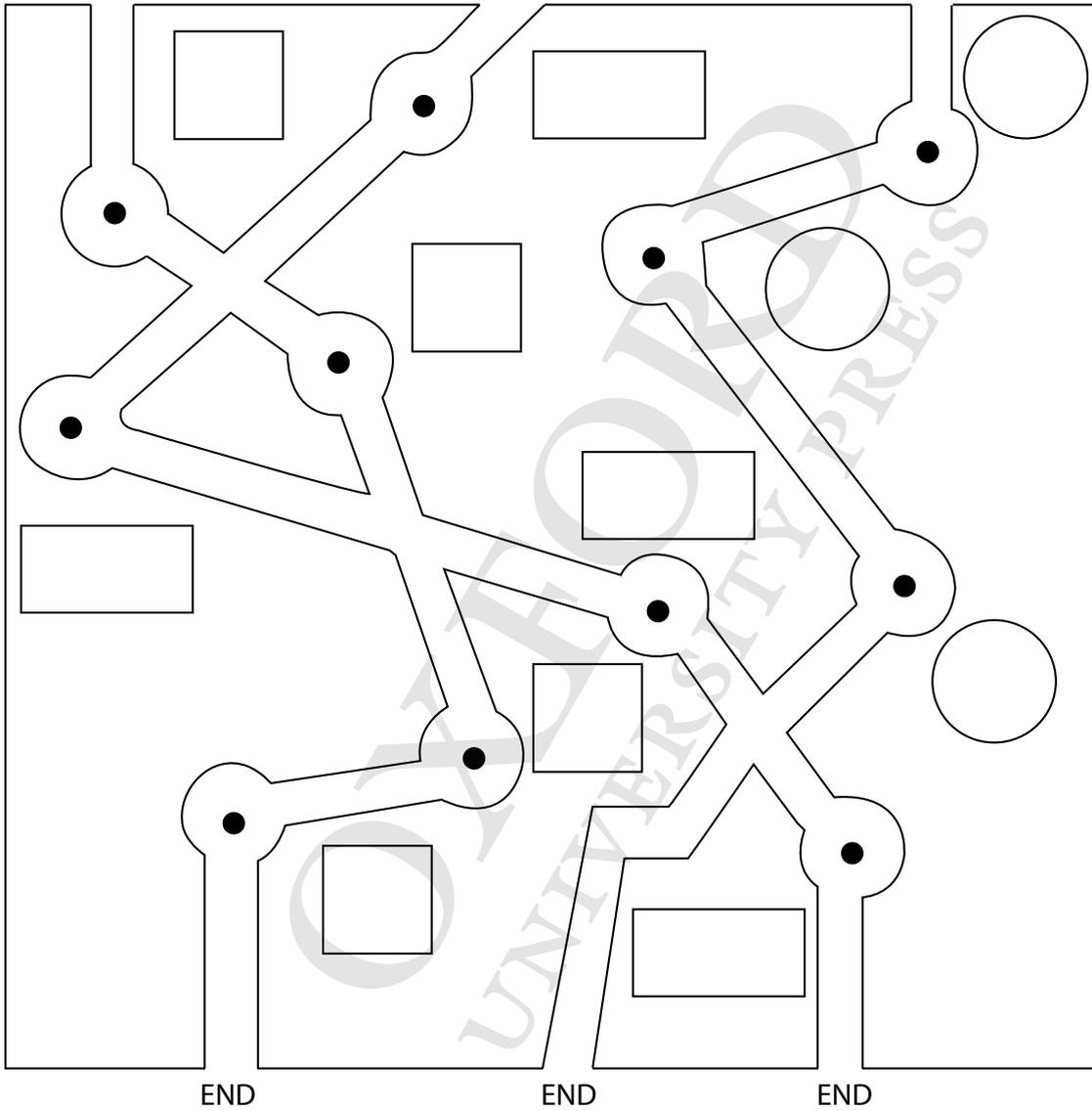
Which of these clocks show the time as 10 o'clock?



Photocopiable material

Worksheet 10

Trace the paths that connect similar shapes.



Photocopiable material

Worksheet 11

Write the missing numbers.

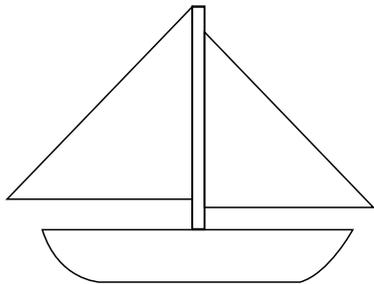
	2		4
5		7	
	10		12
13		15	
	18		20

Photocopiable material

Worksheet 12

Estimating Length

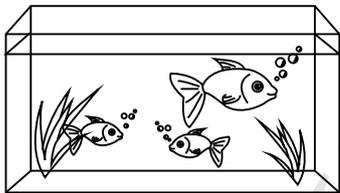
Estimate the length of each object. Tick (✓) the option that gives the best estimate.



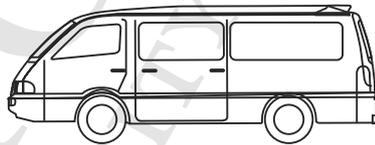
14 feet / 15 inches



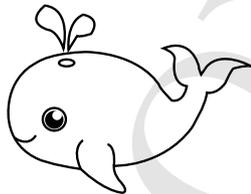
8 feet / 4 inches



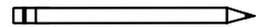
4 feet / 10 inches



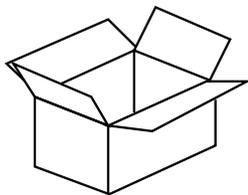
16 feet / 3 inches



50 feet / 13 inches



6 inches / 1 foot



6 feet / 6 inches

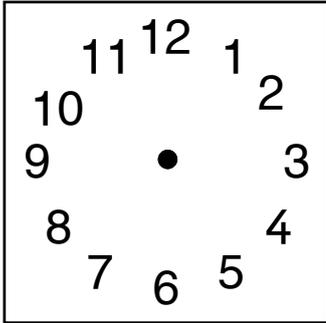


1 foot / 6 inches

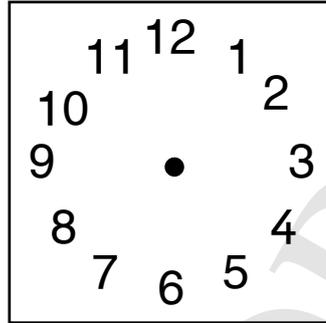
Photocopiable material

Worksheet 13

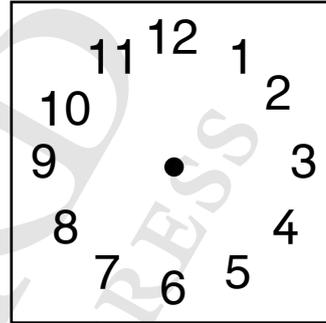
Draw the hands.



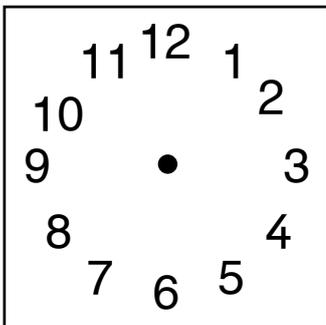
It's four o' clock



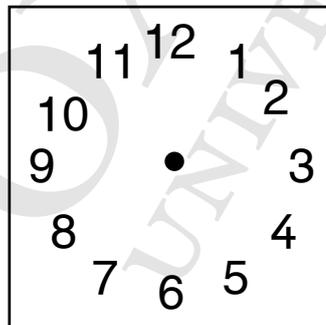
It's nine o' clock



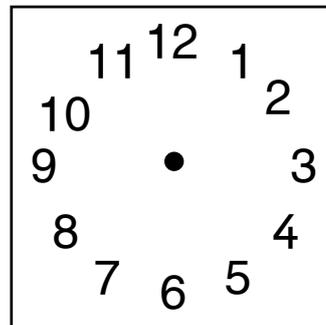
It's twelve o' clock



It's six o' clock



It's ten o' clock

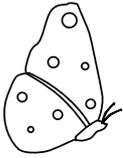


It's three o' clock

Photocopiable material

Worksheet 14

Write the name of the day that comes before:

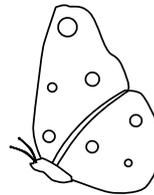
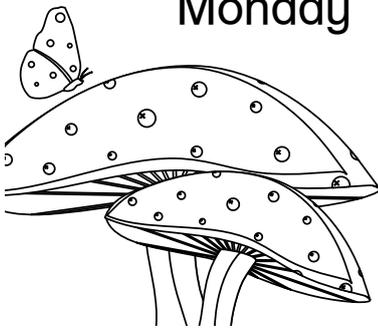


_____ Saturday
_____ Wednesday
_____ Friday
_____ Sunday



Write the name of the day that comes after:

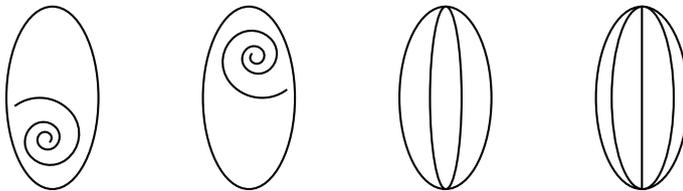
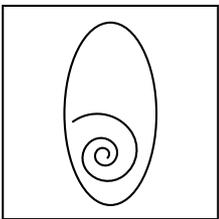
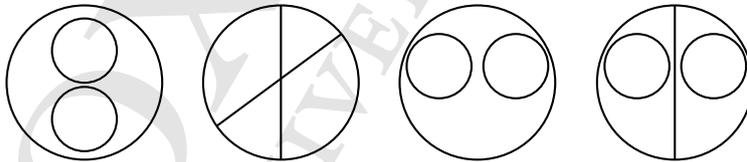
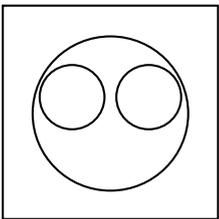
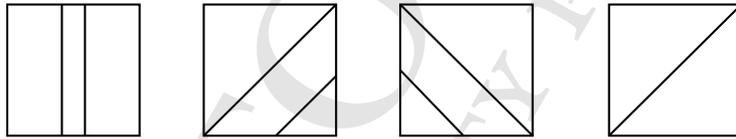
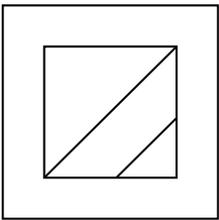
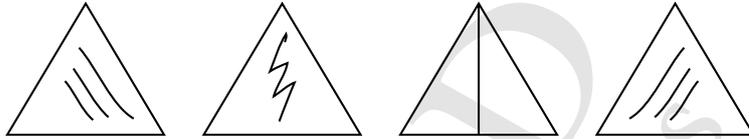
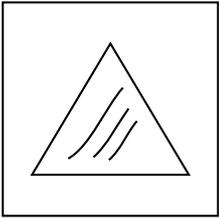
Tuesday _____
Saturday _____
Thursday _____
Monday _____



Photocopiable material

Worksheet 15

Circle the pattern that is most similar to the one in the box.



Photocopiable material

Answers to Unit 1

Page 3

Numbers missing on the Number pyramid: 3, 4, 6, 8, 9, 10

Page 4

Number of cherries: 2, 4, 6, 8, 10

Numbers to circle: 2, 4, 6, 8, 10

Page 5

1st activity

Missing numbers: 3, 5, 6, 8, 9, 11, 13, 15, 18
2, 3, 5, 6, 7, 8, 10, 11, 12, 13, 15, 16, 17, 18, 19

2nd activity

Missing numbers: 3, 4, 6, 9
12, 13, 15, 16, 19

Number pyramid 1: 2, 5, 7, 10

Number pyramid 2: 13, 14, 15, 18, 20

Page 26

1st column: 6, 9, 1, 5, 4, 7, 8

2nd column: 8, 10; 2, 4; 0, 2; 4, 6; 5, 7; 7, 9; 6, 8

Page 27

1st column: 27, 28; 39, 40; 42, 43; 56, 57; 68, 69; 73, 74

2nd column: 78, 79; 81, 88; 49, 51; 63, 64; 76, 77; 84, 85; 92, 93

Page 29

Ascending order: 1, 4, 5, 6, 8, 9; 1, 3, 4, 7, 8, 9; 2, 3, 5, 6, 9, 10

Page 30

Descending order: 6, 5, 4, 3, 2, 0; 10, 9, 8, 5, 4, 2; 10, 8, 6, 5, 4, 3

Page 31

Increasing order: 2, 3, 5, 9, 10; 1, 2, 4, 7, 8; 3, 5, 6, 7, 8

Decreasing order: 8, 6, 4, 1, 0; 10, 9, 6, 5, 3; 8, 7, 4, 2, 1

Page 32

Ascending order: 12, 13, 14, 15, 16; 56, 57, 58, 59, 60, 61, 62
32, 33, 34, 35, 36, 37, 38; 78, 79, 80, 81, 82, 83, 84

Page 33

Descending order: 21, 20, 19, 18, 17, 16, 15
 74, 73, 72, 71, 70, 69, 68
 43, 42, 41, 40, 39, 38, 37
 95, 94, 93, 92, 91, 90, 89

Page 35

Positions of hats: 1st, 2nd, 3rd, 4th, 5th, 6th, 7th, 8th, 9th, 10th
 Positions of faces: 1st, 2nd, 3rd, 4th, 5th, 6th, 7th, 8th, 9th, 10th

Page 36

- | | | |
|--------------------|--------------------|------------------|
| 1. Burgers: 2 | 2. Eggs: 5 | 3. Bananas: 3 |
| Cupcakes: 3 | 3. Bread slices: 4 | Pears: 4 |
| 4. Strawberries: 7 | 5. Choco bar: 1 | 6. Lollipops: 10 |
| Oranges: 6 | Sweets: 8 | Apples: 5 |

Page 37

Rod A: 8 Tree A has 9 stars. Tree A: 4
 Rod B: 8 Tree B has 5 stars. Tree B: 4

Page 38

Numbers to fill in the blanks: 4, 6, 8, 10

Page 40

Numbers to fill in the blanks: 3, 5, 7, 9

Answers to Unit 2**Page 45**

8, 8; 9, 9; 6, 6

Page 46

3, 3; 2, 2

Page 47

10, 10, 7, 9, 9

Page 48

14, 18, 11, 5

Page 50

5, 5, 4, 5, 0

Page 51

7, 1, 5, 3

Page 53

10, 10, 3, 7

10, 10, 4, 6

10, 10, 1, 9

10, 5

Page 54

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

$$\begin{array}{r} 1 \\ +5 \\ \hline 6 \end{array} \quad \begin{array}{r} 6 \\ -1 \\ \hline 5 \end{array} \quad \begin{array}{r} 6 \\ -5 \\ \hline 1 \end{array} \quad \begin{array}{r} 2 \\ +4 \\ \hline 6 \end{array} \quad \begin{array}{r} 6 \\ -2 \\ \hline 4 \end{array} \quad \begin{array}{r} 6 \\ -4 \\ \hline 2 \end{array}$$

Page 55

7, 6, 3, 9

Page 59

9, 3, 8, 12, 7, 0

0, 7, 4, 9, 3, 9

10, 17, 11, 10, 90, 12

59, 10, 29, 26, 2, 33

Page 60

2, 8, 14, 10, 9, 12, 19, 16, 20

Answers to Unit 4**Page 71**

40 chicks would be given for two cows.

Page 72

1, 1; 4, 1; 4, 2; 8, 10; 2, 8

Page 73

Re 1, Rs 2, Rs 10

Rs 20, Rs 50, Rs 100,
Rs 500

Page 74

two; ten

five; one, two, one

one, five; one, one, three

four, two; three, four

two, six; one, eight

Pages 76 and 77

The notepad price matches the 2nd set of currency.

The toothbrush price matches the 1st set of currency.

The choc-bar price matches the 1st set of currency.

The burger price matches the 2nd set of currency.

The bucket price matches the 2nd set of currency.

The cake price matches the 2nd set of currency.

Page 78

Children tick: no, yes, no, yes

Page 79

Rs 70, Rs 30

Rs 90, Rs 10

Rs 50, Rs 50

Rs 40, Rs 50 (There are more than one possible correct answer.)

Page 80

Ahmed has Rs 20 in all. Ahad has Rs 15 in all.

Ahmed has more money than Ahad.

Zeba has Rs 18 in all. Zara has Rs 17 in all.

Zeba has more money than Zara.

Babar has Rs 30 in all. Bina has Rs 31 in all.

Bina has more money than Babar.

Answers to Unit 5

Page 85

2, 7, 24, 60

Page 86

7 o'clock, 8 o'clock

10 o'clock, 11 o'clock, 2 o'clock

1 o'clock, 5 o'clock, 4 o'clock

Pages 88 and 89

1st, 2nd, 3rd, 4th, 5th, 6th, 7th

Page 90

Monday, Tuesday, Wednesday, Thursday, Friday, Saturday, Sunday

Page 91

Saturday, Thursday, Sunday, Tuesday

Friday, Sunday, Wednesday

Page 94

February, November, December

January, October

March, April

May

June, July

August

September

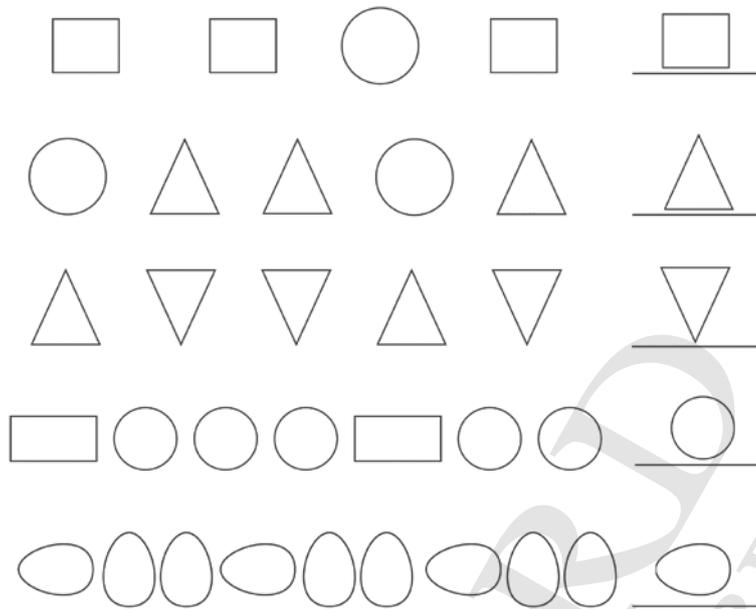
Page 96

April, August; February, May, March; November, October,

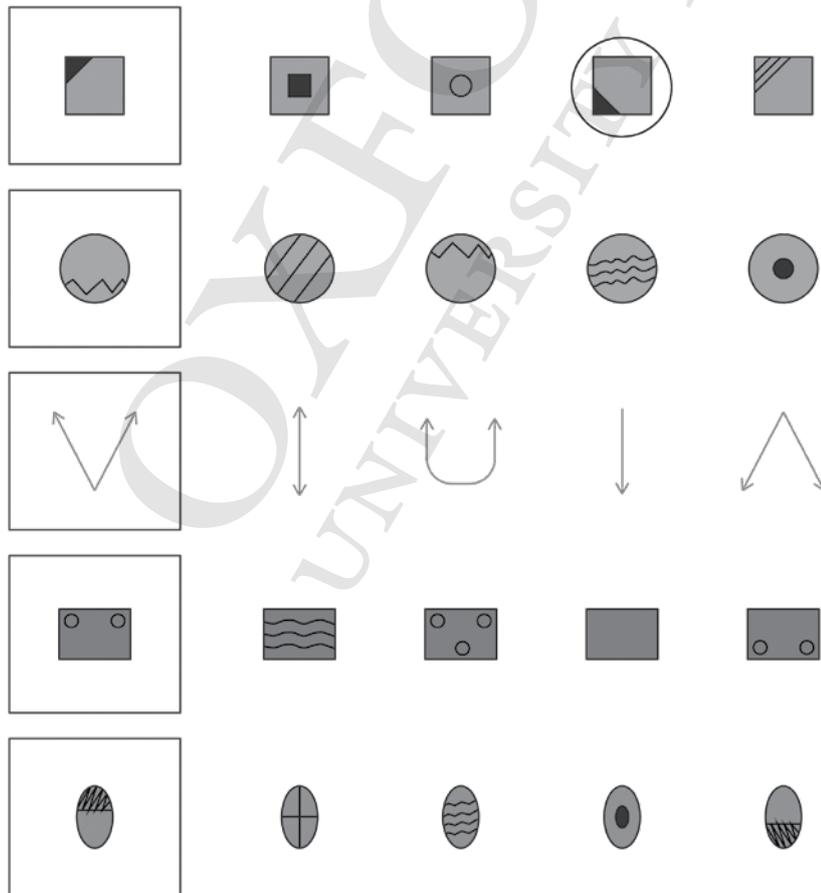
September; January, June, July; December

Answers to Unit 6

Page 104



Page 105



Page 106

1st exercise

Children write the numbers on the given clock.

2nd exercise

1, 7 4, 10

2, 8 5, 11

3, 9 6, 12

Page 107

inside outside

on under

right

the parrot is to be circled

the tortoise is to be ticked; the snail is to be crossed

Page 108

circle; triangle; rectangle; square

Answers to Unit 7

Page 110

2, 3 10, 11

5, 6 7, 8

14, 15 8, 9

9, 10 18, 19

18, 19 12, 13

6, 7 13, 14

19, 20 6, 7

1, 2 9, 10

Page 111

12 5

13 8

6 7

9 14

19 13

Page 112

1. stars

2. hands

3. turned

4. polka dots

5. down

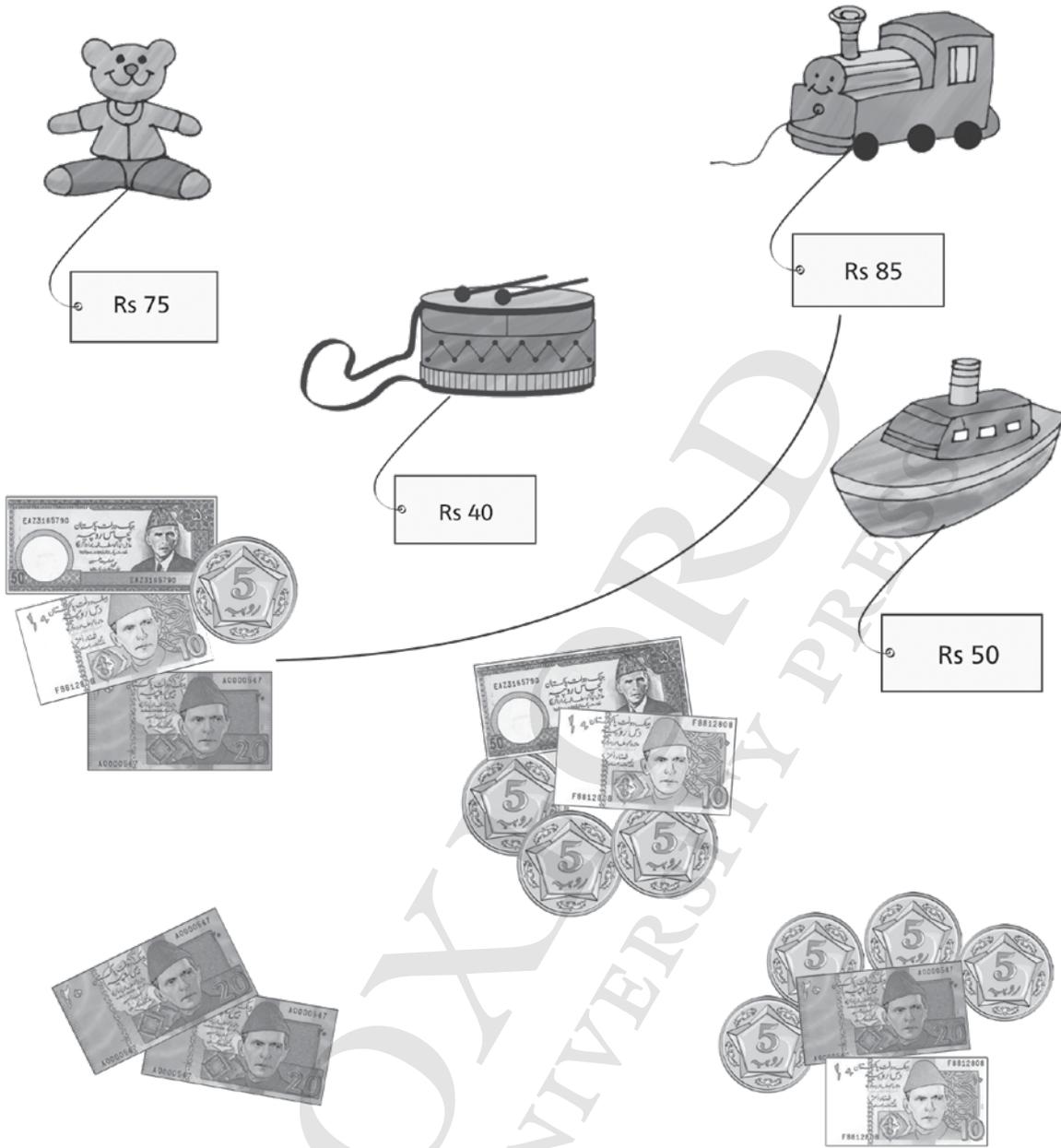
6. back

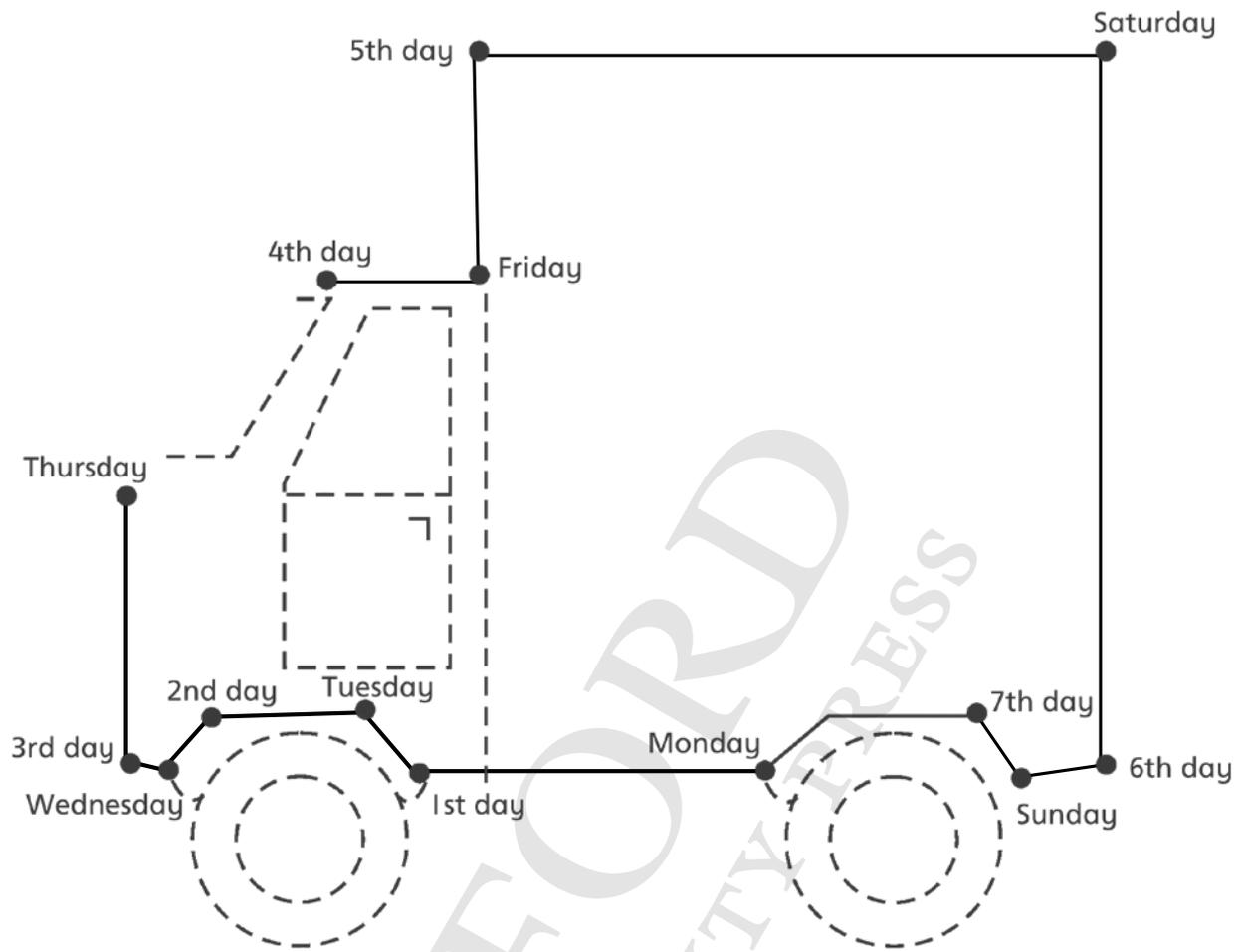
7. longest

8. one

9. Sitting

10. Flower





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Glossary

A

add

to combine a number with another number to increase the amount

Example

Add 23 and 6.

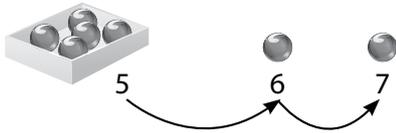
$$23 + 6 = 29$$

$$\begin{array}{r} 23 \\ + 6 \\ \hline 29 \end{array}$$

addition story

mathematical story that involves the addition of numbers

Example



There are 5 marbles in a tray.
2 more marbles are added.

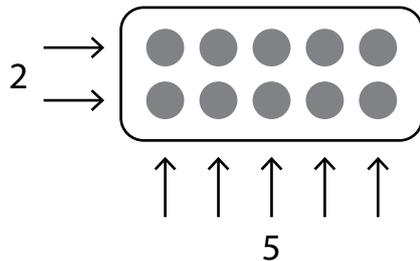
$$5 + 2 = 7$$

There are 7 marbles in the tray now.

array

a rectangular arrangement of objects or numbers

Example

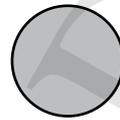


This is a 2 by 5 array.

This is also a 5 by 2 array.

C

circle



a round shape

compare

to find whether a number is greater than, smaller than or equal to another number

Example

Compare 13 and 17.

17 is greater than 13.

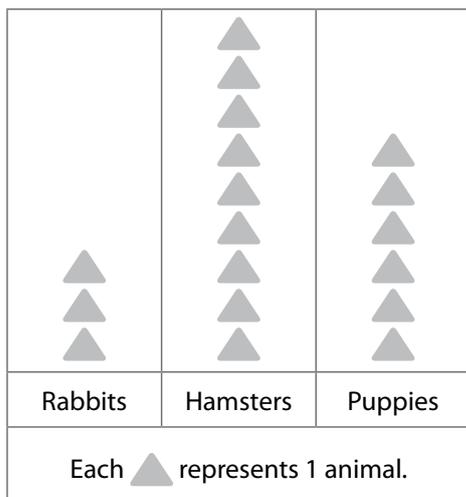
13 is smaller than 17.

G

graph

the arrangement of data that represents a collection of things

Example



The picture graph above shows the number of animals in a pet shop.

H

half past (number)

half an hour or 30 minutes after the stated time

Example



Half past 9

hour

equal to 60 minutes

L

length

used to tell how long an object is or used to refer to a side of a figure

Example



The pencil is about 5  long.

M

multiplication

repeated addition of a number

Example



There are 3 groups of 5 apples.

$$5 + 5 + 5 = 3 \text{ fives} = 3 \times 5 = 15$$

There are 15 apples.

N

numeral

another name for a number

number

used for counting and calculations

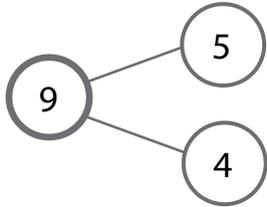
Example

0, 1, 2, 4, 7, 11 and 16. are numbers.

number bond

the relationship between the number (whole) and the parts that make up the whole

Example



$$4 + 5 = 9$$

(part) (part) (whole)

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.

O

ones digit

the last digit of a number

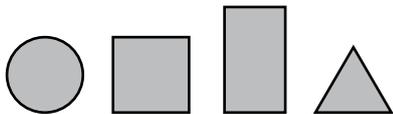
Example

In 39, '9' is the ones digit and it represents 9 ones or 9.

ordinal number

a number stating the position of an object in a series

Example



The triangle is fourth (4th) from the left.

The rectangle is second (2nd) from the right.

P

Pakistani rupees (Rs)



the currency used in Pakistan

place value

numerical value of a digit by its position in a number

2 7

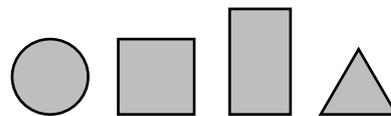
tens ones

'2' represents 20, '7' represents 7.

position

used to state where an object is located

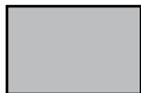
Example



The rectangle is in between the triangle and square. The circle is on the left of the square.

R

rectangle



a four-sided shape with opposite sides equal in length

S

square



a four-sided shape with all sides equal in length

subtract

to take away a number from another number

Example

Subtract 11 from 37.

$$37 - 11 = 26$$

$$\begin{array}{r} 37 \\ - 11 \\ \hline 26 \end{array}$$

subtraction story

mathematical story that involves the subtraction of numbers

Example



There are 15 marbles.

3 marbles are taken away.

$$15 - 3 = 12$$

There are 12 marbles left.

T

time

quantity measured in hours and minutes

tens digit

the digit before the ones digit in a number

Example

In 39, '3' is the tens digit and it represents 3 tens or 30.

triangle



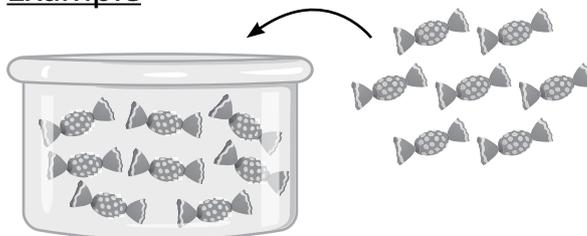
a shape with three straight sides

W

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.