Learning Division the ANUBHOOTI way...

The classroom journey, and selected pages from the Anubhooti Maths textbook

Seed2Sapling Education

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Stories from Anubhooti Classrooms

Division:
The Classroom Journey

Consider 585 ÷ 7.
Try doing this problem without using the long division method.

Let us dive into a story of a classroom using Anubhooti — a place where learning doesn't happen through explanations alone, but emerges through experience. Division is not only understood here; it is felt deeply, in one's 'Anubhooti', through every child's personal involvement.

Setting Up The Context

A teacher begins the fourth-grade classroom with a narration of the story 'Dog Treats'. Children are all ears, and their imaginations begin to spark.

"Bholu's family loves dogs. They have four pet dogs. When Bholu gets home from school, he spends time playing with them and giving them all tasty dog treats. He fetches his bag of treats and shares them equally amongst them all."

Children then use hands-on materials from their kits like ice-cream sticks, beads and cups or *chana* to bring 'Dog Treats' to life.

The total number of treats in the bag is intentionally left *unknown*. There is no number to begin with, and no given method to follow. The focus is simply on the act of **sharing equally** and the children are invited to discover this independently for themselves.

Building Division, The Intuitive Way....

With this context in place, the teacher gives children a series of problems to explore:

"Share a fistful of treats among 5 dogs."
"Share two fistfuls among 10 dogs."
And so on…

Each child gets to work with their own handful of chana. The teacher walks around the classroom and begins to notice a wonderful variety of thinking, a few of which are described here.



THREE CHILDREN. THREE WAYS OF THINKING.

01 | Share one at a time
One child places one *chana* in each cup, moving from one cup to the next and returning to the first cup each time, until there are no chana left.

02 | Start with two
Another decides to place two chana in each cup to begin with. In the next round, they notice that only one chana remains for each cup.

03 | Count, then share
A third counts the handful they have been given and realises there are twenty chana. They place four in each cup and pause to check whether their distribution works.

Multiple methods are not only accepted, but encouraged.

Each child is working with a different number of chana, making their problem slightly different from their neighbour's. More importantly, children have the freedom to approach the problem in ways that make sense to them, with **the teacher organically taking on the role of a facilitator** noticing, listening, and helping them check and refine their own thinking.

> **I just gave them a problem, but no method to solve it. Children came up with different ways of solving it.**
>
> ~Neha Sajwan, The Heritage School, Delhi

By distributing their own set of chana into the containers, every child is actively involved in solving a problem of their own. The **Anubhooti textbook is written to accommodate this** - to ensure that mathematics is not being demonstrated to them; rather, they are building it through their actions and ideas.

The classroom then comes alive as **the teacher invites students to share aloud how they divided their *chana***. Each child listens intently, discovering new methods through their friends' thinking. What began as an individual exploration becomes a shared mathematical experience, **one where children discover that there can be many ways into the same mathematics.**

The ABSTRACTION begins...

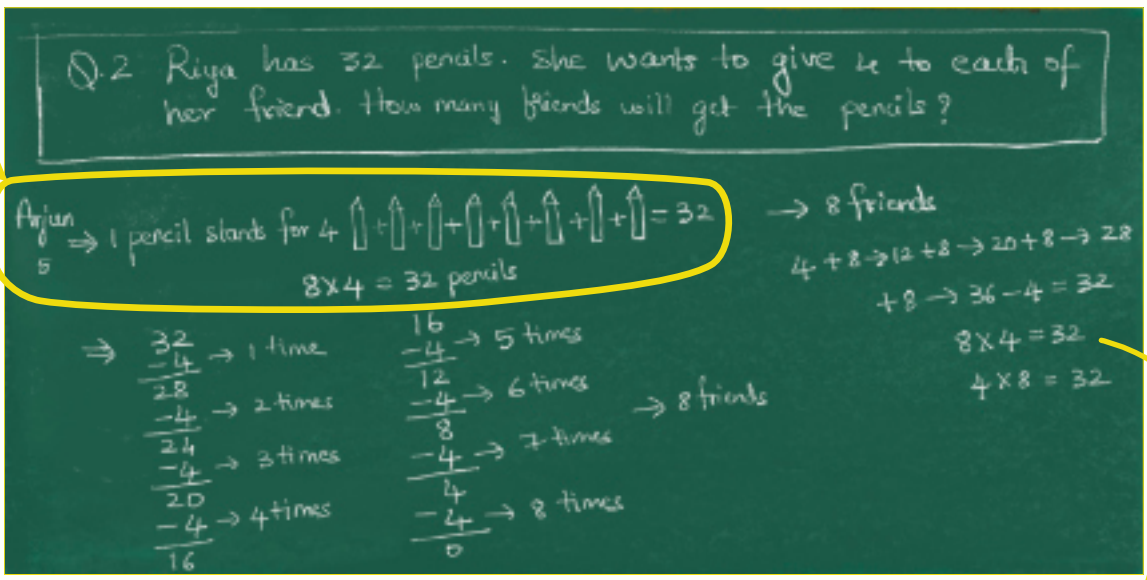
In the forthcoming class, the teacher gives the children enough time and practice to share equally using concrete materials, allowing the idea of **equal sharing** to take root through experience. Concrete materials help children get their hands, as well as their minds, around many of the mysteries of mathematics.

Once children have had opportunities to build this understanding, the teacher then gradually moves towards problems without the materials in front of them — using drawings, numbers and symbols to represent their thinking.

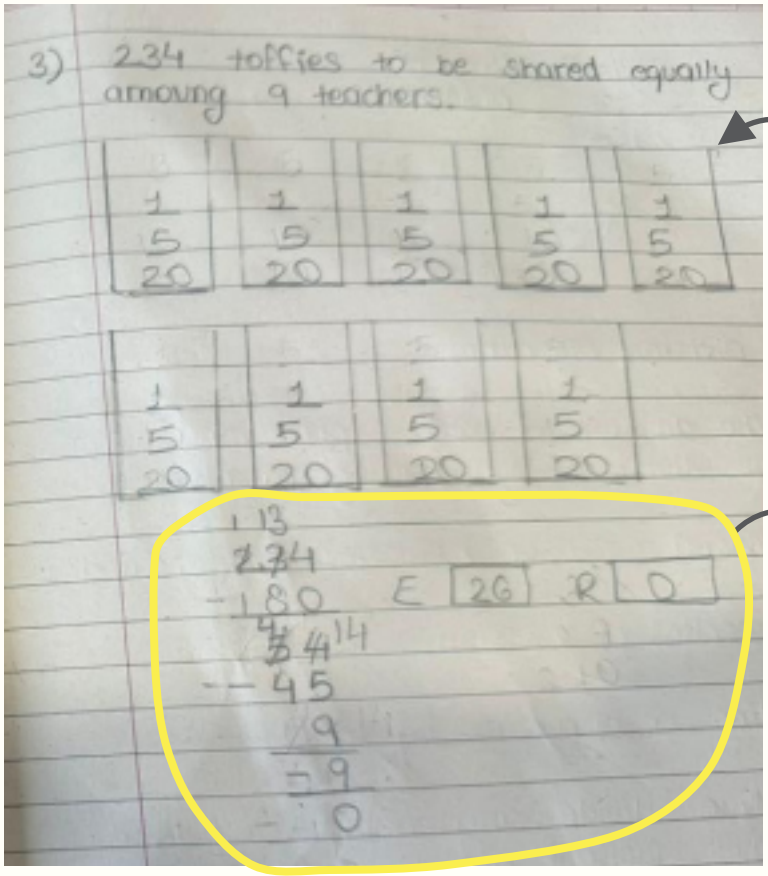
Children begin to a**bstract from what they have experienced**, finding ways to represent and model the scenarios in their own ways.

From Concrete to Representation

Look at how one child has modelled this word problem. It is quite unconventional **using a pencil to represent the number 4**. The child has created their own representation of the situation rather than reaching immediately for a standard mathematical symbol.



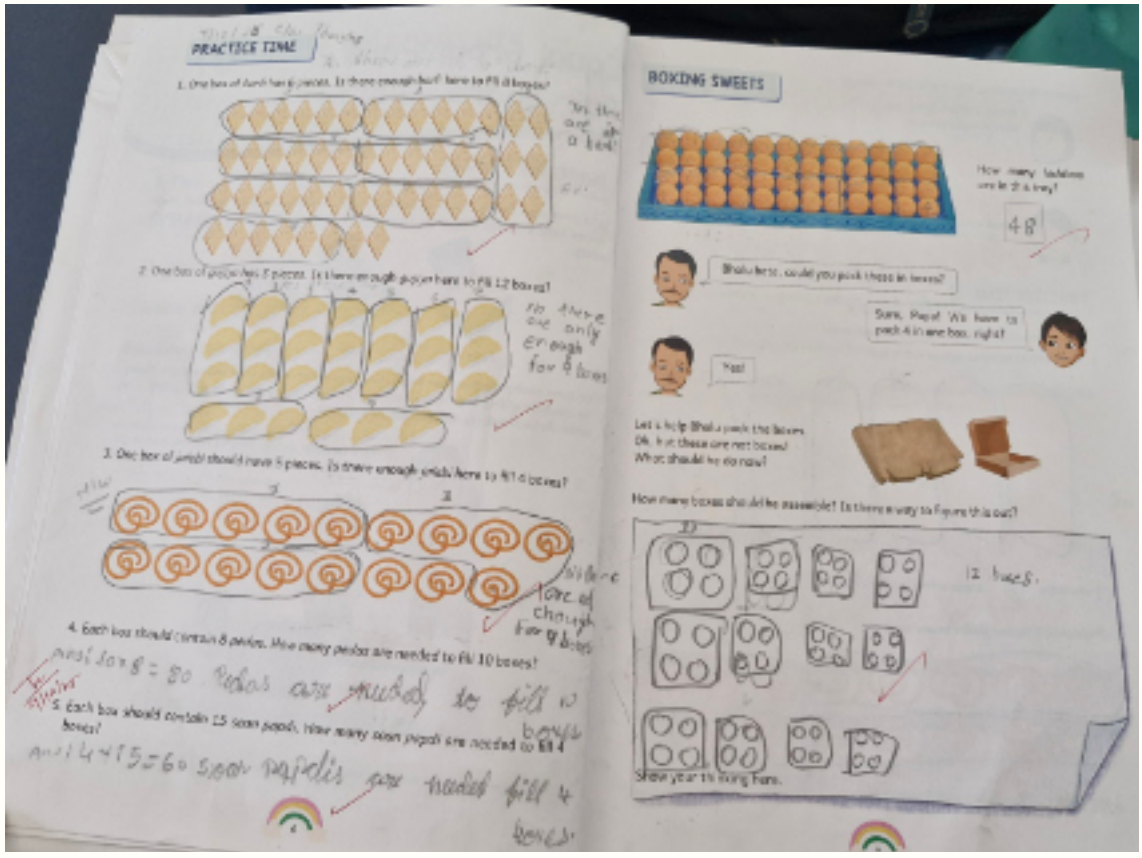
Checking to see if the thinking behind the problem works!



Here, the child has modelled using drawings and numbers. Each cup/bin represents a teacher. The child first gave 20 to each of the nine teachers, then they distributed 5 more and then 1 more.

Can you guess what the student is doing here?

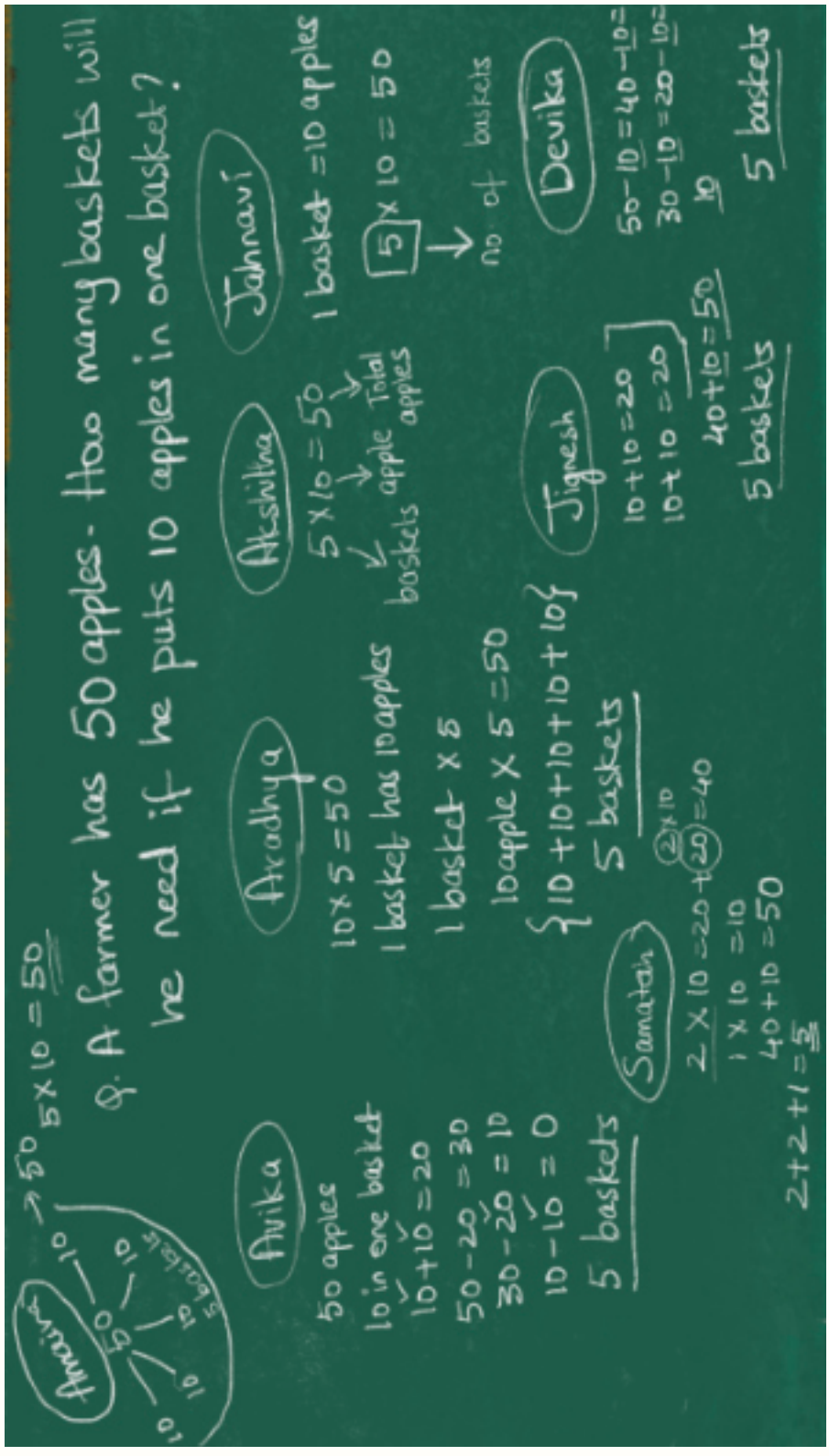
What begins in the hands can become a way of thinking. Representation is not just recording what children know; it becomes a way for them to make sense of what they know.



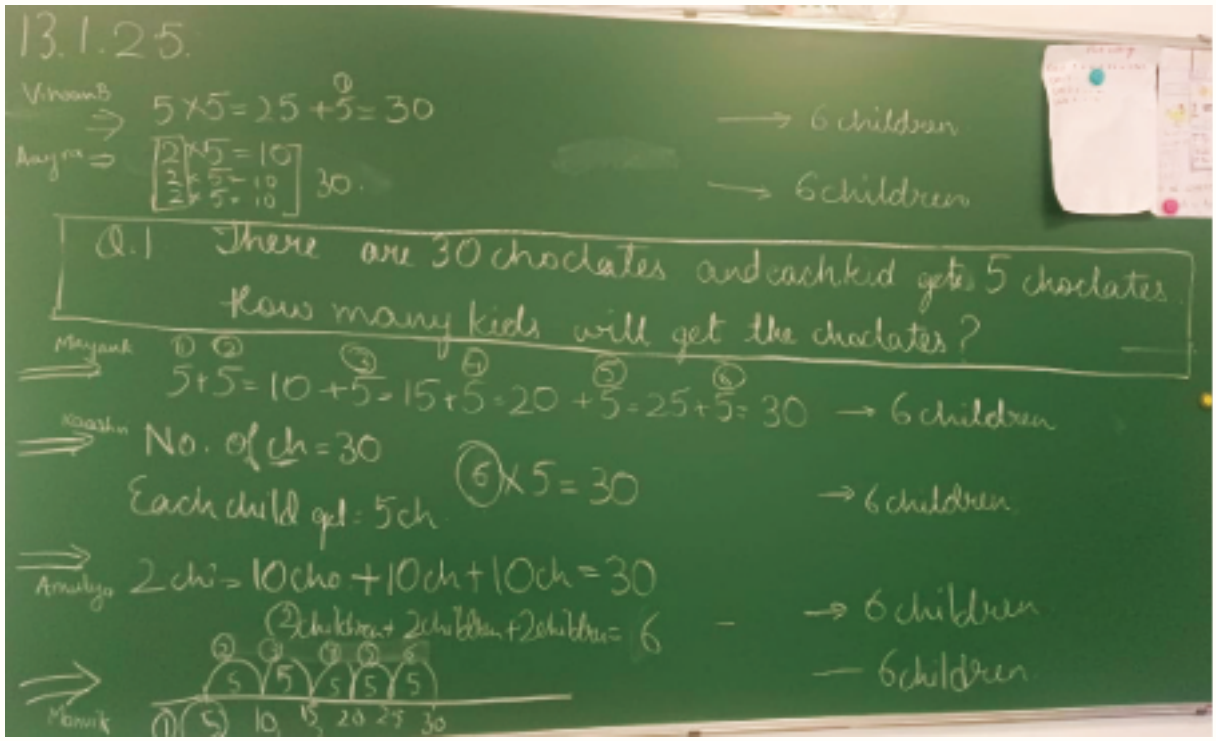
Every Child CAN...

Here is a problem for you to try. A farmer has 50 apples. How many baskets will he need if he puts 10 apples in one basket. Can you backtrack how you did it?

You probably knew the answer instinctively. Now look at this board-work below.
How many different ways of solving the same problem can you spot?
Look closely. Think of how a teacher must have conducted this classroom.



What does this tell you about the classroom in which this happened?



What happened here?

I'm still thinking.
But I think I'll get there!

The teacher did something simple: **she gave the problem to everyone and let them solve it**.
There was no method to copy, and no demonstration to follow. There wasn't any '*right way*' shown beforehand.

What emerged instead was a board full of ideas, each child making sense of the problem in their own way. At the heart of this classroom was an important belief:

EVERY CHILD CAN.

This belief shaped the environment the teacher created. Rather than rushing children towards the 'right method', the teacher gave them time and space to think, and listened carefully to what each child had come up with.

The classroom also made **communication a part of doing mathematics**. Students were encouraged to explain their reasoning, listen to one another, and engage in discussions, both brief and extended. **Academically productive talk emerged,** conversations that helped children develop their reasoning and express their ideas clearly.

> **Everybody talks about fear of mathematics. In our class, we don't 'teach' anything to children. We set up classrooms in a way that children arrive at ideas, formulas and concepts by themselves. So it's their own discovery. How can they fear something that is their own creation?**
>
> ~Maitri Nagda, LWS, Thane

Think Alone. Then Think Aloud.

Such **micro-routines**, practised consistently by the teacher, gradually become part of the **classroom culture**. 'Think alone, then think aloud' gives children the freedom to first develop their own ideas without being influenced by what someone else has done.

With all these in place, **children now begin to trust their own thinking** and have the confidence to say, *"This is how I thought about it."*

> **When I think Math I think multiplication, addition, subtraction and division; math club made me realise math is so much more!**
>
> *~Teerta Menon, Class 6, Vidyaniketan*

A BRIDGE to the Algorithm...

Once children are comfortable with division problems, both with and without materials, the teacher begins to pose problems with **bigger numbers**:

"Distribute 365 chana equally among 3 people."
"What about 365 chana among 7 people?"

While it is still possible to use *chana*, doing so quickly becomes tedious, time-consuming, and prone to error. The bigger the number, the harder it gets. After all, who would want to sit and distribute 30 lakh *chana*? An instinctive need begins to emerge: **we need a method that works for both big and small numbers.**

There has to be another way!
We can't do this with thirty lakh *chanas*!

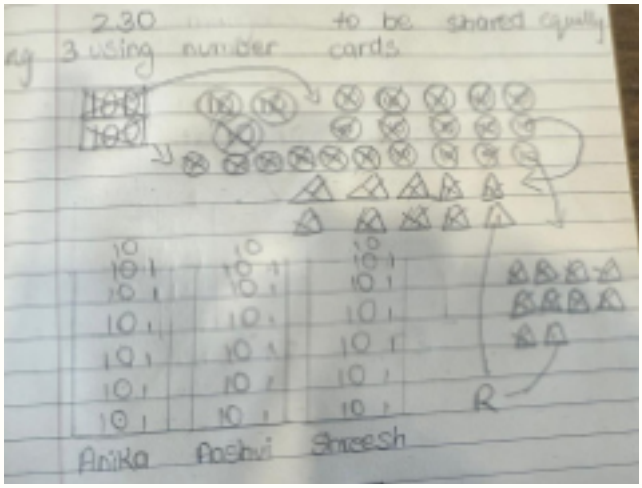
Let's see what happens when we break the number apart.

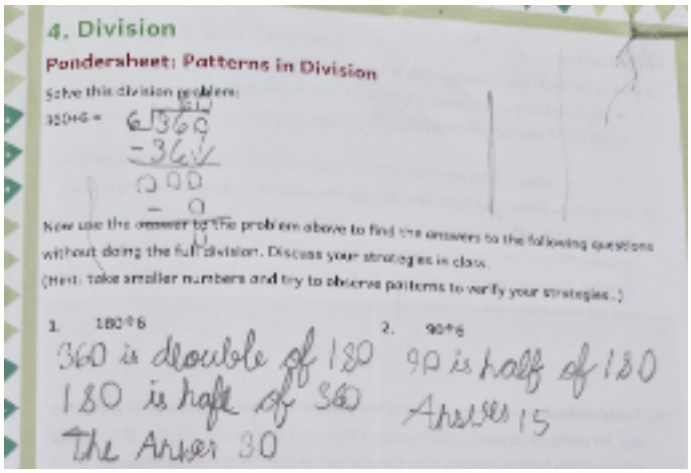
One might think, *"Finally! The right time to introduce the long division algorithm."* But we wait! Introducing the algorithm now would still mean handing children a method. Instead, children get the opportunity to invent, explore and **discover a more efficient way of dividing,** like little mathematicians at work.

This is where **place-value cards become the bridge**. The teacher now poses a new challenge:

"Sit in groups of three. Can you divide 93 equally among yourselves?"

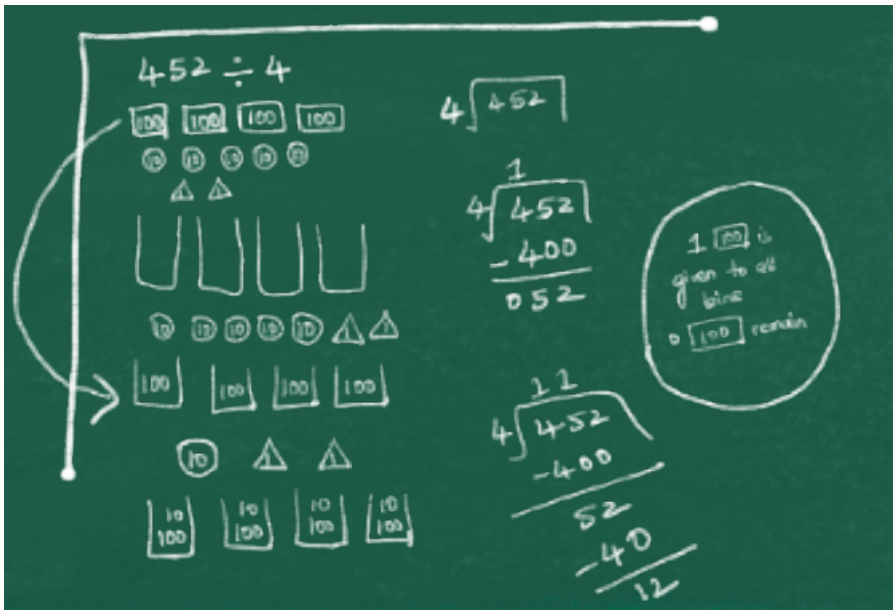
With place-value cards in their hands, children begin to break apart, regroup and redistribute the number making visible the thinking that lies beneath the algorithm.





Bringing It All Together: Long Division Algorithm

Once children have become comfortable with division using place value cards, the **algorithm is simply a paper representation of what they already know how to do.**

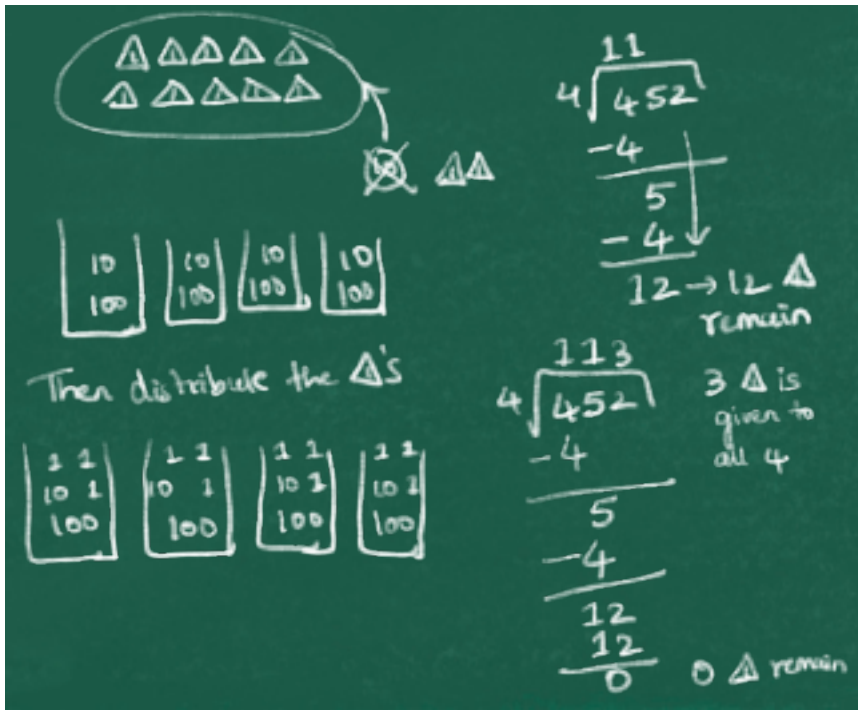


Student: Ma'am, this remaining 10 and the two 1s can't be distributed.
Teacher: Are you sure? If they were channa, what would you have done? Can you guess what we can do from here?

This is often where children get stuck. As teachers, we should know that this is okay. The process is prone to mistakes, making this an important moment for a **mistake-friendly classroom**. Rather than giving children the next step, the teacher gives them time to think, try, and work through the difficulty offering a gentle hint when needed.

Waiting a little may be a small step for us, but figuring it out for themselves can be a huge step for them. These moments can shape not just what children understand, but how they come to feel about mathematics in the long run.

From the Intuition to the Formal



What we have presented here is not meant to happen in a single lesson. It is **a wholesome journey** that can evolve over two to three years, with ideas being revisited, reinforced, and deepened over time.

We begin with the natural way of doing division which is sharing and using materials in meaningful contexts and gradually build towards the formal long division algorithm.

This is central to the ***Anubhooti*** books: we begin with the child's natural intuitions and gradually build towards formal mathematical ideas. Whether in geometry, measurement, numbers and operations, or data handling, **the journey moves from experience towards abstraction and deeper understanding.**

So, what does this journey tell us about learning mathematics?

Learning mathematics is not simply receiving mathematical relationships; it is creating and re-creating them in our own minds.

The algorithm, then, is not the destination. It is the expression of an understanding that children have built for themselves.

> **I used to think it's the responsibility of the teacher to explain everything to kids, but now I make them find answers.**
>
> *~Jaffya G V, Corpus Christi School*

Math Without Words

***Teacher**: Become a picture detective! Look at this picture. How many people do you think are inside the temple?*
(Take a moment and try this out.)

***Many children (shouting)**: twelveeeeeee*
***Teacher**: Look carefully, without rushing. Did you notice the woman without slippers at the front? What about the man in the blue shirt? Do you want to change your answer?*
***Sanya**: I think it should be eleven. The girl in pink dress has just removed her chappal.*
***Sharan**: See the person in the blue shirt. He is also outside, so it should be ten then.*
***Gagan**: But the blue-shirted man is still wearing shoes, I think. So it should be eleven.*

As you might have realised, **we are not looking for a single answer**. Whatever the answer may be, children should be able to support it with reasoning based on their observations. For children, the joy of playing detective is enough to entice them in. But hidden inside this play is the **mathematical idea of grouping**. This picture is the very first step in a long journey, one that will grow over the next four years into a deeper understanding of division.

In ***Anubhooti***, illustrations and artwork are not decorative space-fillers but are **an integral part of mathematical communication**.
Math without words can be powerful, and visuals can convey ideas without the weight of long explanations. A picture can quite literally **paint the problem**!

For many children, it is also what makes them want to open the book in the first place.
Every picture in ***Anubhooti*** is a problem waiting to be discovered.
Be a detective, be a mathematician!

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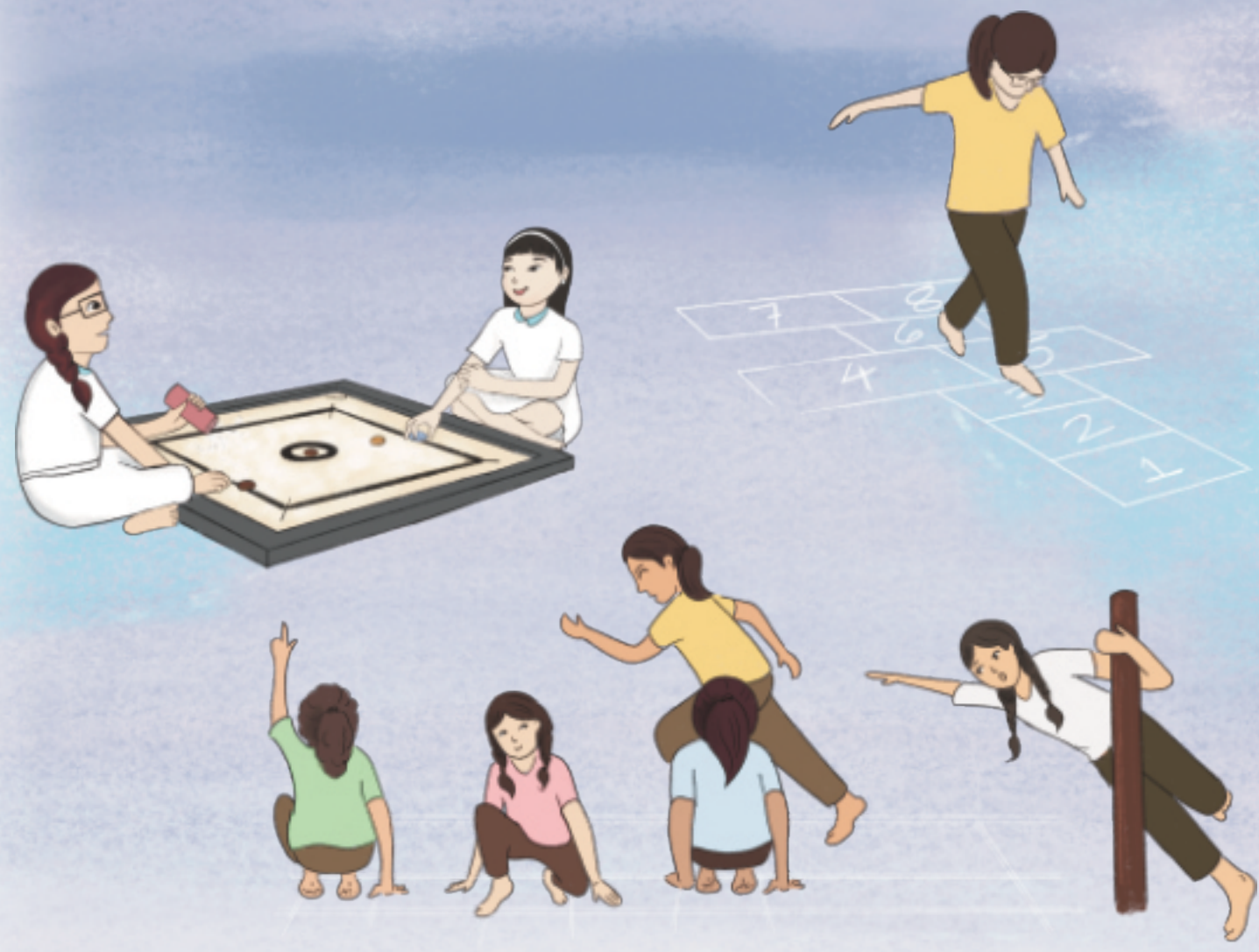
Math
Preview

Anubhooti

An experiential learning textbook for Maths



Equal Groups and Fair Share - Part 2

08

KAKA AND KAALIA

One day, Kaalia was very hungry and searching for food. He found some grains of barley on the roof of a house. Kaalia flew back and forth, collecting the grains and bringing them to his nest until he had 30 grains in all. Just as Kaalia was about to eat, Kaka flew into his nest.

Kaka: “I am very hungry. Can you please share your food?” Kaalia was unsure and said “I don’t know how to share.” Kaka replied “It is very easy. I will take two grains and you will take two grains. We will continue sharing like this until all the grains are finished." Kaalia agreed. How many grains will each of them get? Make a guess.

Kaka will get _____. Kaalia will get _____.

Now, let us see what really happened with Kaka and Kaalia. Take out the beads from your Experiential Learning Kit. Sit with a friend. One of you will be Kaka and the other will be Kaalia. Pool 30 beads together and take 2 beads at a time until all the beads are taken.

How many beads did Kaalia get? _____. How many beads did Kaka get? _____.

Was it fair sharing? (Yes / No)

Now, share the grains in the same way (Kaka takes 2, then Kaalia takes 2) for the numbers given below and observe what happens.

Is it always fair sharing? Is it always NOT fair sharing? Observe all the numbers for which there is a fair sharing of grains. Do you see any pattern?

How will you share the grains so that it is fair? Discuss.

DOG TREATS

Bholu's family love dogs. They have four pet dogs — three pups and their mom — Fluffy, Snuffy, Tuffy and Hira. When Bholu gets home from school, he spends some time playing with his pets, teaching them new tricks and giving them yummy treats. Today, the box of dog treats is almost empty, so he fetches a new bag of treats.

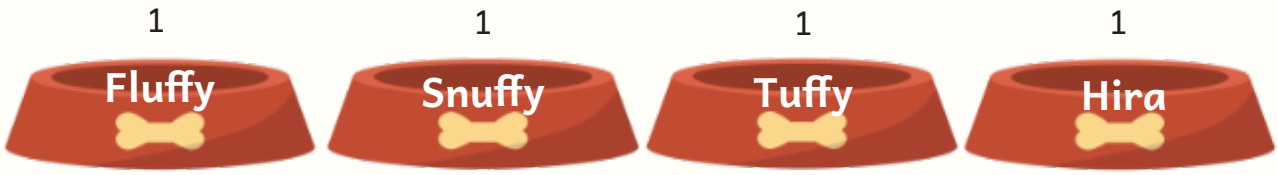
The dogs are wagging their tails and crowding around him hoping for even more treats. "Hmm.. Shall I give them the whole bag of treats!?" Bholu wonders naughtily. "Will that be too much? If I share this half-kilogram bag equally among all four, I wonder how many treats each of them will get... How many treats are in this bag anyway?"

Let's help Bholu figure this out.

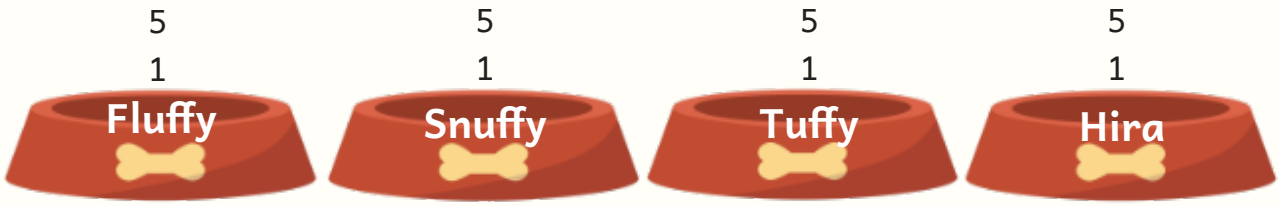
Number of treats in the bag : ???? To be shared among : ____ dogs

How many treats does each dog get? How can we find out?

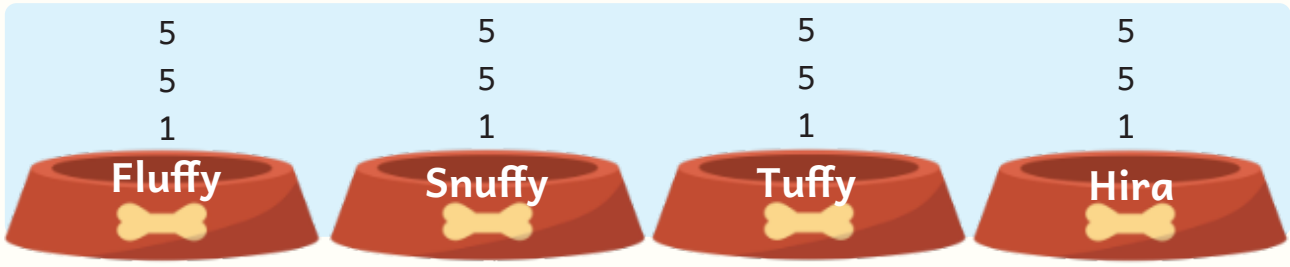
Let's start by giving 1 to each.



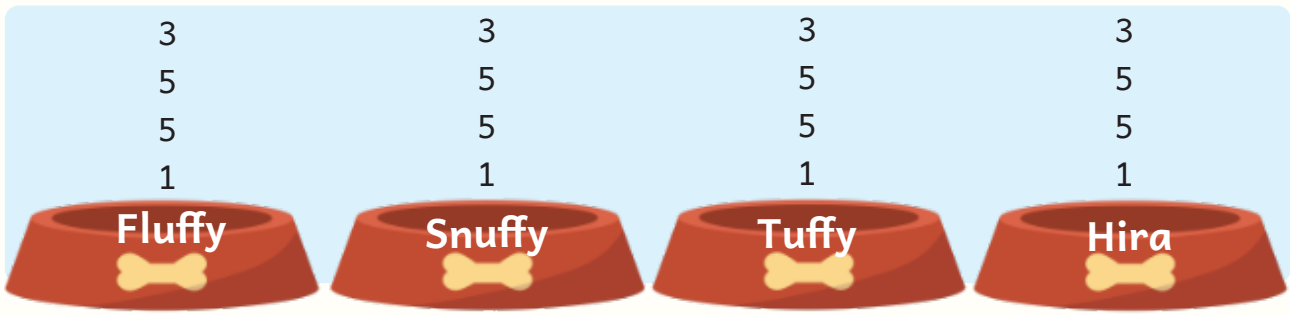
Oh! There are a looooooot of treats in this bag. Distributing them one by one will take too much time! Let's distribute 5 to each instead.



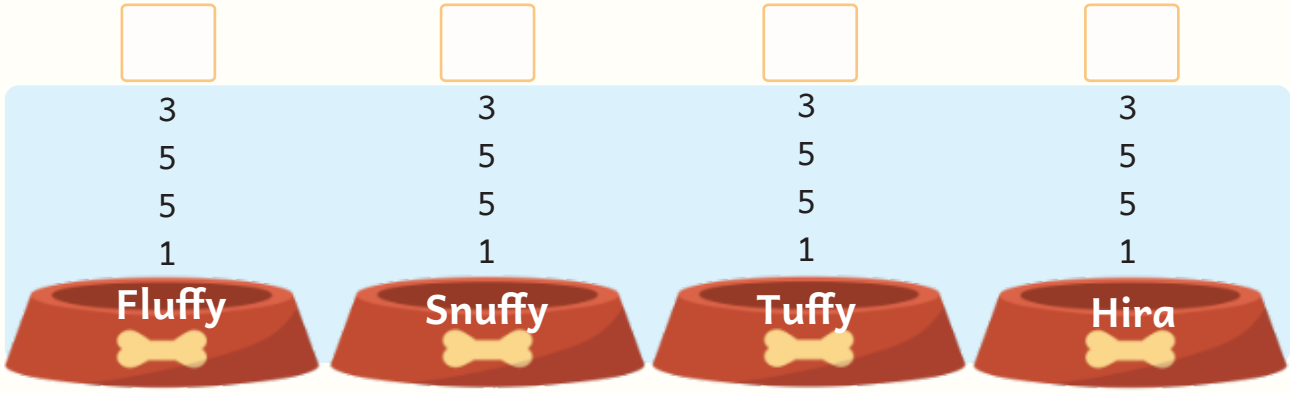
There are still a lot of treats left in the bag. Let's distribute 5 to each once more.



Now, there are fewer treats left. I don't think we have enough to give 5 each. Let's give 3 instead.



Yes! Now I can count the remaining treats in the bag. There are 16 treats left. Let's find out how many each pet will get.

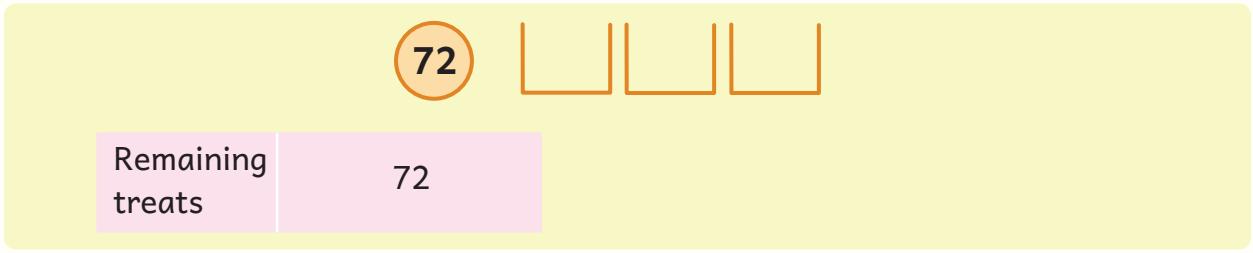


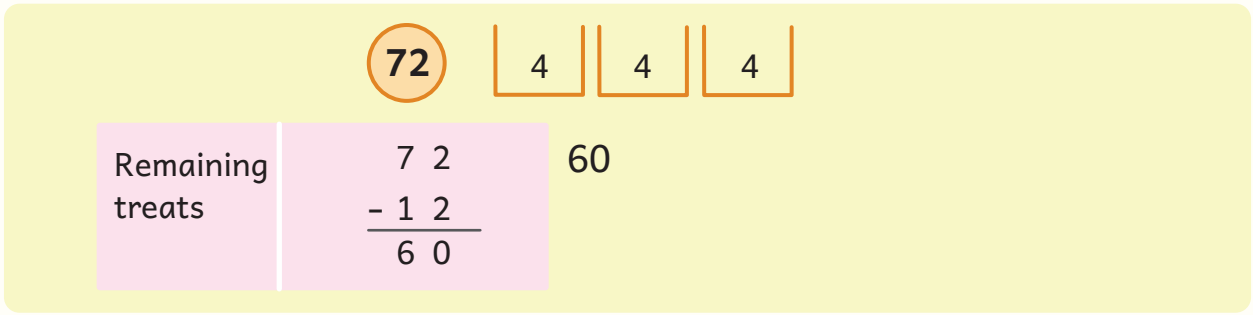
So, each pet will get ____ treats. That is indeed too many treats for one day!

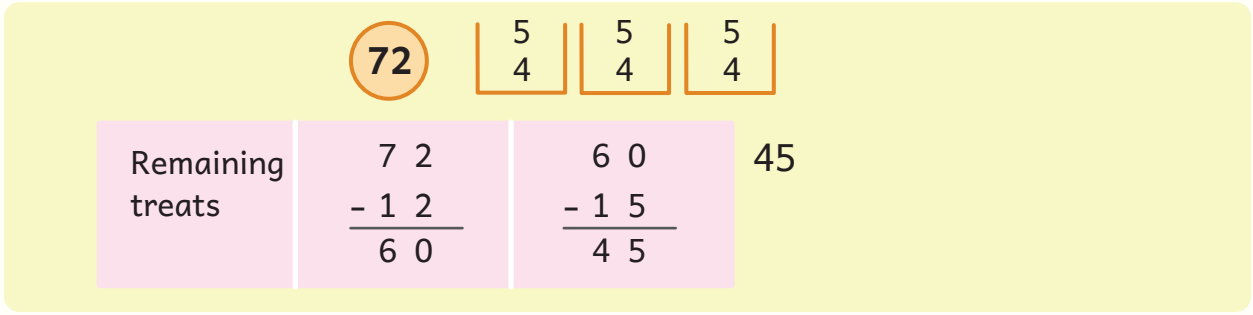
Number of treats that was in the bag ____

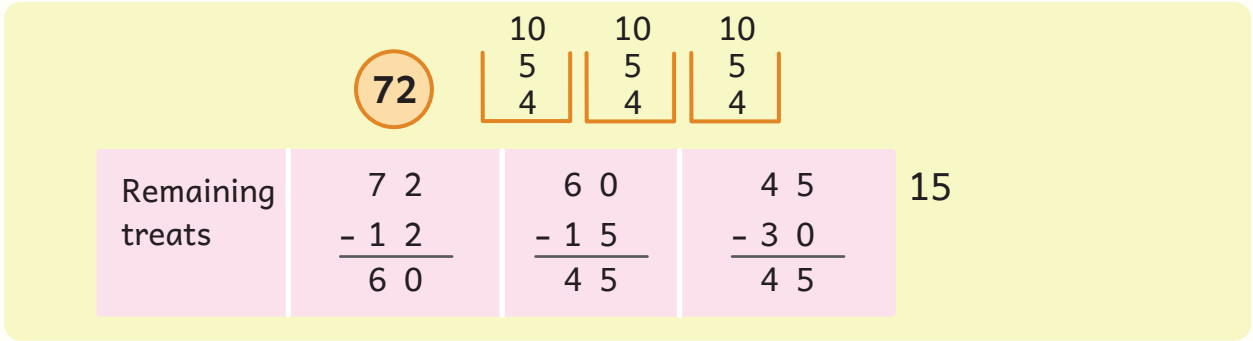
When we divide a large number, it can be hard to see the multiplication fact that helps us group or share equally. In such cases, we can use Bholu's idea of repeated subtraction divide efficiently. Let us practise dividing by repeated subtraction. One has been done for you.

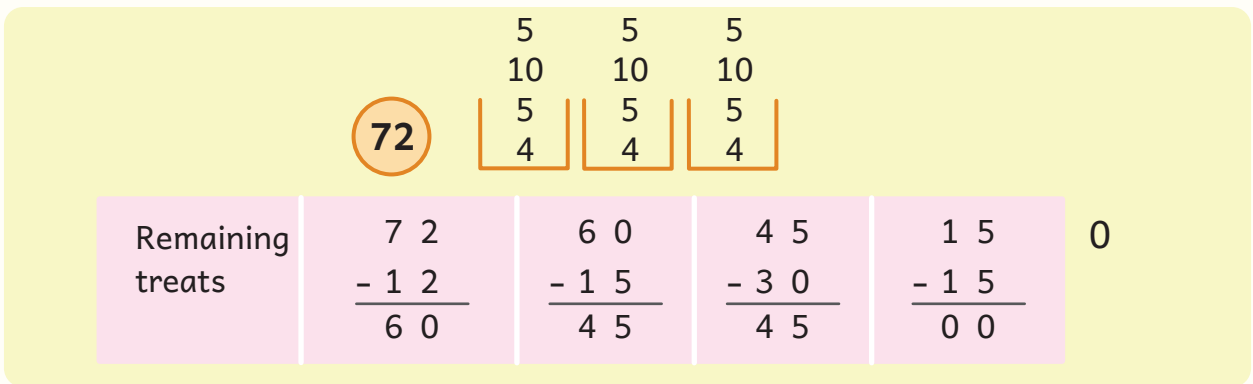
1. Share 72 treats equally among 3 pets. That is 72 ÷ 3 = ? Guess: ☐ Answer: ☐





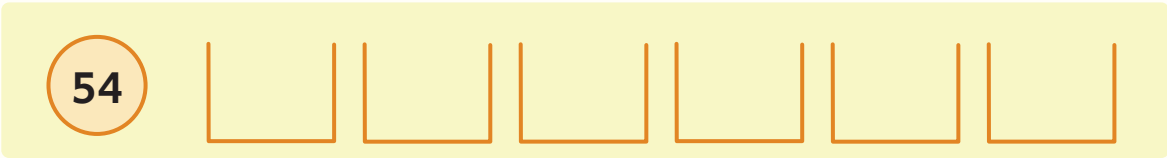






2. Share 54 treats equally among 6 pets. How many treats does each pet get?

That is 54 ÷ 6 = ? Guess: ☐ Answer: ☐



Remaining treats:

TRY IT YOURSELF

Arrange the digits 1 to 9 (without repeating) in each box to make the statement true. How many different solutions can you find for this task?

☐☐ ÷ ☐ = ☐☐ ÷ ☐

PRACTICE TIME

1. Draw pictures in your notebook to represent the given division facts.

   a. 18 ÷ 5 = 3 with 3 left over.

   b. 18 ÷ 4 = 4 with 2 left over.

   c. 18 ÷ 3 = 6 with 0 left over.

2. Solve the following division problems using multiplication facts or the repeated subtraction method.

   a. 47 ÷ 5 = ☐ with ☐ left over.

   b. 48 ÷ 4 = ☐ with ☐ left over.

   c. 50 ÷ 3 = ☐ with ☐ left over.

   d. 65 ÷ 6 = ☐ with ☐ left over.

   e. 82 ÷ 9 = ☐ with ☐ left over.

SUMMARY

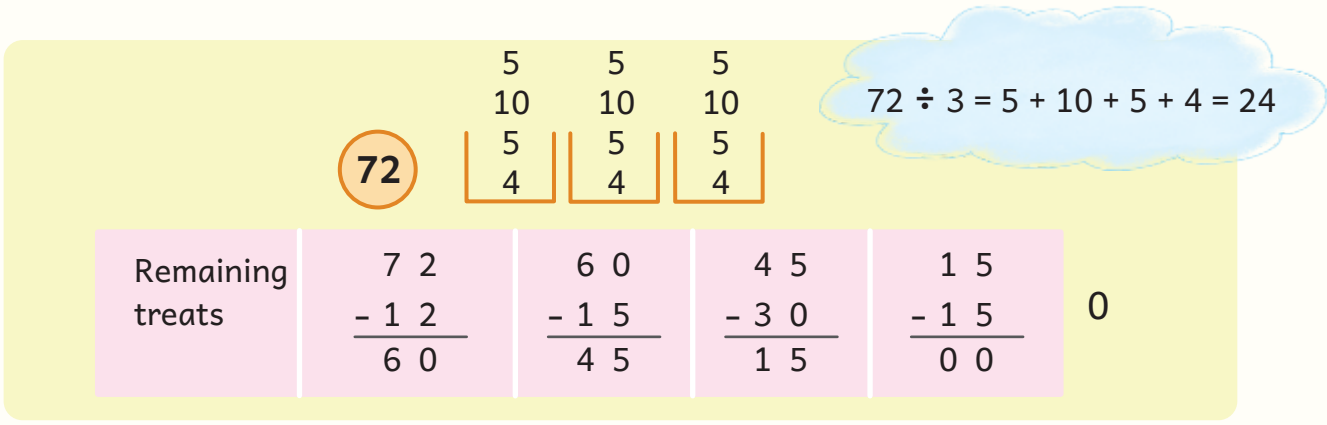
Remember the Kaka Kalia story? We saw through Kaka's little trick—but it also gave us an interesting idea!
Why always share by giving one to each? Why not give more than one at a time?

In this chapter, we learned how multiplication facts can help us solve division problems.

We explored many different ways to divide—

- By sharing equally
- By making equal groups

Sometimes, when the numbers get large, it's hard to see the multiplication fact quickly. In those cases, we learned to use repeated subtraction to help us divide step by step!



Look what I can do!

- [ ] I can make equal groups of a given size from a collection of objects.
- [ ] I can make given number of fair shares from a collection of objects.
- [ ] I can read and write the division symbol.
- [ ] I can see the connection between division and multiplication.
- [ ] I can use repeated subtraction to divide large numbers.

LET'S REVISE

1. Share the money equally among the people. How much will each person receive? Will there be any leftover money?

a.

Shambu's share

Ruchi's share

Dollu's share

b.

Shambu's share

Ruchi's share

c.

Shambu's share

Ruchi's share

d.

Shambu's share	Ruchi's share	Dollu's share	Tanu's share
			

e.

Shambu's share	Ruchi's share	Dollu's share	Tanu's share	Manu's share
				

2. Look at the picture carefully, count the coconuts, and answer the given questions.

a. If you make groups of 3 coconuts each, you will get, ____ heaps.

b. If you make groups of 4 coconuts each, you will get, ____ heaps.

c. If you make groups of 6 coconuts each, you will get, ____ heaps.

3. Solve the following division problems using multiplication facts or the repeated subtraction method.

a. 87 ÷ 4 = ____ with ____ left over.

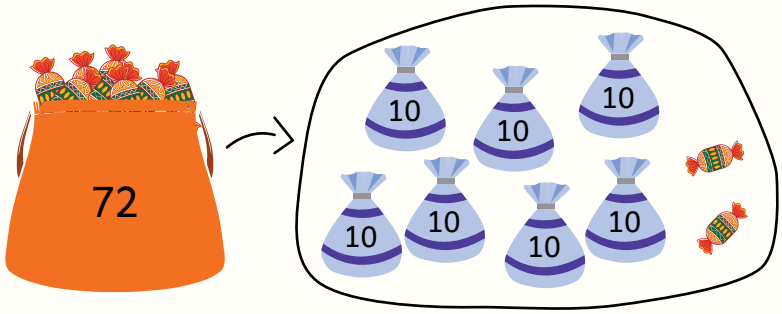
b. 62 ÷ 5 = ____ with ____ left over.

LONG DIVISION

Let us try to understand it with another example.

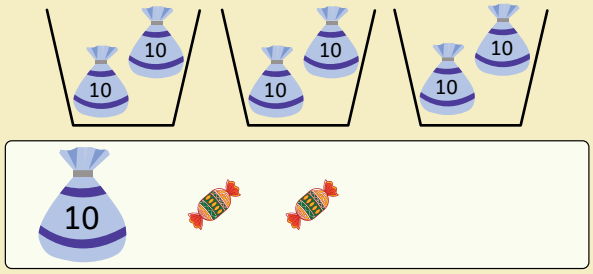
You have 72 candies. You have to share them among three people. How many candies will each person get?

Here we have to recall our understanding of 100's, 10's and 1's.



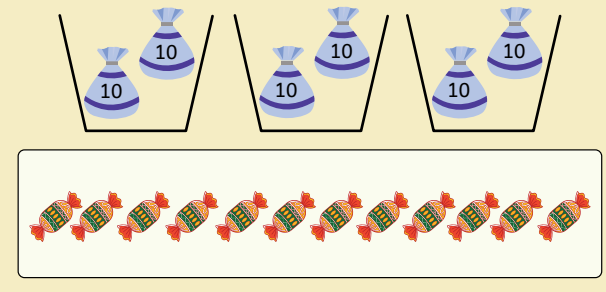
The trick is to first distribute all the bags of 10, then move to the loose ones. Let's see this in detail. There are 7 bags of 10, so....

Distribute as **many bags of 10** as possible



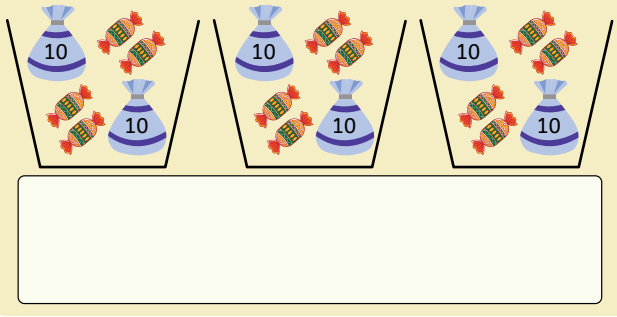

```
   T O
   2          2 (10) is given to all 3.
3 | 7 2
  -6 0
  ----
   1 2       -1 (10) is remaining and 2 are remaining
```

Since we cannot distribute them fairly, we can **remove the candies from the bag**.




```
   T O
   2
3 | 7 2
  -6 0
  ----
   1 2       12 loose candies are remaining
```

Distribute as **many candies** as possible




```
   T O
   2 4
3 | 7 2
  -6 0
  ----
   1 2
  -1 2
  ----
   0         - 0
```

I'll do another one without using bins. Let's say we have 75 candies to be distributed among 5 people.

```
   T O
   1 5
 5 | 7 5
   -5 0
   ----
     2 5
   -2 5
   ----
     0 0
```

1 

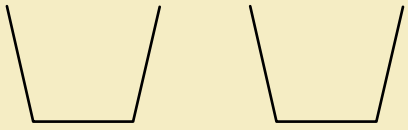
and 5  = 10 + 5

- There are 7 bags of ten . We give 1 bag to each person.
- After this, 2 bags of ten and 5 loose candies remain. These can't be given away directly.
- We have to find the total number of ones (or loose candies), so we open up the bags. We get 20 candies from the bags, plus 5 loose candies, making 25 candies in total.
- We now distribute 5 candies to each person, using all 25 candies.

PRACTICE TIME

1. Divide 52 candies equally among 2 children. Solve the problem using long division method.

Distribute as **many bags of 10** as possible



```
     T O
   ------
 2 | 5 2
   -
   ----
```

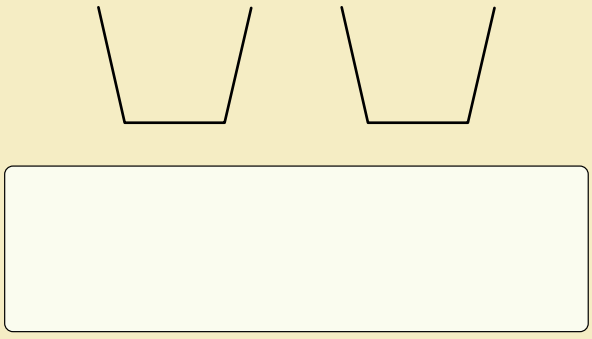
is given to all the 2 children.

____ 

is remaining.

Note for teachers: Encourage children to describe the process orally as they solve the problem. It will help the meaning to sink in. If the children find it difficult to draw, they can use simple symbols like 10 for tens and 1 for ones.

Open the remaining **bags of 10** and see how many **loose candies** are left.



T O

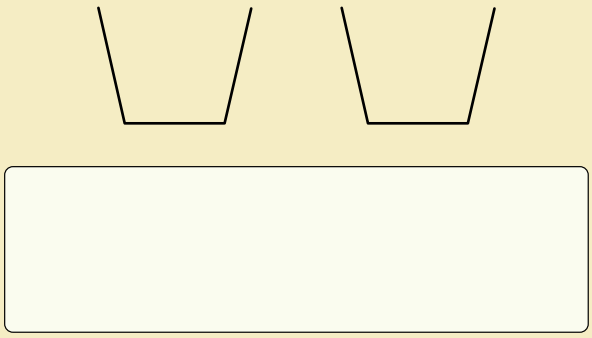
2 | 5 2

\-

____

____ loose candies are remaining

Distribute as **many loose candies** as possible



T O is given to the 2 children

2 | 5 2

\-

____

____ is remaining

4. Diwakar has 6 hens and each hen has laid 8 eggs. He decides to distribute all the eggs equally among his 5 cousins and keep any leftover eggs for himself.

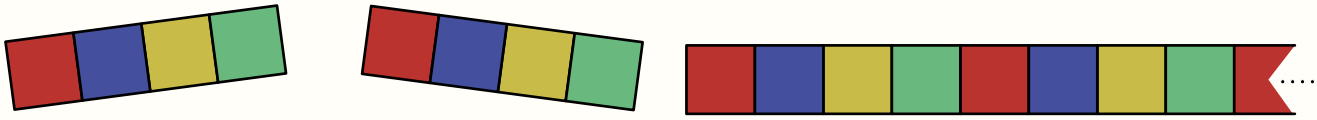
a. How many eggs does Diwakar have in total?

b. How many eggs does each cousin get?

c. How many eggs does Diwakar get to keep for himself?

5. Arjun bought a strip of coloured paper made up of 100 squares.

He cuts it into smaller strips of equal length to decorate his costume.

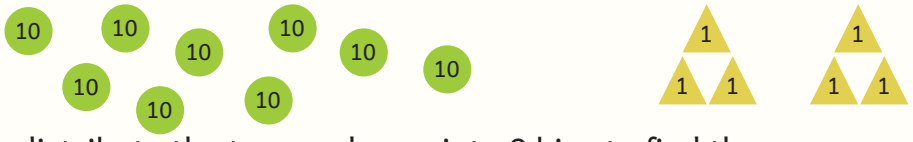


How many such strips can he make?

SUMMARY

- Sharing fairly, Grouping equally, Long Division, Division symbol (÷).

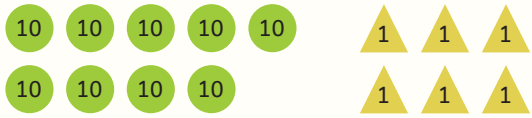
We can make our division problems easier by using our understanding of place value.
For example, to find 96 ÷ 8, we can represent 96 like this:



Now, we need to distribute the tens and ones into 8 bins to find the answer.

96

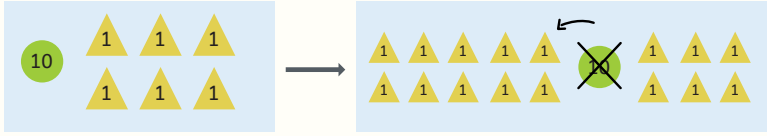
Remaining treats:



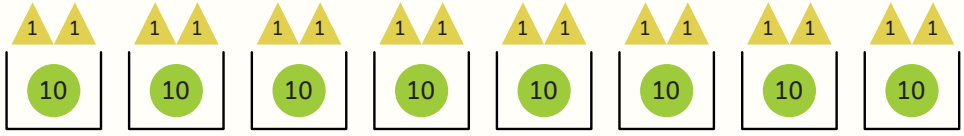
Distribute the place value cards into the 8 bins to find the answer.

96

Remaining treats:



96



Remaining treats: So, 96 ÷ **8** = _____

We can solve the problems even faster using the long division method.
Distribute 56 candies among 4 people.

```
   T O
   1 4
  ------
4 | 5 6
  -4 0
  ----
    1 6
   -1 6
   ----
      0
```

1  and 4

= 10 + 4

- There are 5 bags of ten candies. We can give 1 bag of ten to each of the four people.
- 1 bag of ten remains. This can't be given away directly.
- Open up the remaining bag to get 10 loose candies.
- There are already 6 loose candies, so the total loose candies = 10 + 6 = 16.
- We can now give 4 candies to each person, distributing all
- 16.

  No candies are left over.

Look what I can do!

- [ ] I can solve division problems using place value cards.
- [ ] I can solve division problems using the long division method.

LET'S REVISE

1. Solve the division problems using the long division and write an apt story for each.

   a. $4\overline{)48}$ b. $7\overline{)84}$ c. $8\overline{)92}$

   d. $6\overline{)82}$ e. $5\overline{)79}$ f. $3\overline{)67}$

2. The children of Swadhyaya School are celebrating Children's Day. Each child will receive 4 coloured pencils as a gift. Ms. Parikh has 70 pencils to distribute to third graders. Find out how many children can receive 4 pencils each. Will there be any pencils left over? If yes, how many?

3. Isha has ₹65 with her. She wants to buy chocolates. One bar of chocolate costs ₹7. How many chocolates can she buy? How much money will she have left after buying the chocolates?

4. A shopkeeper has 71 eggs. He arranges them in egg trays. Each tray holds 6 eggs.

   a. How many egg trays does he need?

   b. How many more eggs will he need to completely fill the last tray?

5. There are 24 laddoos in 1 kg. How many laddoos will be there in 4 kg? If 16 laddoos can be packed in 1 box, how many boxes are needed to pack all the laddoos?

6. There are 26 rooms in a school. Each room has 4 plants. If each plant needs 2 cups of water, how much water is needed to water all the plants?

7. Khoji distributes 67 candies equally among Bholu, Simba, Rizu and Anu. She keeps the leftover candies for herself. Then, she distributes 67 jellies, but Anu does not want jellies. So Khoji distributes the 67 jellies among Bholu, Simba and Rizu, keeping the leftover jellies for herself.

   a. Who has more candies - Bholu or Khoji? Can you find out without doing the division?

   b. Will Simba have more candies or more jellies? Can you find out without doing the division?

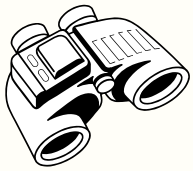
c. Will Khoji have more candies or jellies? Can you find out without doing the division?

d. Find out how many candies and jellies each of them gets.

	Candies	Jellies
Bholu		
Simba		
Rizu		
Anu		
Khoji		

MAGIC MIRROR

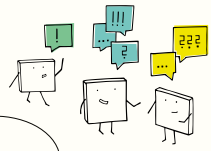
I know now...	I want to know more about...



How can I use what I learned in my everyday life?

What was my favourite part of this chapter?

Is there something I found tricky or hard to understand?



With whom can I share what I have learned?

Was there anything that surprised me?

“Core mathematical skills have become an integral part of the way students think. They have become keen observers, more logical in their approach, and genuinely enjoy problem-solving. They notice patterns, make predictions, share creative strategies, and even begin to generalise before I prompt them to.”

~A Teacher from the Anubhooti Community

When teachers, school leaders, children, and communities come together to engage with it, understand it, and make it their own, it creates deeper meaning for everyone.

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