

# Mathematics Activities

Guided by key Teaching at the Right Level (TaRL) principles, Pratham has created a number of engaging, fun games and activities over the years. This page attempts to show just a few of the mathematics activities that are used in TaRL classrooms.

TaRL implementers can create their own activities based on TaRL principles or tweak activities and materials to suit their own contexts when needed. Please also note that, before implementing TaRL, it is important to understand the holistic TaRL approach, rather than a few pieces of the approach and to engage with further process support from Pratham and J-PAL Africa before launching a TaRL programme.

Mathematics classes focus on number recognition, place value understanding, and the four basic operations: addition, subtraction, multiplication, and division. Central to TaRL classes is building confidence in mathematics and giving children ample time to practise their mathematics skills.

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## 1. Number chart

Through daily practice with a number chart, children at the beginner and 1-digit recognition level become familiar with written numbers.

**Levels:** beginner and 1-digit recognition

**Activity format:** whole group

**Steps:**

1. Begin by asking children to listen carefully while you read numbers from the chart. Place your finger under each number you read to help connect the spoken number to its representation on the chart.
2. Ask children to come forward and read the chart for the class. Make sure to continually praise children for their effort.
3. Ask children to follow along on their own small number charts.
4. As children become familiar with the numbers, switch up the order with which you read (horizontally, vertically, diagonally, and randomly to help children memorise the symbols). You can focus on specific parts of the chart on different days (for example, focus on numbers 1-20, then expand to 1-40, and so on).
5. For children at the 2-digit recognition level and above, an expansion chart is used in a similar way, to help them to become familiar with larger numbers.

Hundred Thousand	Ten Thousand	Thousand	Hundred	Ten	One
100,000	10,000	1,000	100	10	1
200,000	20,000	2,000	200	20	2
300,000	30,000	3,000	300	30	3
400,000	40,000	4,000	400	40	4
500,000	50,000	5,000	500	50	5
600,000	60,000	6,000	600	60	6
700,000	70,000	7,000	700	70	7
800,000	80,000	8,000	800	80	8
900,000	90,000	9,000	900	90	9

Expansion Chart

**Materials:** Large number chart; small printed number charts for each child

## 2. Bundle and stick activities

Sticks<sup>1</sup> are used for a number of TaRL activities for all levels. At the beginner and 1-digit recognition level, children practise counting with sticks and begin learning the basic operations. Having tangible objects to count helps to build a stronger understanding of the concepts. At the 2-digit recognition level and above, children use bundles and sticks to better understand place value, using the bundle rule: *ten sticks make one bundle*. They also manipulate bundles and sticks to understand how to use carry-over in addition and subtraction sums.

**Levels:** all

**Activity format:** whole group, small group, individual

<sup>1</sup> Different stick-like materials are used in different places – for example, in India, straws are easy to find and so are often used instead of sticks.

## **Steps:**

This activity uses bundles and sticks to help strengthen children's understanding of place value and is just one of the many TaRL activities using bundles and sticks.

1. When first introducing bundles and sticks in a mathematics class, begin with a short discussion about sticks. Where have the children seen sticks before? What have they used them for?
2. First, ask the class to simply observe. Place a large number of sticks on the ground and pick up a bunch of sticks (more than 10) from the pile.
3. Count the sticks carefully and loudly, placing each stick above your head as you count so that all children can see. Once ten sticks have been counted, tie them up in a bundle and tell children the bundle rule: "ten sticks make a bundle."
4. When there are less than ten sticks left, count them and ask: "can I make a bundle?"
5. Draw a number frame on the ground, with a column for bundles and another for sticks. Place the sticks and bundles in their columns and ask children how many bundles and how many sticks there are, writing in the numbers as they answer.
6. Once the number has been written, ask children to read the number.

Children can practise this activity with different numbers of sticks in their small groups and individually. To help children at higher levels manipulate larger numbers, instructors use play money with denominations of 1, 10, 100, 1000, and 10 000 in a similar way.

**Materials:** sticks, rubber bands or string, chalk, writing surface (floor/board)

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## **3. Basic operations**

TaRL mathematics classes introduce children to each of the four basic operations (addition, subtraction, multiplication, division) using techniques that help familiarise children with the operations:

- Tangible counters such as sticks can be used to show children how numbers can be added, subtracted, multiplied, and divided. This can go alongside real-world problems: for example, give one child ten sticks and ask them to divide the sticks among two friends.
- Word problems are an important part of TaRL classes. World problems grounded in children's context contain themes, ideas, and characters that are familiar and interesting to them. This helps to draw them into solving the problem and to begin to see how mathematics is relevant to their everyday experiences.
- Instructors lead discussions about operations, helping children to think about when each operation might be necessary.

Even children at the beginner level benefit from practising basic operations. Practising addition and subtraction using small numbers at this stage helps them to strengthen the link between the spoken numbers, their actual magnitude in physical counters (for example, sticks), and their written representation.

Once children have been introduced to the basic operations, their skills can be strengthened using bundle and stick activities and, for higher levels, play money, to help them understand carry-over and borrowing.

**Levels:** all

**Activity format:** whole group, small group, individual

The following activity uses play money to practise subtraction.

**Steps:**

1. Read a word problem for the class and show them a written version of the word problem to read.
2. Lead a discussion of the problem, using four questions<sup>2</sup>:
  - a. What information is given?
  - b. What is the question asking for?
  - c. What do I need to do?
  - d. Why should I do this?
3. Ask a child to come up and count out the first number and place it in the number frame. Then, ask a child to count out the number to be subtracted underneath the first number. Choose a sum involving carry-over to help children grasp this concept.
4. Then, remind children about the following rules:
  - a. Always start with the 'ones' column.
  - b. When the number you are subtracting is larger than the number to be subtracted from, exchange it for smaller denominations.
  - c. Show children how to solve the sum showing each step carefully – ask children to volunteer to demonstrate for the class.
5. Children should practise in their small groups and individually.

**Materials:** sticks, rubber bands or string, chalk, writing surface (floor/board)

[See the Bundles and Sticks TaRL Video on YouTube.](#)

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## 4. Concentric circles

The concentric circle game helps to reinforce children's understanding of place value and helps them practise writing out numbers.

**Levels:** beginner, 1-digit, and 2-digit recognition

**Activity format:** whole group

**Steps:**

1. Draw two concentric circles on the ground and label the inner ring "ones" and the outer "tens".
2. Count out nine stones and explain the rules of the game:
  - a. If a stone lands in the "ones" circle, it represents a one

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<sup>2</sup> Pratham recommends asking these four questions each time a word problem is discussed in a whole class setting. See this in action in the TaRL mathematics videos.

- b. If a stone lands in the “tens” circle, it represents a ten
  - c. But if the stone lands on a line or outside of both circles, we must exclude it.
3. Throw the nine stones into the circles.
4. Ask the class to count the number of stones in the “ones” circle and those in the “tens” circle (remove the stones that landed on the lines or outside of both circles)
5. Draw a number frame and write in the number.
6. Ask a child to demonstrate the activity for the class.
7. Once children understand the game, they can practise together in their small groups.

**Materials:** nine stones; chalk

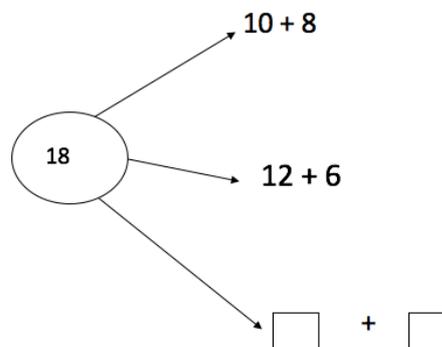
## 5. Practising sums

**Levels:** all

**Activity format:** small group and individual

Children at all levels benefit from practising sums individually. This can involve:

- i. Practising word problems
- ii. Learning multiplication tables individually or in groups, using games
- iii. Practising bonds to help with mental addition and subtraction
- iv. Doing at least five sums a day using basic operations – addition, subtraction, multiplication, or division. Children should be given sums involving carry-over and borrowing when they are ready.



*Bond chart for addition practice*

## 6. Multiplication Activities

Once children are familiar with the concept of multiplication, they should practise solving a variety of different multiplication sums and, as they progress, should be challenged to solve more difficult sums. Memorising multiplication tables is an important part of learning how to quickly solve sums.

**Levels:** all

**Activity format:** whole class, small group, or individual

Instructors are encouraged to use a variety of games and activities to encourage learning multiplication tables and solving sums:

- i. Give children a multiplication chart and encourage them to memorise the sums.
- ii. Test children's memorisation by asking them to quickly solve sums. There are a variety of ways to do this, including using number flashcards, facilitating competitions, or asking children to orally solve sums. Make this process as fun and non-threatening as possible and encourage children to challenge themselves.
- iii. Give children practical examples of how multiplication tables are useful for solving larger multiplication problems. For example, ask children how they might solve  $25 \times 7$ . Show them the connection by writing out each
- iv. Expand children's understanding of multiplying by ten by asking them to practise a series of sums involving large round numbers. For example:  $3 \times 4$ ;  $30 \times 4$ ;  $300 \times 4$ ;  $3 \times 40$ ;  $3 \times 400$ , etc. until they notice a pattern.
- v. Initially, children might struggle to solve larger sums (especially those involving two-digit by two-digit multiplication ( $23 \times 39$ , for example)). Once children understand the process of multiplication, help them tackle larger sums by discussing how to break them down into steps.

**Materials:** number cards, writing materials

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