

New
Countdown
Second Edition

Primer A & B

Teaching Guide

OXFORD
UNIVERSITY PRESS

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A Note to the Teacher from the Author

New Countdown Primers A and B are the first two of seven books specially designed for the young mathematician of today's fast changing world. With their lively illustrations (some of them in full colour), puzzles and activity pages, *New Countdown* Primers aim to excite the imagination of the child at the very start of his or her journey in maths; they are ideal for use at the kindergarten level.

New Countdown Primers A and B cover all the concepts recommended for the learners of primary level: comparison; the numbers 1-10; the concept of zero; elementary addition and subtraction; use of the number line, counting backwards; numbers in sequence (ascending and descending order); and counting to 100. And they do so in ways designed to stimulate activity: children are invited to colour and count, to draw and count, to solve puzzles and colour, to look about and discover numbers in the world about them, to note differences like big, small; more, few; find similarities, make sets, establish pairs and begin adding and subtracting. This is very much in line with the modern approaches to mathematics teaching, which emphasize play, activity, experimentation, and practical application over old mechanical or rote learning methods.

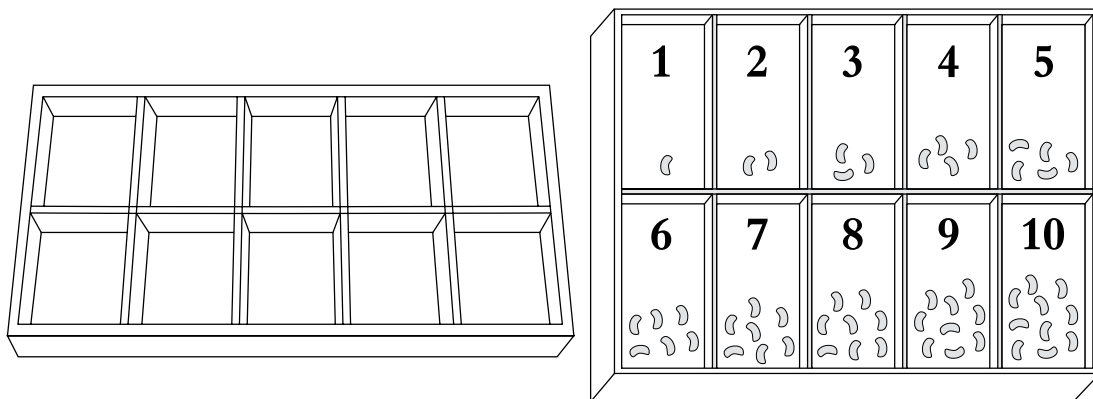
But no maths book—even like *New Countdown* Primer A and B, that combine the functions of text book and workbook—can hope to 'cover' a subject that is so varied and so rich in teaching potential. The inclusion, in your classroom and in your day-to-day teaching, of a few simple pieces of equipment will reinforce a child's understanding of the concepts presented in the books and provide additional opportunities for communication between teacher and pupils. Here are my recommendations for basic teaching aids at this beginner's level.

- OBJECTS FOR SORTING AND COMPARING

Encourage children to bring small collectibles into the classroom: beads, shells, buttons, marbles, twigs of different lengths, pencils and crayons of different thicknesses. A special table could be set aside for these. Make sure that coloured counters and dice are readily available. And ensure you have a variety of solid shapes on hand: balls, globes, tins, cubes, boxes etc. Encourage the children to discover fresh examples of these shapes.

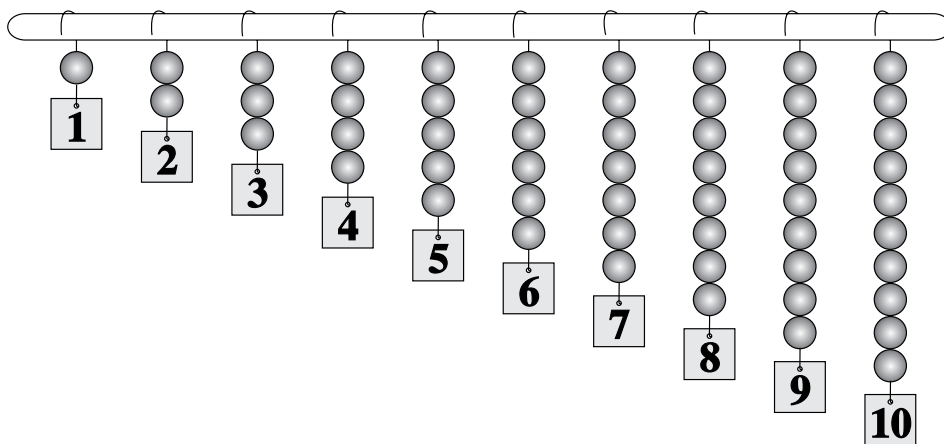
- THE SORTING TRAY

All you need is a broad, flat box or tray, divided (perhaps by strips of cardboard) into compartments. This has almost endless possibilities: it can be used for sorting the children's small collectibles into sets of every variety: sets of size, sets of colour, sets of number and many more.



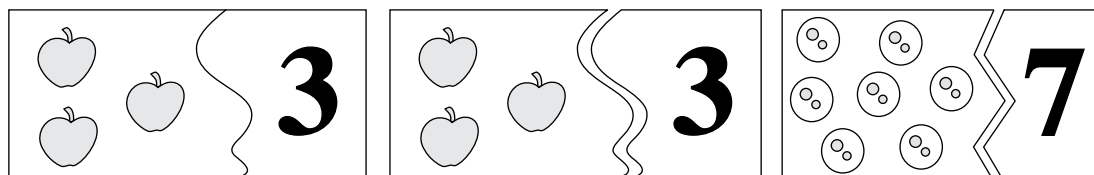
- **THE BEAD BAR**

Here you need a long wooden rod with 10 evenly spaced holes along it. Suspend lengths of wire through the holes, each hooked at the bottom for cards to hang from. On each wire hang beads made from clay or wood and painted brightly.



- **NUMBER CARDS**

This is an activity in which children can get on with by themselves. Make a set of cards covering the numbers 1–10. Each card should have a drawing on one side and the relevant numeral on the other. The teacher then separates the set and the numeral by cutting the card—making sure to cut each card a different way :



Mix the split cards up and ask the children to fit them together again. The child knows if he is wrong because the two parts will not fit together properly.

- **GIANT NUMBER LINE**

Make sure you have a large, colourful number line 0 – 10 on permanent display.

Finally, and perhaps most important of all :

- **COLOURFUL PICTURES**

Pictures of animals; pictures of cars and buses; pictures of flowers; make sure your classroom is a bright, happy place with lots of talking points and many examples of objects that you can include in your maths lessons.

Wishing you enjoyable teaching!

Shamlu Dudeja

Introduction

Children are born with a mind which is thinking, receptive, and ready to try out new things. So it has vast a potential to grow unless circumstances throttle it. The two aspects most essential for this growth are the two Rs, i.e. 'Reading and Riting' and both of them are dependent on each other.

The primary objective of the Countdown series is to ensure that every child develops a strong affinity for mathematics (as against a fear for it). And, for this, the following are necessary:

- Concentration
- A sense of fun
- Retentive memory
- A sense of discovery and learning (rather than "being taught")
- Understanding of the subject in a creative, logical, and lateral manner,
- Individual, easy pace of learning for each child
- A sense of confidence
- Affectionate bonding with the teacher

Teachers need to take the age group of the children into consideration, and help them learn in a manner suitable to their age.

BUILDING THE CONCENTRATION

This can start with the children shaking their arms and legs while standing at their individual positions and giving out a jolly good laugh! Look right, look left, raise your right hand and thump your left foot... It may sound crazy, but it does help to make a good beginning for the day.

This is followed by a round of meditation. All children sit down, close their eyes, and mentally focus on whatever they wish—be it a beautiful scene on a beach, a colorful flower or the face of his/her mother. They sit in this posture for a minute or two, to start with, and then go on to increase this duration up to five minutes.

The kind of concentration children are likely to develop through this focusing exercise will stay with them for many hours. In fact, this can be repeated after lunch break, once the children are back on their seats.

Note: It is essential to mention here that teachers do not mix this focusing exercise with religious meditation, as a matter of respect for the multi-religious societies we live in.

MEMORY RETENTION AND FUN

All learning needs to start with practical activities in a garden or in the classroom or on the board. This makes learning enjoyable and fun-filled (vis-à-vis rote learning).

Such an approach also goes a long way in making memory retentive. Rote learning, at the most, uses two senses—listening and seeing (reading) whereas activities involve touching (doing) all the time, and smelling and tasting too, on a few occasions. And the sense of joy or pleasure at discovering new things, which is missing in rote learning, is a great accelerator for learning.

The greater the number of senses used during a learning exercise, the better will be the concentration, and subsequent understanding, retention, and application. The joy that children derive out of such a learning experience would be an added bonus.

Formal textbook learning leads to vertical learning, such as:

$2 + 1 = 3$; so $3 + 1 = 4$ and so on.

Nowadays it is important that children think, learn, and apply their knowledge laterally, i.e. they are actually able to apply the things learnt by them to their environment, throughout the day.

DISCOVERING, LEARNING, AND UNDERSTANDING THE CONCEPT

Children learn something new every minute as they discover. Each discovery is a result of a practical activity and without practical activity proper grasp of the subject is not possible.

A child may recite a poem like '1+1=2' and '1+2=3' and so on. But unless these numbers are connected to the physical world by presenting the above sums as say, '1 marble put together with 1 more marble gives 2 marbles' and '2 marbles put together with 1 more marble gives 3 marbles', the entire number sequence makes little sense.

After a start like this, the child's sense of curiosity will be heightened and will remain with him/her throughout life lending it a dimension that many adults have never experienced.

ADDITIONAL KNOWLEDGE

Children may start with the 5 colours on page 5 of Primer A, but when they are out in the garden that has, say, pink or purple flowers, then these colours must also be included in the activities performed.

This leads to the discovery of many more colours. So, observation and vocabulary improve, leading to a major jump in learning.

CHECK THAT PACE OF LEARNING

In this 'open' method of learning, it is possible to include children with different learning abilities. Every child works at his/her own pace without being singled out. With greater exposure, he or she will eventually fall in line with the majority, and hence slow learners will not feel a sense of failure.

BUILDING SELF-CONFIDENCE

Being in a familiar and friendly environment itself is a confidence-building exercise. The more relaxed and confident a child is, the easier it is for him or her to absorb new concepts as the year progresses.

BONDING WITH THE TEACHER

Children are born with a mind which is thinking, receptive, and ready to try on new things. So it has a vast potential to grow if handled properly by the teacher.

A happy and fun-filled atmosphere, with a relaxed teacher, leads to a greater bonding between the children and the teacher. This is very important at the levels of Primer A and B, and cannot be overemphasized. A comfortable, tension-free atmosphere leads to healthier mental growth.

Primer A

PART ONE

Colour (Page 1)

OBJECTIVE

By the end of the year, children should be able to identify at least the three most common colours—the red colour and the two main colours in nature: the blue colour of the sky and the green colour of the grass.

LEARNING CURVE (10 MIN)

Children are already familiar with the black and white colours, having observed the colour of milk, their own hair, shoes, etc. They may now be introduced to red, blue, and green colours by pointing to red roses, the sky, the sea, the grass or the trees.

The teacher can reinforce the concept of colours by means of nursery rhymes like the following:

The grass is green, The rose is red, The sky is blue, And, I love you.

LEARNING AIDS

Baskets painted in red, green, and blue with swatches of matching fabrics, painted wooden blocks, paper flowers, and other items with these colours that children see in their daily life, worksheets.

LEARNING ACTIVITY (20 MIN)

Step 1. In the garden, the teacher asks the students to show anything of green colour and one student points to the grass and trees. Another student is asked to fetch a matching block from the basket. Both the students get a paper smiley on their collar for identifying the colour correctly.

Step 2. The teacher now asks a student to point to something blue. The student points to the sky (or to his/her uniform, if applicable) and another student brings a swatch of blue fabric from the basket. Both of them get smileys.

Step 3. Repeat the same exercise with red, orange, and yellow colours. The orange and yellow colours are a little tougher to identify. Yellow is the colour of the sun and orange is found in oranges and the outfits of the 'sadhus'.

The teacher can make the children stand in a circle, sing and dance to the tune of the song 'If you are happy and you know it'.

The song goes as follows:

If you're happy and you know it, clap your hands (clap, clap, clap)

If you're happy and you know it, and you really want to show it...

If you're wearing red and you know it, shake your head,

If you're wearing blue and you know it, touch your shoe,

If you're wearing black and you know it, pat your back.....

ADDITIONAL WORK

Many more colouring pages like the one given on page 5 are necessary. Children colour these pages in the classroom or in the lawn. They make handprints and footprints on newspapers using colours and then compare sizes.

CLASSROOM ORGANIZATION (10 MIN)

'Colour Week' can also be organized in the class where the classroom is decorated according to the 'colour of the week.' If blue is the colour of the week, then water based activities can be done with the children. The bulletin board too should have objects that are blue.

Opposites—Big and Small, Fat and Thin (Pages 2-3)

OBJECTIVES

The children should be able to recognize the opposites like 'big and small' and 'fat and thin'. This increases visual skills and logic.

LEARNING CURVE (10 MIN)

Children already have an idea of the opposites 'good' and 'bad'. A child is called a good boy/girl if he/she does not fight with anyone, eats food properly, gets up in the morning on time and does not shout. Although it is not right to call children 'bad' but a child who shouts or doesn't finish his/her food or wakes up late in the morning is said to have 'bad' habits. (This child needs help.)

More opposite words are introduced in the children's vocabulary this year. This prepares them for big and small numbers, multiplication and division and other related mathematical concepts.

These sample pages test the understanding of the concept of 'opposite' in children through colouring activity. The children colour the pictures on these pages according to the difference in the sizes of 'Big' and 'Small', and 'Fat' and 'Thin'.

Note: Comparison of BIGGER THAN and SMALLER THAN, FATTER THAN and THINNER THAN is intentionally omitted at this level. This concept should be introduced gradually, even though it may be formally taught only in the following year.

LEARNING AIDS

Two tables, one with BIG written on its top and another with SMALL written on the top (Later these names are changed to FAT and THIN, or TALL and SHORT). Using placards and/or objects such as dolls, toys or books, the display on these tables change with different pairs of opposites. For example, the difference between BIG and SMALL may be shown by displaying the following opposites:

1 big blue ball	1 small blue ball
1 big red bus	1 small red bus
1 big white bat	1 small white bat
1 big orange	1 small orange

LEARNING ACTIVITY (20 MIN)

The children work in pairs to pick up 'opposite' objects or draw 'opposites'. For example, if a child from a particular pair picks up a fat, pink doll, then his/her partner has to pick up a pink, thin doll or if a child from a pair draws a fat cat, then his/her partner has to draw a thin cat.

ADDITIONAL WORK

The teacher should create other similar worksheets in which children identify the differences through colour. It would be better if the teacher precedes this work by a visit to the zoo or a garden, where they learn the meaning of these opposites without being aware of the 'learning process'. By observation, they will also be able to understand some finer aspects like the word SHORT has two opposites, viz., LONG and TALL. 'Long' is used for objects such as ribbons and sticks whereas 'Tall' is used for objects standing on the ground such as people, trees, buildings, and poles.

CLASSROOM ORGANIZATION (10 MIN)

The bulletin board could also be utilized to bring out the differences between opposites. For example, children print their palms/ feet on a sheet that is displayed on the board and the teacher prints hers right next to the child's print. This would show the contrast between BIG and SMALL.

Tracing Curves, Loops and Straight Lines (Pages 4-8)

OBJECTIVES

Children improve motor control by drawing patterns, and as a result their handwriting improves which helps them in their later years.

LEARNING CURVE (10 MIN)

Colouring books at home have already provided the children enough opportunity for stroke-play. It is expected that, with a pencil firmly held in hand and the hand correctly poised, the muscle control improves motor control, which in turn develops into better hand-writing, better strokes at drawing and colouring and, generally, better quality of handwork.

These pages show various drawing patterns associated with movements of animals in real life (snakes, snails, and butterflies) and objects like balls, aeroplanes, etc. Terms like straight, wavy, crooked, horizontal and vertical need to be used.

(Tips such as : 'H'orizontal for Head-down, 'V'ertical for Very tall, Wavy like the waves, Crooked...not straight, help children memorize the words.)

Note: Left-handed children must not be criticized or forcibly asked to switch to the right hand. Some of the greatest artists and the best brains were left-handed.

LEARNING AIDS

The children may work with sand and sticks. Obviously, making castles with buckets is great fun. But, drawing a path between two castles is also challenging. The children may be encouraged to draw straight, curved, and crooked path or even try to connect them by loops.

LEARNING ACTIVITY (20 MIN)

Each child is given a shape made out of sand-paper, such as 8, O, I, 6, L, S, or W. They are asked to feel these shapes with the forefinger. They feel the straight line in the letter I, the curves in the letter S and O, the zig-zag in the letter W and the loops in 8.

8

O

I

W

S

Try untying a full-blown balloon and then leaving it loose in the classroom. Allow the children to watch the path it takes!

ADDITIONAL WORK

The children stand in a circle. A child makes the shape 'S' using his/her fingers on the back of the child in front of him/her who has to then guess the letter/number written on his/her back. This child now writes '1' or '0' on the back of the child in front of him/her and in this way the guessing game goes on.

They draw different strokes on a newspaper with crayons. All of these improve their motor control and handwriting.

More worksheets are prepared with different patterns such as circles and spirals. It must be remembered that, at this age, children will not be able to draw accurately and this must not be criticized.

CLASSROOM ORGANIZATION (10 MIN)

The teacher can make pattern strips and keep them in the activity corner for the children. Sand trays, slates, and water trays should also be made available for the children.

Matching the Pairs (Page 9)

OBJECTIVES

Identifying pairs of identical objects such as 2 clips or 2 ear-rings or 2 sandwiches is very easy. The children now learn that there are certain things that go together, but are not identical, i.e. two unlike objects can also form a pair in the sense that they are incomplete without the presence of the other. Recognising such unlike pairs develops conceptual skills which help in working out associations between numbers at a later stage.

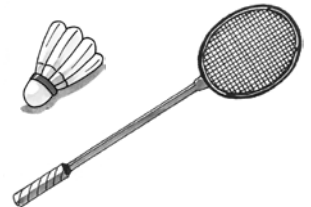
LEARNING CURVE (10 MIN)

Children are familiar with non-identical pairs from an early stage. For example, they have seen their mothers sew clothes using a needle and thread or their fathers drink tea from a cup and saucer. Similarly, they might also have noticed their elders eat with a fork and knife. It would be useful to bring out these points in the classroom while discussing this topic.



LEARNING AIDS

A basket full of mixed pairs of non-identical objects, such as lock and key, fork and spoon, racquet and shuttle, toothbrush and toothpaste, etc., could be placed on a table for the children to match. Several charts with colourful objects drawn on them, some in pairs and some not, may be used to drive home the concept of non-identical pairs.



LEARNING ACTIVITY (20 MIN)

One by one, the children go to the table, pick up pairs of non-identical objects, turn around and show them to the class. Some children find the non-identical pairs on charts. Others talk about the non-identical pairs in the room (table and chair).

ADDITIONAL WORK

Children bring pictures from old magazines which form non-identical pairs. An open discussion on identical and non-identical pairs would be useful. It may be pointed out to them that a pair of shoes (left and right) form a non-identical pair and so does a pair of gloves.

CLASSROOM ORGANIZATION (10 MIN)

The teacher may separate the available non-identical pairs and put them into two different cartons which are then placed in two different corners of the room. The utility of each of the objects in one carton can be discussed and the kids are made to realize that each object in one carton is incomplete without its counterpart in the other. So children can go to the other corner one by one and find the matching object for all non-identical pairs.

Shadow Matching—with Cut-outs and Outlines (Page 10)

OBJECTIVE

Children learn to associate an outline (or a shape) with the object it represents. Visualising the actual object through its outline or a shadow helps in building imagination and logic.

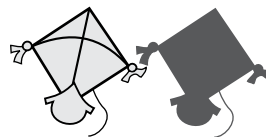
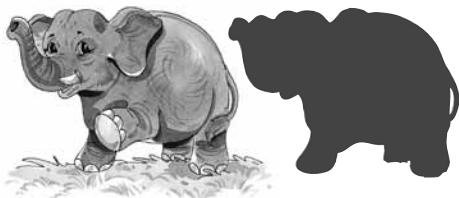
LEARNING CURVE (10 MIN)

Children learn to recognize objects from the outlines, such as packed gifts. This also involves association and recognition of shapes such as the wings of an aeroplane which stick out in the packed gift. The outline or the shape of a ball, when gift wrapped, is easily discernable. Children learn to observe how the shape of a cricket bat differs from that of a hockey stick.

This skill is very important for sensory perception, not only in mathematical concepts but also in everyday life.

LEARNING AIDS

- i) A number of cut-outs of different objects placed on a table, such as a pair of palm trees, a pair of bicycles, and a pair of boats with sails.



- ii) A chart with pictures of various objects and their shadows, such as an elephant with the trunk raised, a kite, a balloon, an aeroplane, a hockey stick and their shadows, etc.
- iii) A table full of gift-wrapped toys such as an aeroplane, a ball, and a cola bottle.

LEARNING ACTIVITY (20 MIN)

- i) The teacher calls the children to the table one by one and asks them to pick up two similar cut-outs from those of different objects such as cut-outs of a pair of horses, trams, trains or dolls.
- ii) Shadows are best introduced in the garden with the bright sun casting shadows of birds, poles, trees etc. The children place their hands near the grass and see the shadows of their hands cast on the grass. Alternatively, this exercise can also be done in front of a lamp with moving fingers. A shadow of fan can also be cast on the ceiling by placing the source of light on the floor. The children learn to pair the shadow with the object that is casting it.
- iii) An assortment of wrapped gifts are placed on the table, showing distinct outlines of the toys inside. Example: an aeroplane, with its two wings on the side; a ball, a bicycle with the outline of the wheels showing through, a doll, and so on.



The class is then divided into two groups. A child from one group picks up a packed object and children in the other group are asked to identify it. The game goes on with the groups switching roles.

After a number of such activities are carried out, both indoors and outdoors, children are asked to match animals to their shadows in the book.

ADDITIONAL WORK

Additional work involves identifying two pictures, one large and one small, of the same object such as the shadows of a large tree and a small tree of the same shape.

Story telling with the shadow-technique aids, also helps the children grasp the concept better.

CLASSROOM ORGANIZATION (10 MIN)

The doors can be left open with a white curtain drawn across the frame. The children guess what/who is on the other side, based on the shadow that he/she is able to make out from the curtain.

PART TWO

Counting Numbers 1-5 (Pages 11-25)

OBJECTIVES

Children learn numbers and number names between 1 and 5. They start with drawing as many lines as the toys in the classroom cupboard or as many toothpicks as there are bits of bread kept on a plate. The children stick the toothpicks in the pieces of bread and discover the meaning of 'as many as'.

After various such activities showing 'one-to-one' association, The children start writing numbers in their books, writing the numerals alongwith the corresponding number names. They also call out the name after writing it.

LEARNING CURVE (10 MIN)

Stories about cavemen and the way they kept their records are very exciting for children. Charts of those times, if put up in the classroom, fascinate children a lot.

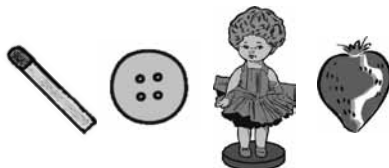
A lot of such data can be obtained from the internet.

The shapes of numbers 1 to 5 are introduced to children along with their meaning. For example, 2 is one more than 1, 3 is one more than 2, and so on. This lays the foundation of the concept of addition and subtraction that is discussed later on in the book.

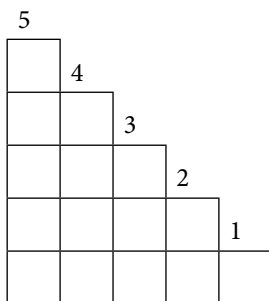
Not only do they learn the 'value' of numbers, but they also learn to associate 1 with one nose, 2 with two eyes, 5 with five fingers, etc. It is even possible for the children to recognize groups of 2, 3, 4, and 5 objects at a glance if enough practical work is carried out in the class.

LEARNING AIDS

1. An assortment of countable objects such as matchsticks, plastic cutlery, large buttons, bottle caps, dolls, plastic fruits and vegetables, and toy cars, etc., that children see in their everyday life.



- It is very useful to have groups of 1, 2, 3, 4, and 5 marbles or large wooden buttons sewn in little 'net' pouches. Children can see and feel the marbles and observe how they group together.
2. A staircase is very useful for showing how numbers increase in value as children go up the stairs.



The switch board indicating floors in a lift, with the numbers changing as the lift goes up or down, is an excellent way to show the meaning of 'going up' as we go from smaller to bigger numbers and 'going down' when we move in the reverse order.

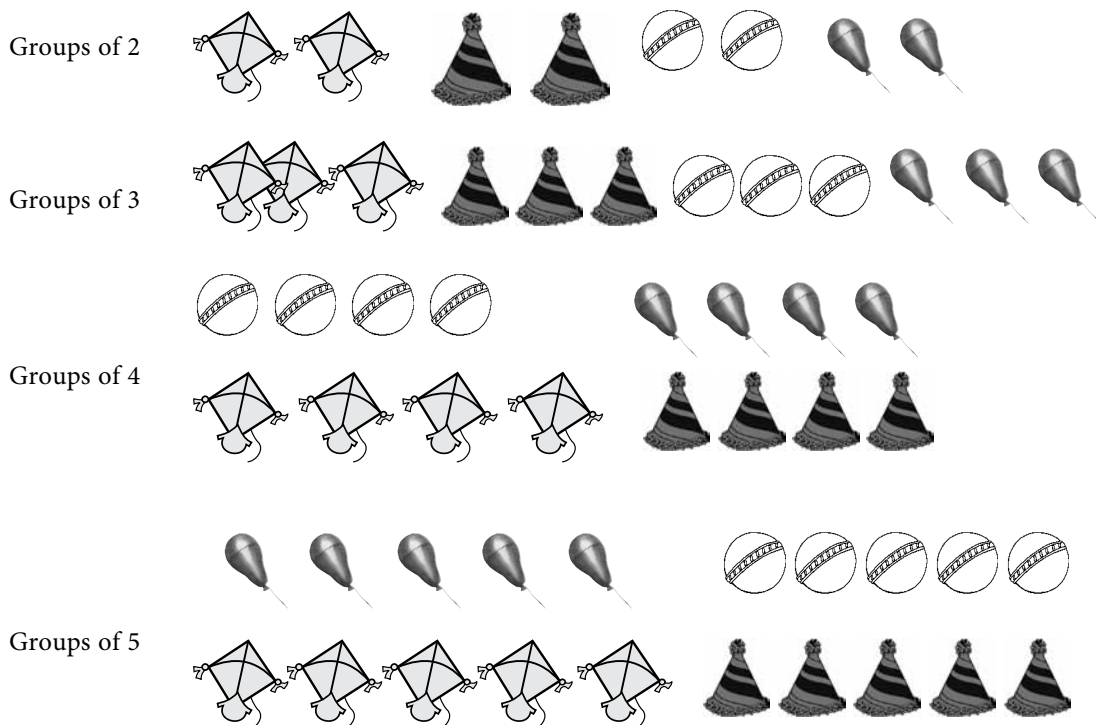
3. Charts with numerals 1 to 5 written in the centre in large size and matching number of objects placed all around the number.
4. 5 tables can be arranged in such a way that Table 1 has one of each object like 1 doll, 1 kite, 1 balloon, 1 book, 1 eraser, and so on while Table 2 has two of each object such as 2 plastic spoons, 2 lunch boxes, and so on. Similarly Table 3, Table 4, and Table 5 can also be laid.
5. Charts showing different groups of numbers for instant recognition.
6. It would prove to be very productive if the teacher adheres to the following order during the lessons:
 - First move from the actual physical example to picture
 - Then move from the picture to 'picture and number'
 - Finally move from 'picture and number' to number only

LEARNING ACTIVITY (20 MIN)

The teacher should carry out in the classroom the same activity of relating 'one-to-one' by placing as many sticks of chalks on the table as there are buttons on the clown's shirt or pencils in a pencil box. This activity may be followed by writing the numerals on the board and an introductory discussion on the concept of $1 + 1$, $2 + 1$, etc. As children grow, it is important that they also learn simple addition of numbers.

ADDITIONAL WORK

On sheets of old newspapers, children draw 1 kite, 2 balls, 3 balloons and so on. Number poetry is also fun to learn. Instant recognition of groups of 2, 3, 4, and 5 is very important.



Charts with pictures stuck on them in such formations help children visualize number patterns.

CLASSROOM ORGANIZATION (10 MIN)

The teacher can arrange a number development corner in the classroom. In it the following aids can be placed to assist the children further:

1. Dice
2. Counters
3. Number books
4. Dominoes
5. Flannelgraph
6. Number charts
7. Number mobile, etc.

The teacher should ask the children to write the number in the air as well and she can devise rhymes to assist in the movement of hands.

Pages 27–29 reinforce the number sequence and thus must be accompanied by a great deal of practical work. Use of fingers, toes, and pictures on the soft board are very helpful.

The following poem can be recited in the class to enhance learning:

1 sun, 1 moon, 1 nose

And 1 horn of a unicorn

2 hands, 2 eyes, 2 horns

And 2 feet of birds that tweet.

3 legs of a tripod, 3 wheels of a tricycle,

And 3 cheers for the 3 musketeers.

4 legs of a dog, 4 of a cat

And 4 legs of the chair we sit on.

5 fingers, 5 toes, 5 vowels

And 5 paws of animals in the zoos.

Addition (Pages 26-29)

OBJECTIVE

Children learn addition of numbers up to 5. Speed and accuracy in addition of numbers up to 10 is essential in all walks of life (despite the presence of calculators in the cell phones).

LEARNING CURVE (10 MIN)

By explaining the number sequence as '2 is 1 more than 1', '3 is 1 more than 2' and so on, addition is introduced in a practical manner. A great deal of practical work in the garden or in the classroom is necessary for this.

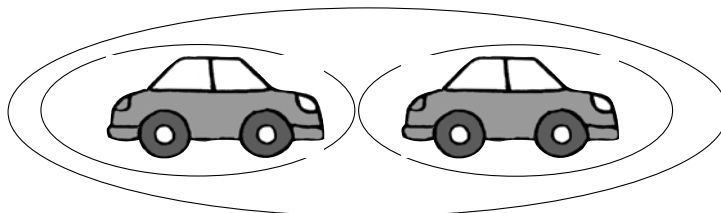
The children also learn to write the addition symbol, + (pronounced as plus) and the equality sign, = (pronounced as 'equal to'). It is important that they learn where to place these symbols.

LEARNING AIDS

1. Ropes for making loops of various sizes.
2. An assortment of objects from children's everyday life like small dolls, sweets, toy cars, trains, helicopters, paper flowers, and leaves, etc.
3. Sticks for symbols of + and =.
4. Flannelgraph

LEARNING ACTIVITY (20 MIN)

Take the children on a 'plastic bag collection' drive in the garden. One child collects 1 plastic bag, and puts it in a bin. So, there is 1 plastic bag in the bin. Another child puts 1 more plastic bag in the same bin. Thus, when 1 more plastic bag is added to the bin that already contains 1 bag, there would now be two plastic bags (i.e. $1+1=2$) in it.



Similarly, 2 plastic bags when added to 1 give 3 plastic bags. Ask each child to repeat the same activity till 5.

Next, make two loops on a table with ropes. Place a toy car in one loop and another toy car in the second loop. Now place a bigger loop around both these small loops. How many cars altogether in the big loop? (+ and = symbols not to be used here).

More such activities can be carried out on the board with loops drawn and stars or smileys drawn inside the loops to display addition.

The children learn about the addition symbol (+) as well as the 'equal to' (=) sign and where to place them when the teacher writes the addition statements separately.

Note: Do not use the symbols inside the loops.

ADDITIONAL WORK (10 MIN)

Continuous practice in addition needs to be given to children with fingers, bars of chocolate or anything else that is a part of their everyday life. The children **MUST** know by heart, simple facts such as:

$$1 + 1 = 2$$

$$2 + 2 = 4$$

$$1 + 2 = 2 + 1 = 3$$

$$1 + 3 = 3 + 1 = 4$$

$$1 + 4 = 4 + 1 = 5$$

$$2 + 3 = 3 + 2 = 5$$

More photocopied addition pages must be given to children to work on.

Subtraction and Concept of Zero (Pages 30–37)

OBJECTIVE

Children learn subtraction by practically 'taking away' upto 5 objects. Addition and subtraction form the basis of the entire number system.

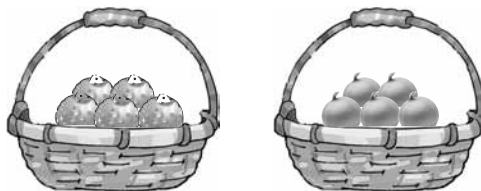
LEARNING CURVE (10 MIN)

Through addition, learnt in the earlier pages, children automatically get an idea of 'more than' and 'less than' and consequently the concept of 'taking away' becomes intuitive.

Subtraction becomes easy for students to grasp with the use of practical examples like: 'I had 4 sandwiches, he took away 2'; 'I had 3 chocolates, I gave 1 to my sister' and so on. Children enjoy learning through a practical discovery approach. These pages introduce subtraction in a practical manner, using the symbols '-' and '='.

LEARNING AIDS

It is useful to have baskets of plastic vegetables and fruits. Each basket contains 5 oranges or 5 onions. But any other objects from real life, as used in earlier pages for ADDITION, will do just as well.



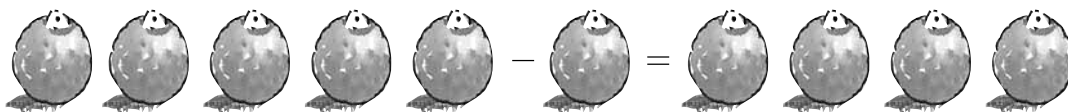
LEARNING ACTIVITY (10 MIN)

A fruit vendor comes to the school gate with small baskets of fruits and children observe how he sells the fruits (by numbers).

They then, try to emulate him. One of the students plays the role of a shopkeeper having 4 baskets. Let each basket contain 5 identical fruits like oranges, bananas, guavas, cherries or mangoes.

The other students visit the shop to buy fruits.

One of the students posing as a customer buys 1 orange. The shopkeeper gives him/her 1 orange and counts the number of fruits left in the basket. He/she counts and says, '5, take away 1, leaves 4'. The teacher writes ' $5 - 1 = 4$ ' introducing the sign of subtraction.



Another student buys 2 mangoes and the shopkeeper says, "I have 3 mangoes left," and the teacher writes on the board, " $5 - 2 = 3$ ".



And this carries on ...

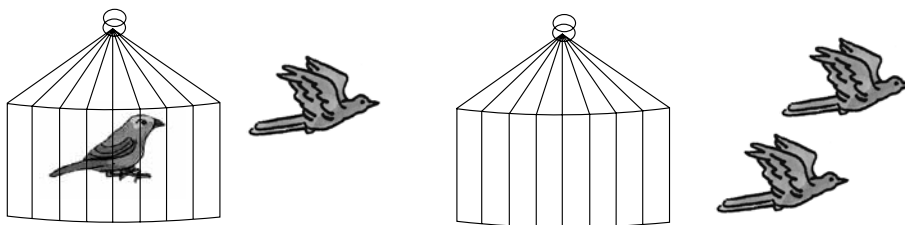
PAGES IN THE BOOK (15 MIN)

After having worked practically and seen the teacher write the symbols on the blackboard, working on the subtraction pages in the book becomes very easy.

Subtraction leads to the concept of '0'.

Bobo the Bunny, had 4 carrots, and it ate all of them, so it has 0 carrots left.

Two birds in a cage, both fly away, one by one, ... 0 birds left. Zero(0) merely stands for NOTHING.



Note: Do not cage the birds.

ADDITIONAL WORK

Circulate more worksheets with horizontally set addition and subtraction sums having illustrations showing actual 'take away.'

REMEMBER (5 MIN)

It is essential to show subtraction practically as 'taken away' and to show the same on a sheet of paper by means of 'crossed-out' objects, not as:



The teacher may also introduce the concept of more, few or less at this stage by framing sentences like:

Raghav has 3 sweets and his mom gave him 1 more. He has more sweets now. Rana had 3 buns. He ate 1. He has fewer buns now. (Children often say 'less' which is alright, at this level.)

More or *Less* comparisons should always be done in a practical manner.

Take 2 sets of pebbles—one having 3 pebbles and the other having 5 pebbles (You may also take vases with flowers or jars with toffees). Children match one to one from each set. The set, which has some pebbles left over, has more, and the set, which has none left over has fewer or less. (Visual recognition of number groups is very useful here.)

PART THREE

Count and Write (6-9) (Pages 38-46)

OBJECTIVE

Association of the numerals with the objects, visual grouping and concept of 1 more, leads on to the numbers 6, 7, 8, and 9.

LEARNING CURVE (10 MIN)

Although children have been working with numbers up to 5 but a rough concept of higher numbers already exists in their minds through various day-to-day observations like listening to elders talking about time, counting their fingers, looking at chocolate squares in a chocolate bar and so on.

6 runs in a SIXER in cricket, 6 legs of an insect

7 days in a week

8 legs of an octopus and a spider

The focus at this level should be on single-digit numbers up to 9 but if the number 10 is also introduced, then the concept of 0 as a 'place-holder' is not emphasized here. It may be explained that just as '=' is a symbol for 'equals', '10' is a symbol for 'ten' which is the number of fingers of two hands.



LEARNING AIDS

Counting trees in a garden, counting toys, going up and down the stairs, the buttons in an elevator, etc., serve as great tools for teaching numbers up to 9 (or 10 without the introduction of place value).

Other learning aids can be: Used strips of medicines with 10 bubbles, 10 pens in a packet, 10 chocolate squares in a bar and similar objects. Another similar set may be used with one item missing from each (for showing 9).

LEARNING ACTIVITY (10 MIN)

Children work on the basis of '1 more' till they come to number 9, as was done for numbers from 1 to 5. Learning activity here is just an extension of earlier work. Use of fingers may be encouraged, before taking the children on to 'mental' addition and subtraction.

PAGES IN THE BOOK (20 MIN)

The pages in the book are also an extension of the work done in pages dealing with 1 to 5. The ladders given on page 46 in the book show that each bigger number is one step higher than the number below it. Here, the teacher can also talk about the buttons in the elevator.

This eventually leads to 'ascending and descending orders'.

ADDITIONAL WORK

A hopscotch-type pattern can be created on the board as well as on sheets of paper on which children work with numbers from 1 to 9.

Children play a clapping game with numbers. They sit in a circle and speak out the numbers aloud, one by one. Every alternate child or every third child merely claps. He/she does not call out the number.

Pages 47-50 reinforce the number sequence in various practical ways. More activities like this are necessary in the classroom. A great deal of repetitive activity for writing numbers and number names is required to improve motor control, and hand-and-eye coordination.

It is important to stress here that children must learn to sit with a straight back and maintain a proper posture while writing. They should hold the pencil in the correct manner.

Count and Write Ten (Pages 47-49)

OBJECTIVES

Children learn the value of 10, and are able to count objects up to 10.

LEARNING CURVE (10 MIN)

'1 more than 9', 10 fingers and 10 toes, and other similar concepts arise in the mind of the child after working with numbers up to 9 in the earlier pages. These will be reinforced in the current pages leading to the introduction of 2-digit numbers.

LEARNING AIDS

Strings with 10 beads, bundles of 10 matchsticks, used bubble strips of medicine, packs of 10 pens, little 'net' packets containing colourful beads in groups of 1s, 2s, 3s,... up to 10s, an abacus, a number mobile.

LEARNING ACTIVITY (20 MIN)

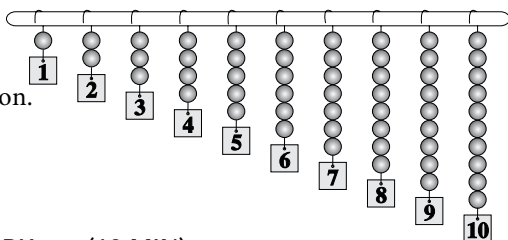
The concept of 10 can be taught easily by counting of fingers and toes. It is important to reiterate that 10 is merely a number and is written as: **10**. A lot of practical work is necessary before the concept of 10 is reinforced with the written work given in the book.

In this activity, children string beads in groups of 10. They count the hanging beads along the rope. They may tie toothpicks or lollipops in groups of 10 or group objects together up to 9, and then add 1 more to make 10 and so on. The 'net' packets with beads are very useful to make groups of 10s in the manner shown below:

$$1 + 9 = 10$$

$$2 + 8 = 10$$

$$3 + 7 = 10 \text{ and so on.}$$



ADDITIONAL WORK (10 MIN)

Children may be asked to segregate pages in their exercise books in groups of 10. They may also be asked to work with missing numbers and number sequences up to 9.

Net bags are very useful for grouping numbers as '5 + 1' or '5 + 2', and so on. Each of these net bags may be tied with different coloured ribbons. Children begin to associate 1 with red, 2 with blue, 3 with green, 4 with white, and 5 with black coloured ribbon.

Then, 6 will have a black and a red ribbon.

7 will have a black and a blue ribbon, and so on.

10 will have 2 black ribbons (showing $5 + 5 = 10$).

Addition and Subtraction of Numbers up to 9 (Pages 50-53)

OBJECTIVE

The children learn addition and subtraction of numbers upto 9, based on the earlier concepts.

LEARNING CURVE (10 MIN)

The children have learnt addition and subtraction of numbers up to 5. This is merely an extension of the earlier practical and written work.

LEARNING AIDS, LEARNING ACTIVITIES AND PAGES IN THE BOOK (20 MIN)

All learning aids, activities and pages at this level are similar to addition and subtraction of numbers up to 5, except that larger numbers are used here.

All the work in these pages stems from the earlier work using symbols + and −, and reinforces it. It is important for children to be able to mentally add and subtract numbers up to 9.

ADDITIONAL WORK (10 MIN)

Children work with concrete objects and teacher works on the board, with children giving answers before writing in their books. More sheets like these are necessary for greater practice.

At this level, it is important that teachers always proceed in the following order:

1. Concrete objects
2. Pictures only
3. Picture and number
4. Numbers only

This order must be followed for introduction of any mathematical concept.

Worksheets (Pages 54-60)

These worksheets are based on all the learning done throughout the year. They have been provided for reinforcement in the areas of hand and eye coordination, recognition, association, memory, and logic. They are as much fun as the learning pages, if not more.

Topic wise Answers **Primer A**

PART TWO

- Write the missing numbers (page 23)
(a) 3, 5 (b) 2, 4 (c) 1, 3, 4 (d) 2, 3, 5
- Fill in the missing numbers (page 24)
flowers: 2, 3, 4 (a) 3 (b) 3 (c) 5 (d) 2 (e) 1
- Add and colour (page 29)
4, 3, 2, 2, 5, 2
- Subtraction (page 33)
 1. (a) 2 (b) 2 (c) 2 (d) 1 (e) 4 (f) 3 (g) 3 (h) 1
 2. (a) 1 (b) 3 (c) 4 (d) 2
 3. (a) 2 (b) 2 (c) 3 (d) 1 (e) 2 (f) 2 (g) 1 (h) 3
- Concept of zero (page 34)
Bobo: 4, 2, 0
- Count and write the numbers (page 35)
4, 3, 2, 1, 0

PART THREE

- Up and down the ladders (page 42)
First ladder: Up = 1, 3, 4, 5, 7, 8
Second ladder: Down = 9, 6, 4, 3, 2
- Addition (page 43)
tail = 4, 5, 3, 5; wing = 3, 5; neck = 4, body = 4, 2; foot = 5
- Join the dots (page 44)
Write the numbers: 3, 4, 6, 7, 8
Write backwards: 8, 7, 5, 4, 3, 2
What comes between: 4, 2, 5, 3, 6, 7

- Fill in the missing numbers (page 49)
 - (a) 2, 4, 5, 7, 8, 9
 - (b) 1, 3, 4, 5, 7, 8, 9, 10
 - (c) 2, 3, 4, 6, 7, 8, 9, 10
 - (d) 8, 7, 6, 4, 3, 1
- Addition (page 50)
 - 1 (b) 5,5 (c) 6,6 (d) 7,7 (e) 8,8 (f) 9,9
 - 2 (b) 5,5 (c) 9,9 (d) 9,9 (e) 7,7 (f) 8,8
- Subtraction (page 52)
 - (b) 8 (c) 7 (d) 9 (e) 4\
- Addition and subtraction (page 53)
 - (b) 6, 4 (c) 9, 8 (d) 9, 6

Worksheets

Worksheet 2: (a) 7, 9 (b) 9, 10 (c) 6, 8
 (d) 3, 6 (e) 1, 3 (f) 8, 10

Worksheet 4: 2 (a) 5 (b) 9 (c) 4 (d) 7 (e) 3 (f) 8
 3 (a) 6 (b) 7 (c) 9 (d) 8 (e) 1 (f) 2

Primer B

PART ONE

Revision (Pages 1-15)

These are creative and fun pages where the following concepts have been revised:

- Counting and writing numbers
- Colouring shapes (for recognition of colours and to improve motor control)
- Recognizing numbers up to 10 including 0 and associating them with the correct group of objects
- Assessing many or few
- Carrying out simple additions and subtractions
- Matching shapes and grouping them together
- Recognizing solid shapes and revising names

All these reinforce earlier concepts and prepare children for the discovery ahead.

The Learning Curve at every new level involves the following steps:

- First step: Practical work
- Second step: Pictures and blackboard
- Third step: Work in exercise books

Addition and Subtraction on a Number Line (Pages 16-18)

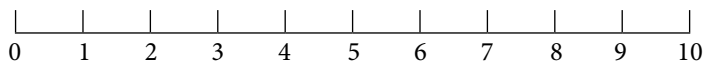
OBJECTIVE

Children learn to add and subtract numbers up to 10 on a number line.

LEARNING CURVE (10 MIN)

In Primer A, children have already learned to work practically with numbers up to 9 and have done addition and subtraction using hand-held objects. In these pages, they reinforce their knowledge of addition and subtraction, first by trying them out in a hopscotch pattern on the floor, then on a number line drawn on the floor and finally in their books.

A number line is a very helpful tool as children can differentiate between the bigger number and the smaller number at a glance by just looking at the position of a number on the line. Then they carry out additions and subtractions up to 10.



LEARNING AIDS

- Little 'net' bags (properly sealed) containing 1, 2, 3, 4...up to 10 beads,
- Triangular flags
- Similar 'grouped' objects such as empty medicine strips cut into 1, 2, 3... up to 10 squares
- Abacus
- Strings of beads, numbered 1 to 10, hanging from a rod

Note: Make sure that the material used is non-metallic, as metal may cause injury.

LEARNING ACTIVITY (20 MIN)

Children play hopscotch for fun. They then draw a number line from 0 to 10 on the floor (in the verandah or in the classroom) with the help of a teacher, making sure that all sections of the number line are equal.

If space permits, children can hop on the number line, like bunnies, to learn about more or less, add and subtract, and the beginning of the number sequence.

ACTIVITY 1

The teacher asks one of the students to go to the position 3 with 3 flags in his/her hand. Next, another student goes to 5 with 5 flags in his hand. Gradually all the positions are filled up. One student is made to stand on the position '0'. This one has no flags in his hand. The students exchange positions and simultaneously exchange the number of flags, according to their new position.

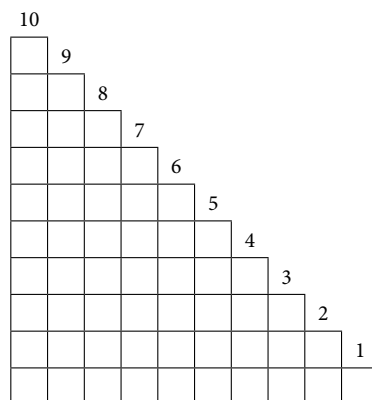
ACTIVITY 2

The teacher gives three flags to one of the students and asks him/her to go to the position 3. The teacher then gives two more flags to this student and asks him/her to go 2 more spaces to the right on the number line. The student finds that he/she is on position 5. On counting the number of flags in his/her hand, he/she discovers that there are 5 flags.

The teacher, then, writes on the blackboard, $3 + 2 = 5$.

For subtraction, the student takes away, say, 3 flags from 7 and writes $7 - 3 = 4$ on the blackboard. He/she works it out on the number line before writing the same in his/her book.

The bulletin board could have a visual demonstration of the same like a stair.



PAGES IN THE BOOK (10 MIN)

The pages in the book provide a lot of practice for recognition of numbers, carrying out addition and subtraction and filling out the answers in the boxes provided. Sufficient colouring activities, incorporating simple additions, have also been included.

ADDITIONAL WORK

The teacher should create more worksheets showing number-group association, number recognition, and addition and subtraction work and distribute them among children so that they get good amount of practice.

PART TWO

Number Families of 10 (Pages 19-21)

OBJECTIVE

To recognize the number families of 10, such as: $3 + 7 = 10$, $7 + 3 = 10$, $10 - 3 = 7$, $10 - 7 = 3$

LEARNING CURVE (10 MIN)

Addition and subtraction (and multiplication and division) with 10s forms the basis for the decimal number system. As children are constantly using fingers of their hands to count up to 10, they can be easily made aware of such group formations.

The children should learn various number families by heart. This will prove useful for mental addition and subtraction in their later lives.

LEARNING AIDS

- Strings and beads
- Triangular flags
- Flags numbered from 1 to 10. They can also be used when making bundles of 10 later on in the book.

LEARNING ACTIVITY (15 MIN)

Stringing together different number of beads to make groups of ten is a very useful exercise. Similarly, triangular flags can be used to make groups of ten, with 2 or 3 children holding the flags high, for the rest of the class to see. Repeat activities involving the net bags, the number beads and the number line but this time keep them focussed on number 10.

Using bangles and sweets, children reinforce what they know instinctively about addition. They learn to write addition statements in their books. The following poem can be of great help in reinforcing the concept of 10.

“1 is one,
And all alone,
But zero is the hero!
Place 0 after 1,
You get not 1,
But, Oh! My! My!
10 becomes the Hero!

ADDITIONAL WORK (15 MIN)

The pages given in the book reinforce the work done practically. A great deal of oral and written work needs to be done to make sure that children can orally work out pairs of numbers which add up to 10 and then reposition the numbers to show subtraction.

It is great fun to tie different bundles of 10 made of flags, beads (in strings) or ice cream sticks. These can be regrouped in further bundles of 10 (without emphasizing the concept of HUNDRED) in preparation for Class I.

To help children memorize number names and start with simple reverse counting, a little poem like this is fun:

- 1, one; Zero is fun!
- 2, two; 1 cow says mooooooo!
- 3, three; 2 donkeys say hee hee
- 4, four; 3 nails on the door
- 5, five; 4 fish alive!
- 6, six; 5 dogs have ticks
- 7, seven; 6 Angels from Heaven
- 8, eight; 7 eggs in a plate
- 9, nine; 8 grapes on a vine
- 10, ten; 9 chicks and a hen

Shapes (Pages 22-31)

OBJECTIVE

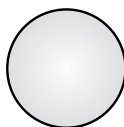
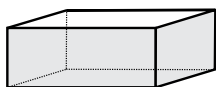
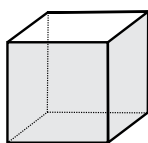
To establish an association between flat shapes and solid shapes.

LEARNING CURVE (10 MIN)

Children can recognize solid shapes which they hold in their hands in everyday life such as balls, tins, dice, bricks, and cones. They also recognize flat shapes such as circle, square, rectangle, triangle and sometimes even hexagon (because of its association with beehives or shapes of pencils). They look for and recognize flat shapes as sides of solids.

LEARNING AIDS

- Wooden blocks of all the solid shapes that are readily available such as balls, tins, dice, bricks, and cones are of great use.
- 'Feely bag' (a strong cloth bag, stuffed with little thermocole granules) is a good aid to use.
- Water colours, paint brush, and old newspapers can also be used for colouring the shapes.



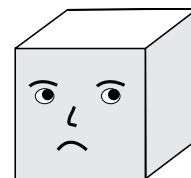
LEARNING ACTIVITY (10 MIN)

Children close their eyes, hold the wooden blocks in their hands and guess the shape merely by feeling. One of the all-time great activities is to paint each face of a solid (say, a cube) in different colours, and stamp each face on an old sheet of newspaper. For example, the first 'stamp' is red. This stamping is repeated with different colours (blue, green, black, yellow, and orange) on each of the 5 faces. Children discover that a cube has 6 faces because they used 6 different colours. Children can also draw different patterns on the surfaces for fun and work out the numbers of faces, and so on.

Children work with balls, cans, and cones. They find that a ball has one round face. A can has two flat circular faces. The curved face can be flattened to form a rectangle. A cone has one circular face and one curved face, which can be flattened to look like a part of a circle.

PAGES IN THE BOOK (10 MIN)

Various shapes are referred to as 'faces' (rather than surfaces) and have amusing expressions (all sad or angry though) drawn on them. As a result, the lesson becomes 'play', rather than 'study'.



ADDITIONAL WORK (10 MIN)

The students may be asked to search in the classroom or garden for solids and flat shapes studied in these pages. The work at this level is pre-primary and should aim to concentrate on improving the spatial skills, recognition of various flat shapes and their association with the solid shapes.

Making 10 (Pages 32–33)

Children practice the formation of 10 by counting the objects and then adding them vertically. This could be done before the next topic (Addition with Zero).

Addition with Zero (Page 34)

OBJECTIVE

To learn that the 'opposite' of ALL is NOTHING, i.e. ZERO.

LEARNING CURVE (15 MIN)

In Primer A, zero was introduced as: $1 - 1 = 0$, $2 - 2 = 0$, $3 - 3 = 0$ and so on. This concept is there, forever. However, on this page, zero has been taught using another concept with illustrations. According to this concept, the notion of zero being 'nothing' is conveyed to students by asking questions like:

- 1) All the 9 apples are on the floor; how many apples on the tree?
Referring to the illustration, the teacher conveys that the answer is 0.
- 2) All the 4 fish are outside the tank; how many fish in the tank?
The answer is again 0.

On similar lines, the teacher can make more questions like: All 30 children in the garden, how many children in the class?



LEARNING AIDS

- Toffees and a plastic jar
- Several paper fish (with a clip attached at the back) and a fish tank
- A magnet on a fishing rod, to do 'fishing'
- Flags and a rubber band to tie them together in groups of 10



ADDITIONAL WORK (25 MIN)

This page in the book reinforces the concept of zero and children develop more writing habits. Many more worksheets using the above concept need to be created and distributed among children for practice.

PART THREE

Numbers 11–20 (Pages 35–54)

OBJECTIVES

To introduce numbers from 11 to 20 and to practice their number names, association of numbers with objects, addition and subtraction based on what has been learnt so far for numbers up to 10.

LEARNING CURVE (10 MIN)

Numbers up to 20 are merely an extension of the number sequence from 1 to 10. Visually, children recognize '10 + 1' and '10 + 2' as 11 and 12 respectively. And they know these numbers by their names as 'eleven', 'twelve', 'thirteen' and so on.

The teacher points out that these numbers are associated with earlier numbers as follows:

'**twelve**' is to '**two**' : 2 + 10

'**thirteen**' is to '**three**' : 3 + 10

'**fourteen**' is to '**four**' : 4 + 10, etc.

LEARNING AIDS

- Number line from 1 to 20 on the floor and on the blackboard
- Number lines from 1 to 20 for each child
- Net bags, each containing 10 stones, and some loose stones
- Strings, each with 10 beads, and some loose beads
- Packets, each with 10 pencils, and some loose pencils
- Packets, each with 10 buttons, and some loose buttons

LEARNING ACTIVITY (10 MIN)

The children have already been introduced to skills required for addition and subtraction of smaller numbers. On similar lines, they learn to add and subtract with numbers up to 20, at first with objects listed above, then on the number line, and finally on the paper.

The concept of *before*, *after* and *between* can be taught by means of an interesting activity wherein two children stand in front of the class with two cards showing consecutive numbers such as 16 and 17. A third child is then asked to find the number that would come before these two numbers (i.e. 15) and another one is asked to find the number that would come after these two numbers (i.e. 18).

Similarly, they find the number between any two even numbers or between any two odd numbers and so on.

PAGES IN THE BOOK (10 MIN)

Children work with numbers *before*, *between*, and *after* two numbers. The more they are familiar with the sequence of numbers up to 20, the more easy it would be for them to attempt such questions.

ADDITIONAL WORK (10 MIN)

While working on these pages in the class, the teacher may point out to the children that, in a number sequence, if a number is odd (e.g. 11), then the numbers before and after it will be even (10 and 12); and similarly if a number is even (e.g. 16), then the numbers before and after it will be odd (15 and 17).

Counting in 2s: Pairs (Pages 55-58)

OBJECTIVE

Working with pairs leads to understanding of odd and even numbers.

LEARNING CURVE (10 MIN)

Children are familiar with like pairs such as 2 tea spoons, 2 bangles, or 2 ear-rings, and unlike pairs such as left and right, a set of spoon and fork, or a set of cup and saucer which pair together to make a set.

LEARNING AIDS

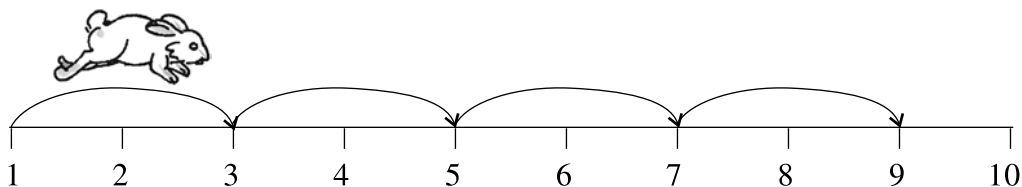
- A table with like pairs such as 2 ear-rings on a card, 2 bangles put together with a rubber band, and so on.
- Another table with unlike pairs such as a toothbrush and a paste, tied together with a rubber band, a badminton racket and a shuttle cock held together and so on.
- Net bags with odd and even number of beads in them.

LEARNING ACTIVITY (15 MIN)

Children stand in pairs (pairs of children are unlike pairs) and each of them hold up 2 objects, initially like pairs and then unlike pairs. The children then say out aloud that 4 makes 2 pairs, 6 makes 3 pairs, and so on. The teacher explains that since the numbers 2, 4, 6, 8, etc., can be associated with pairs, they are even numbers. These numbers are then shown on the number line.

In odd numbers, after making pairs, there will always be an 'odd' one left out. On the number line too, after the bunny hops in 2s, there will be one space left out.

If there is a like or unlike pair of twins in the class, it would be a good idea to show them as pairs but *not before* taking the permission of their parents.



ADDITIONAL WORK (15 MIN)

With the help of net bags or on the number line, children find that:

- When 2 even numbers are put together or added, the resulting number is even.
 - When 2 odd numbers are put together or added, the resulting number is also even.
- They mix numbers from odd and even bags and find these out for themselves.

Worksheets (Pages 60-67)

Worksheets have been so designed that they provide condensed revision of the entire Primer B. The same objectives and learning activities apply for these pages as well. Such an exercise increases ability to recall and improves memory. There are many problems in the worksheets that also encourage lateral thinking among the children.

Topic wise Answers **Primer B**

PART ONE

- Concept of Zero (page 3)
5, 0; 8, 0; 0, 4
- Count and write (page 5)
2. 2, 3, 4, 5, 6, 7, 8, 9, 10
- Addition (page 6)
1. (a) 4 (b) 3 (c) 4 (d) 5
2. (d) 4 (e) 2 (f) 3 (g) 0 (h) 1 (i) 0 (j) 0 (k) 2 (l) 1
- Subtraction (page 10)
2. (b) 4 (c) 3 (d) 2 (e) 1
3. (b) 2 (c) 4 (d) 3 (e) 5
- Addition and subtraction (page 12)
head = 2 neck = 3 wing = 2, 4, 1 stomach = 2 tail = 4 top leaf = 2 branch = 5 bottom leaf = 2
- Number Pairs (page 15)
1. (b) 4 (c) 2 (d) 5
2. (b) 4 (c) 3 (d) 1 (e) 2 (f) 3 (g) 2

PART TWO

- Number line (page 16)
1. (a) 6 (b) 7 (c) 3 (d) 3
2. (a) 5 (b) 6 (c) 9 (d) 5 (e) 9 (f) 6 (g) 0 (h) 2
3. (b) 4 (c) 2 (d) 4 (e) 0 (f) 0 (g) 1 (h) 4
4. (a) 8 (b) 7 (c) 6 (d) 4 (e) 8 (f) 9 (g) 6 (h) 7
(i) 5 (j) 8 (k) 4 (l) 7 (m) 6 (n) 9 (o) 6 (p) 8
- How many hops to get to 10? (page 20)
5. Row 1: 9, 8, 7, 6, 5, 4, 3, 2, 1
Row 2: 8, 3, 4, 5, 9, 1, 6, 7, 2

- Subtraction from 10 (page 21)
 6. 10, 9, 8, 7, 6, 5, 4, 3, 2, 1
 7. 9, 6, 4, 0
- Colour the shapes (page 22)

(a) cylinder	(b) cuboid	(c) cuboid	(d) cuboid
(e) cone	(f) cylinder	(g) sphere	(h) cube
- Puzzle (page 27)
 2. (a) $\triangle\bigcirc$ (b) $\triangle\bigcirc$ (c) $\bigcirc\triangle$ (d) $\bigcirc\bigcirc$
- Colour the shapes (page 30)
 5. 4 triangles, 5 circles, 2 squares, 3 rectangles
- Making 10 (page 32)
 1. 2, 7 + 3, 6 + 4, 5 + 5, 4 + 6, 3 + 7, 2 + 8, 1 + 9
 2. a - e = 10
- Climb the steps to 10 (page 33)
 3. 2, 3, 4, 5, 7, 8, 9
 4. Add the following (page 33)
 - (b) - (f) = 10
- Addition with Zero (page 34)

(a) 2	(b) 0, 8, 8	(c) 5, 0, 5 + 0 = 5	(d) 0, 6, 0 + 6 = 6
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PART THREE

- Addition (page 35)
 - 12, 13, 14, 15, 16, 17, 18, 19, 20
- Before, After, and Between (page 37)
 1. before: 13, 2, 6, 17, 5, 1, 14
 between: 17, 5, 12, 4, 10, 13, 6
 after: 14, 7, 18, 5, 20, 3, 6
 2. before: 14, 8, 18, 11, 15, 19
 after: 15, 18, 1, 13, 9, 11
 between: 11, 1, 18, 15, 12, 19
- Count and write (page 42)
 4. (a) 8 (b) 11 (c) 12 (d) 7 (e) 16 (f) 20 (g) 9
 8. 5, 6, 5, 4
- Count and write how many (page 47)

(a) 8	(b) 12	(c) 10	(d) 4	(e) 20	(f) 16
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- Count and circle the objects (page 48)

(b) 13	(c) 11	(d) 14	(e) 15	(f) 16
(g) 18	(h) 19	(i) 20	(j) 18	
- Joining dots (page 49)
 13. 2, 3, 4, 6, 7, 8, 9, 11, 12, 13, 14, 16, 17, 18, 19

Review

Review 1: Trees = 18 Sun = 17 Cloud = 16 Tiger = 12 Elephant = 16
Bear = 14 $10 + 5 = 15$ Flower 1 = 19 Flower 2 = 11 Flower 3 = 13

Review 2: 1. 15, 18, 11, 20, 17, 12, 17, 13
2. 8, 1, 10, 15, 12, 6, 2

Review 3: 1. (a) 18 (b) 19 (c) 12 (d) 7 (e) 14 (f) 10
2. (a) 16 (b) 18 (c) 13 (d) 10 (e) 20 (f) 19
3. (a) 18 (b) 16 (c) 10 (d) 13
4. 18, 17, 16, 15, 14, 13, 12, 11, 10, 8, 7, 6, 5, 4, 3, 2

• Missing Numbers

Review 4: 12, 13, 14, 16, 17, 18, 19, 20, 20, 18, 17, 16, 15, 13, 12

- Ascending and Descending Orders (page 54)

Ascending: 6, 9, 11, 15, 18

Descending: 18, 15, 11, 9, 6

- Counting in 2s: Pairs 2, 4, 3, 6, 6
- Even numbers: 4, 8, 8; 5; 10, 10

Review 5: (a) 2 (b) 9 (c) 4 (d) 8 (e) 3 (f) 5 (g) 7

Worksheets

Worksheet 3: (a) 4 (b) 3 (c) 5

Worksheet 5: 3. (a) 13 (b) 4 (c) 11
4. (a) 13 (b) 9 (c) 17 (d) 12 (e) 18 (f) 19
(g) 15 (h) 17 (i) 15

Worksheet 6: 1. (a) 4 (b) 9 (c) 6 (d) 9
(e) 7 (f) 6 (g) 7 (h) 9
2. (a) 7 (b) 4 (c) 2 (d) 0 (e) 6

Worksheet 8: 2, 3, 4, 5, 6, 7, 8, 10
12, 13, 14, 15, 17, 18, 19
21, 23, 24, 25, 26, 27, 29, 30
32, 33, 34, 35, 36, 38, 39, 40
41, 43, 44, 45, 46, 47, 48, 49
51, 52, 53, 54, 56, 57, 59, 60
62, 63, 64, 65, 66, 67, 68, 70
71, 72, 73, 74, 76, 77, 78, 79
82, 83, 84, 85, 86, 87, 88, 90
91, 93, 94, 95, 97, 98, 99