Singapore Math

Multiplication Hand Game

1. Face your partner. Two hands must be at your back.
2. At the count of three, show a number using your two hands.
3. As fast as you can, multiply your number by your partner's number.
4. The first player to get 5 points win.
5. If you lose, go back to your seat. If you win, look for another winner to beat.

Mathematics Game

Directions:

This is a multiple choice game… Points are collected as a team; however, each player can answer his/ her question with the help from your teammates.

1. What numeral means the same as 50 000 + 3 000 + 10 + 3?

A. 53 313
B. 53 013
C. 50 313
D. 50 303

2. Bushra needs to equally divide a 10 slice pizza between 5 friends. How many slices will each person get?

A. 8

B. 2

C. 6

D. 1

3. John counted 8 apartment buildings in his neighborhood. Each building had 10 apartments. Some apartments had 2 bedrooms. What was the total number of apartments in his neighborhood?

A. 160

B. 80

C. 20

D. 18

4. Dana’s party started at 6:05 PM and ended at 9:50 PM. What was the total amount of time that Dana’s party lasted?

A. 2 hours

B. 2 hours 45 minutes

C. 3 hours

D. 3 hours 45 minutes

5. What is the missing number below?

____, 40, 32, 24, 16

A. 46

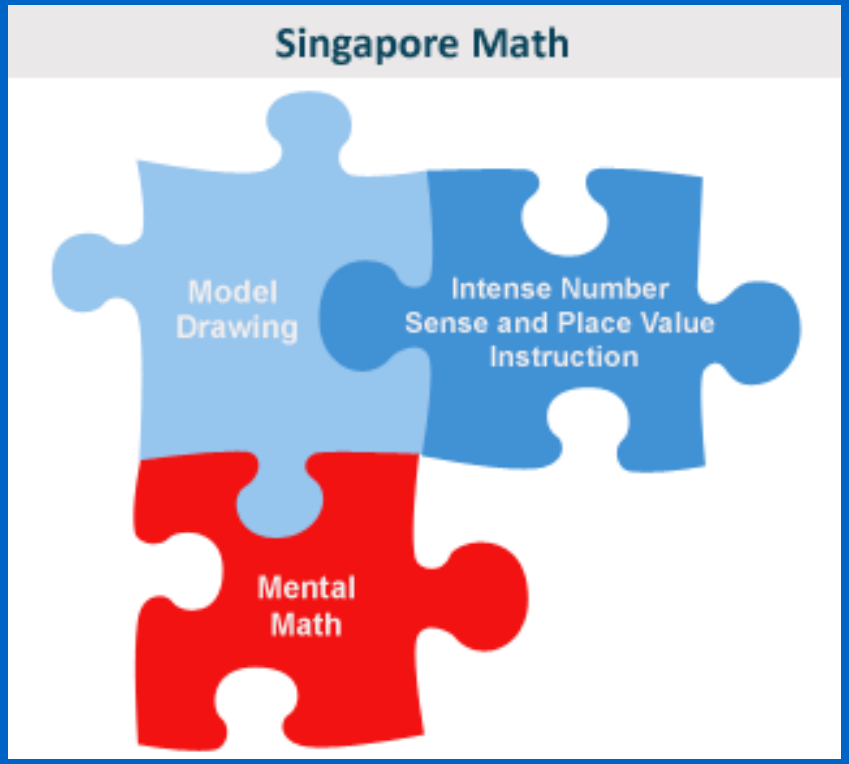
B. 48

C. 56

D. 64

What is Singapore Math?

- It is the highly successful national math program that has been taught in the country of Singapore since 1982.
- Base – 10 math program used in Singapore
- Three – part program
  - Intense Number Sense & Place Value Instruction
  - Model Drawing
  - Mental Math



- **Number Sense** is the overall understanding of a number. Mental Math helps to develop this.
- **Place Value** is a student's understanding of a digit's position in a number.
- **Model Drawing is a 7 – step visual method of turning a word problem into a diagram with unit bars that represent values.**

Why do we teach Mathematics?

- Mathematics is an excellent vehicle for the development and improvement of a person's **intellectual competence.**

1. Visualization
2. Looking for Connections
3. Communication

Characteristics of Singapore Math

Greater Depth/Less Breadth

- Fewer topics, greater emphasis on mastery

Emphasis on Problem Solving

- Bar models

Characteristics of Singapore Math

Mental Math

- Introduces different strategies

Emphasis on Developing Conceptual Understanding

- Students and teachers learn to focus on "why" not just "how."

Characteristics of Singapore Math

Concrete→ Pictorial→ Abstract progression

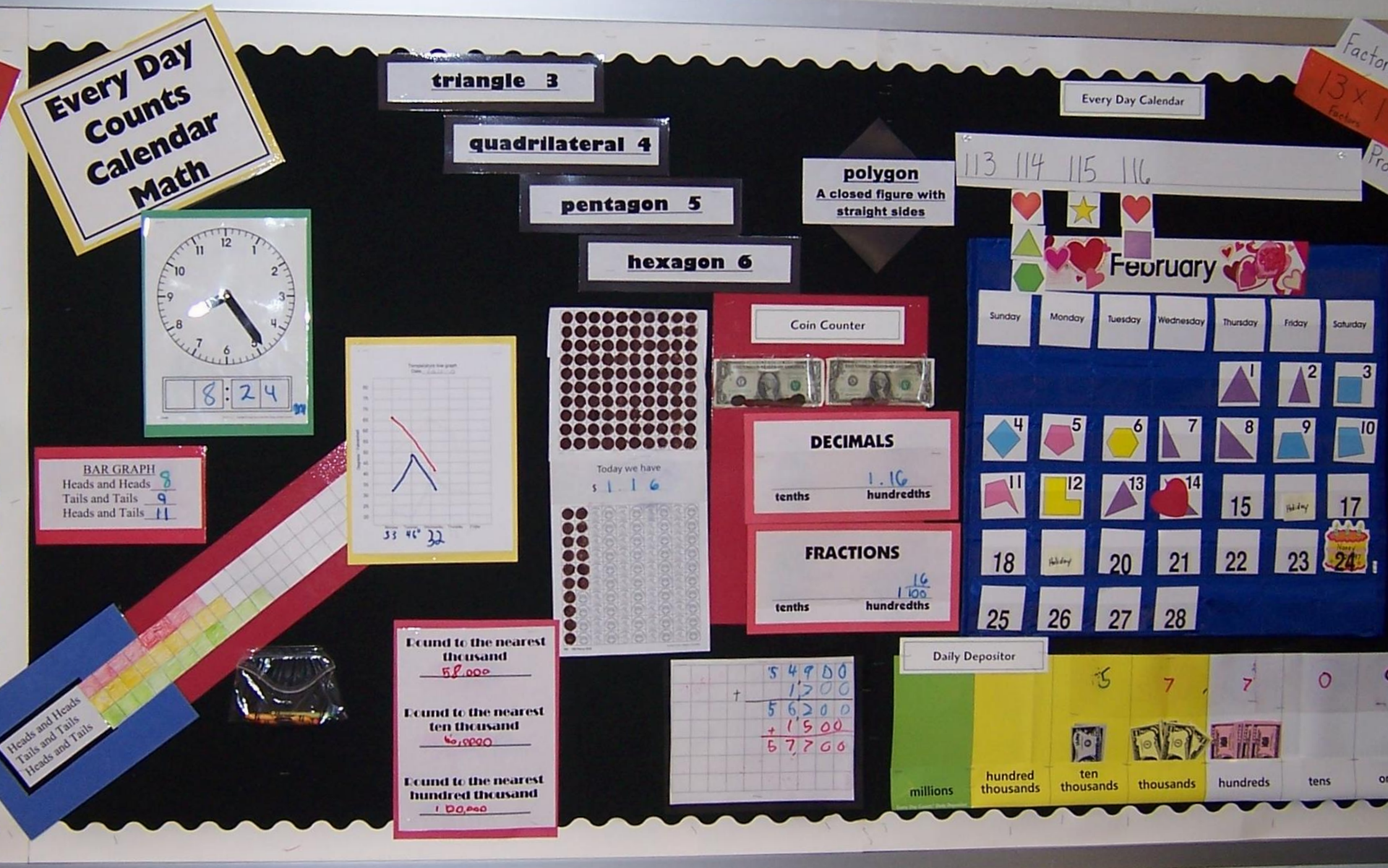
- greater emphasis on mastery

Goal: Develop children's visualization and analytical skills

- Helps in improving ones problem solving skills

Spiral Curriculum

- 'A curriculum as it develops should revisit this basic ideas repeatedly, building upon them until the student has grasped the full formal apparatus that goes with them



Every Day Counts Calendar Math

What does Singapore Math offer our students?

A new approach to developing in-depth mathematical understanding through:

- concept building activities
- unique mental math strategies
- problem solving methods
- guided lessons

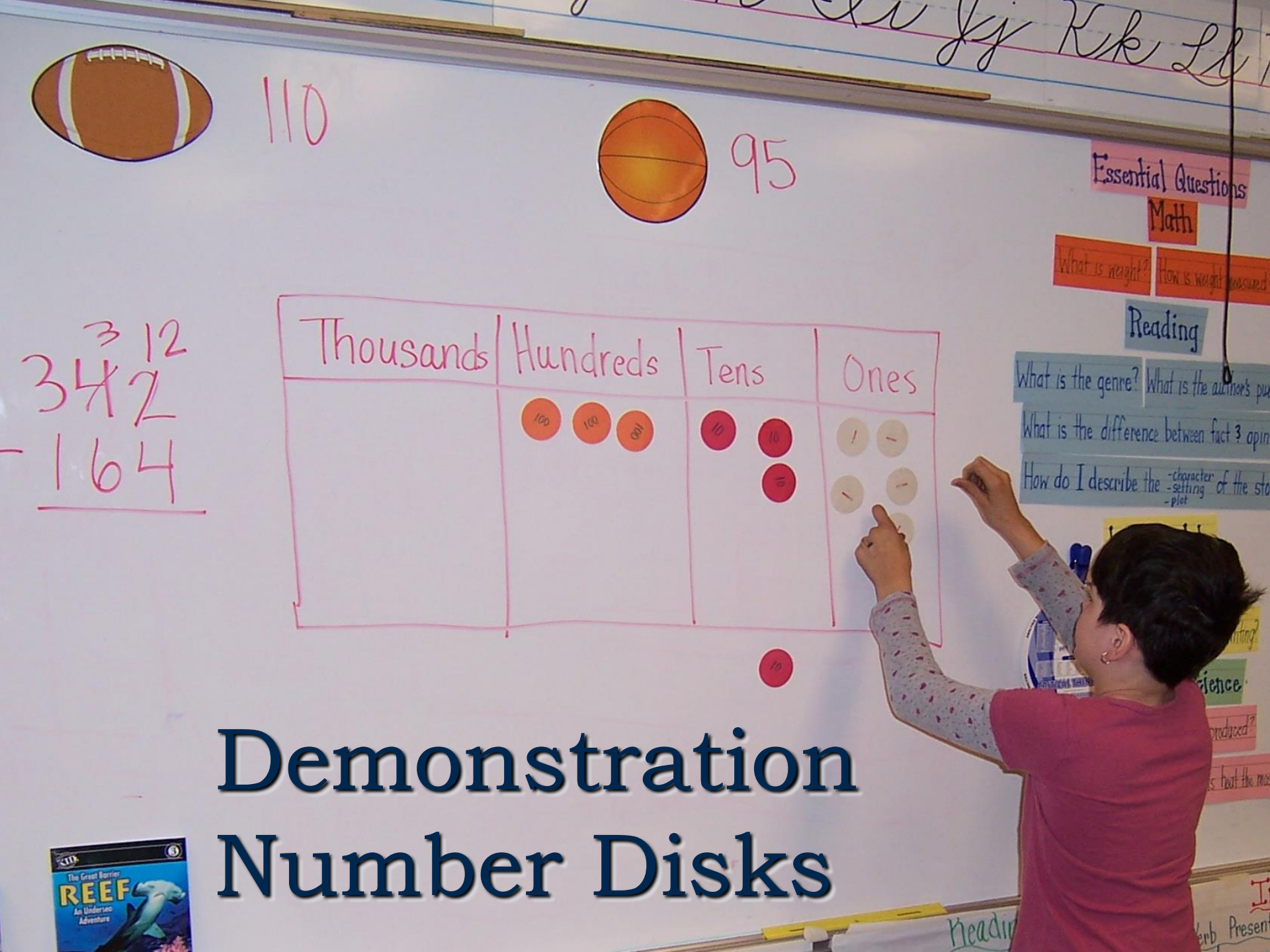
How does Singapore Math accomplish student success?

- Manipulatives and hands-on activities that build concrete understanding
- Unique strategies that build from year to year
- User friendly student texts and workbooks
- Detailed teachers editions and teacher training

Manipulatives and Hands-on Activities are used to develop concrete understanding

Singapore Math uses number disks, place value charts, shape cutouts, number dice, number cards, and games


Student Number Disks


110
95
Essential Questions
Math
What is weight?
Reading
What is the genre?
What is the difference between fact 3 opin
How do I describe the -character -setting -plot of the sto
3 12
3 4 2
- 1 6 4
Thousands
Hundreds
Tens
Ones
100
100
001
10
10
10
1
1
1
1
1
Demonstration
Number Disks
The Great Barrier
REEF
An Undersea Adventure

Teacher made games


Games with number cards

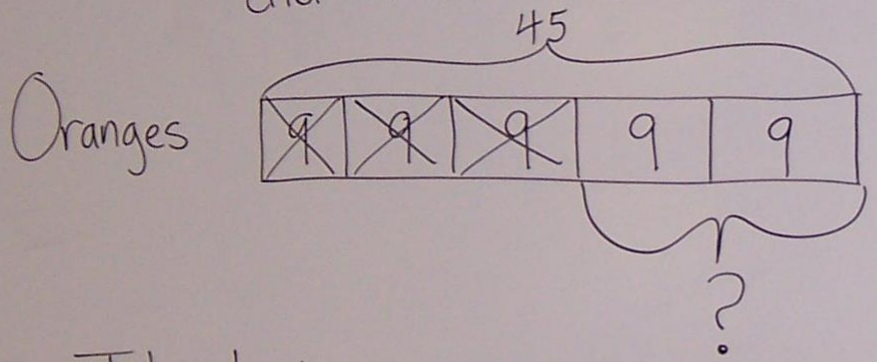
Strategies

- Number ladders are used to teach multiplication
- Bar modeling is used to solve word problems
- Number bonds help students develop mental math strategies


Number Ladders

Good Morning! 3-12-07

John bought 45 oranges. He used $\frac{3}{5}$ of them to make orange juice. How many oranges did he have left?

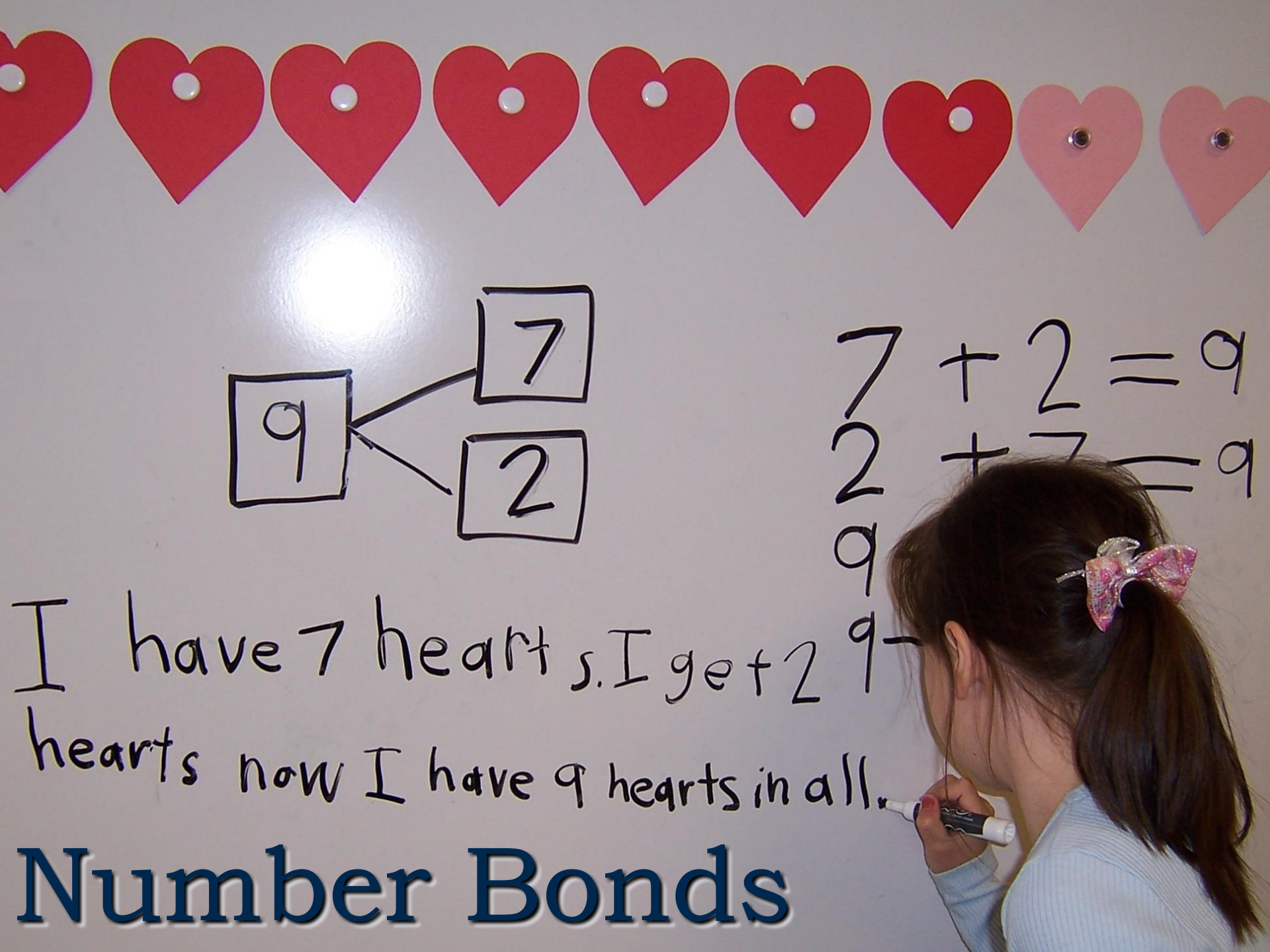


$45 \div 5 = 9$

$9 \times 2 = 18$

John had 18 oranges left after he made orange juice.

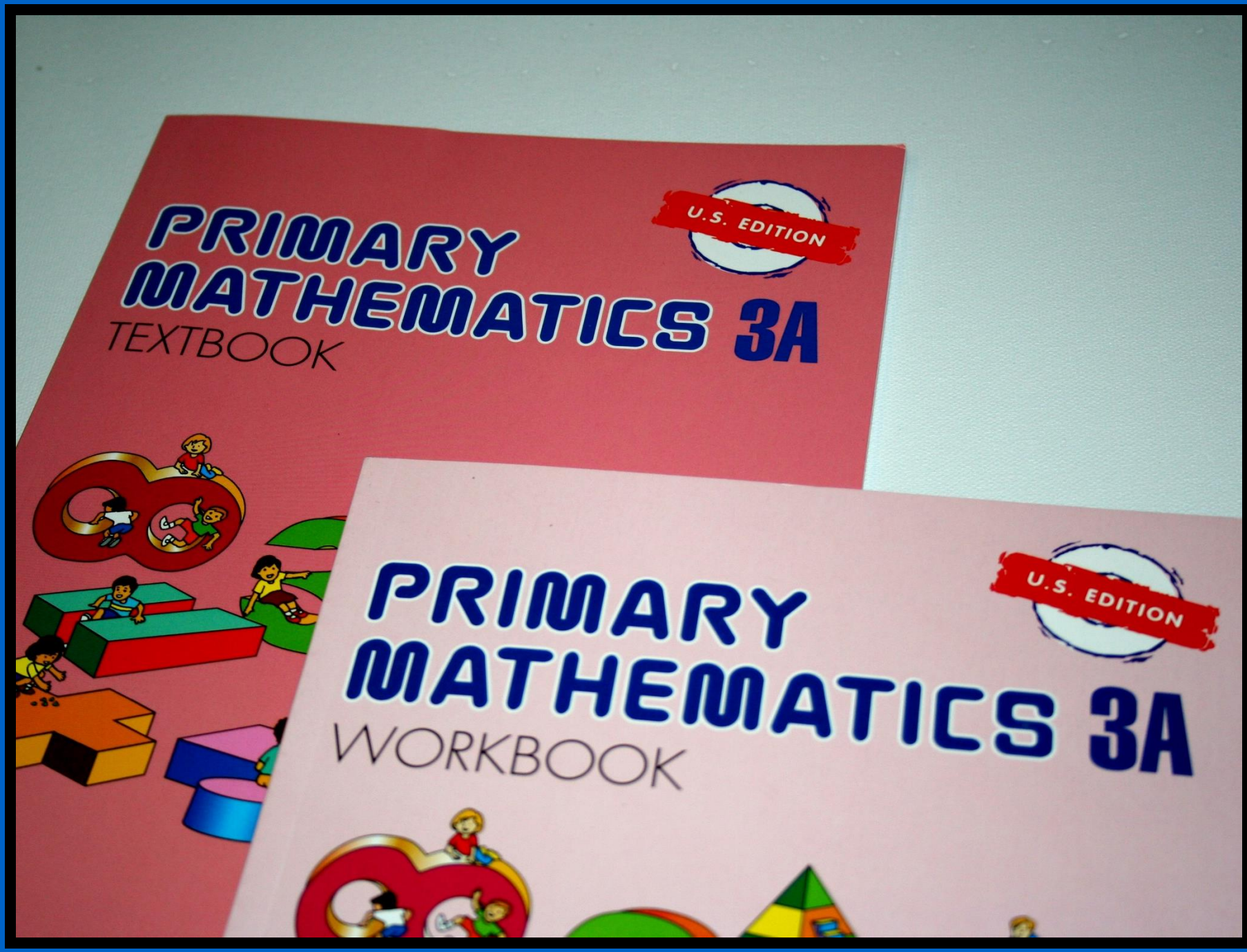
Bar Modeling



Number Bonds

User Friendly Student Textbooks and Workbooks

- Smaller, less repetition, practice work progressively increases in difficulty
- Provides the pictorial and abstract practice students need in order to fully develop their knowledge and use of mathematics


PRIMARY MATHEMATICS 3A
TEXTBOOK
U.S. EDITION
PRIMARY MATHEMATICS 3A
WORKBOOK
U.S. EDITION

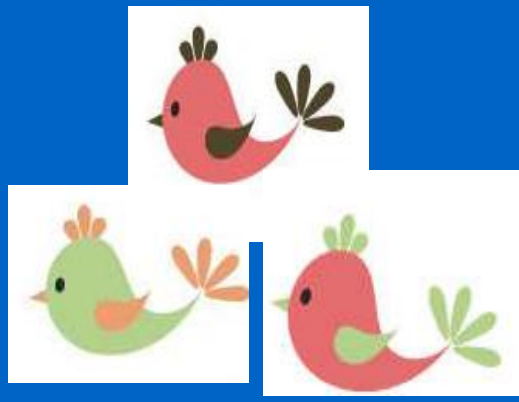
Detailed Teachers Editions and Training

- Teachers editions provide very guided instruction for teachers
- Teachers participated in a 3 day professional development this summer
- Ongoing training throughout the year
- Teachers are learning Singapore Math too

Singapore Math parents:

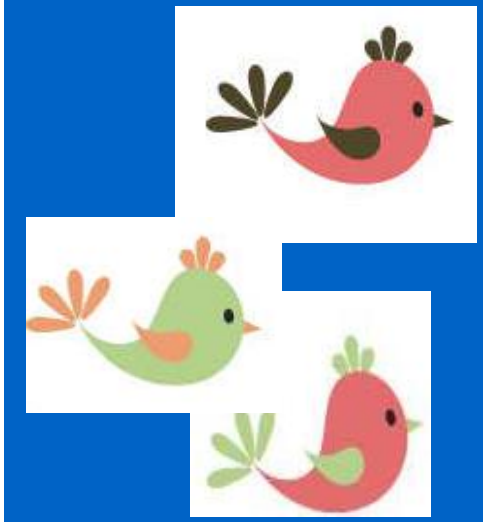
- May see homework with fewer but more challenging problems
- Will see teacher made tests
- Will need to allow your child to work math using Singapore Math methods
- Will need to practice math facts daily

Problem Solving in Singapore Math



There were 2 birds on a tree. Three more birds went to the tree. How many birds were there altogether?

Problem Solving in Singapore Math



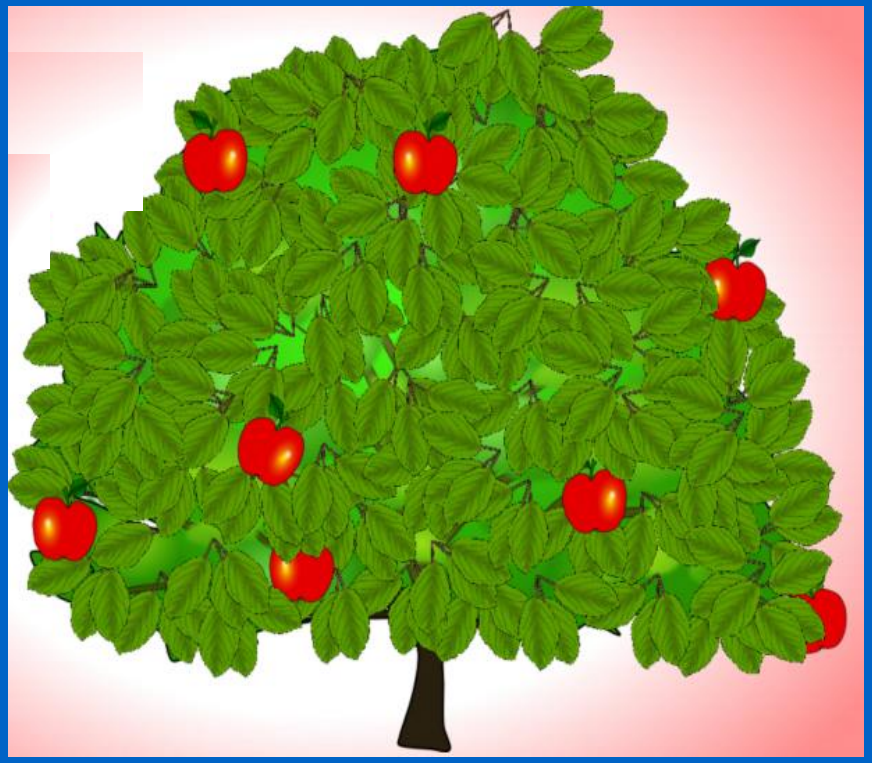
There are 5 birds on a tree. Three birds flew away. How many birds were left?

Problem Solving in Singapore Math

Making Addition Stories

Problem Solving in Singapore Math

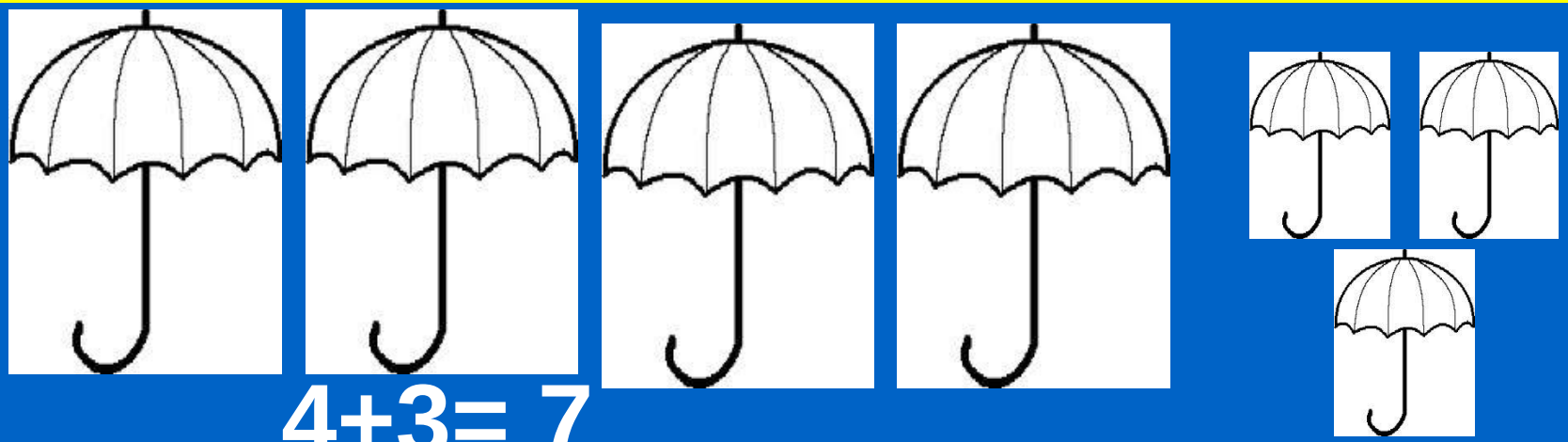
Making Subtraction Stories



Problem Solving in Singapore Math

Leah has 4 big umbrellas. She also has 3 small umbrellas. How many umbrellas does she have altogether?

Ask your child to draw to make the problem concrete to him.



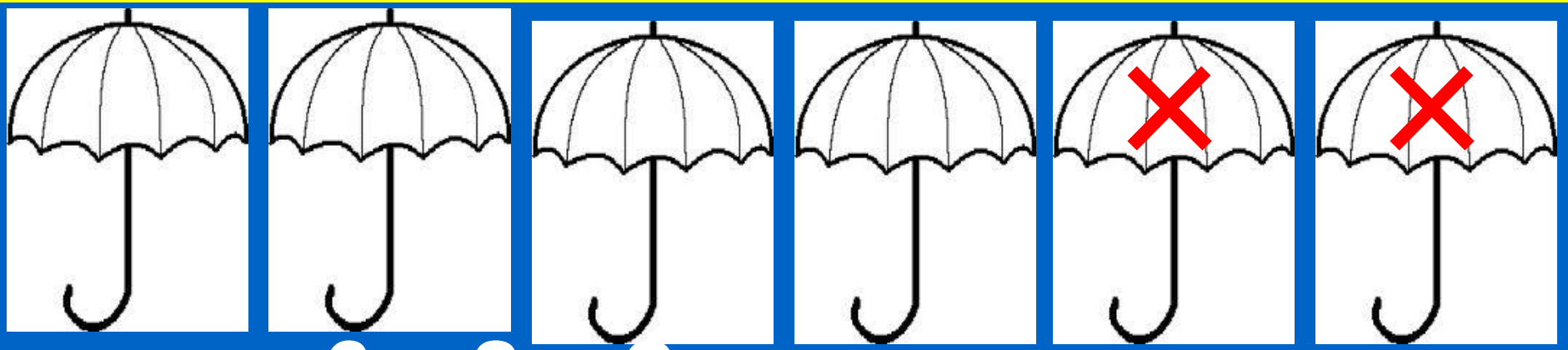
4+3= 7

She has __7__ umbrellas

Problem Solving in Singapore Math

Leah has 6 umbrellas. She gave her 2 umbrellas to Anne. How many umbrellas does she have left?

Ask your child to draw to make the problem concrete to him.

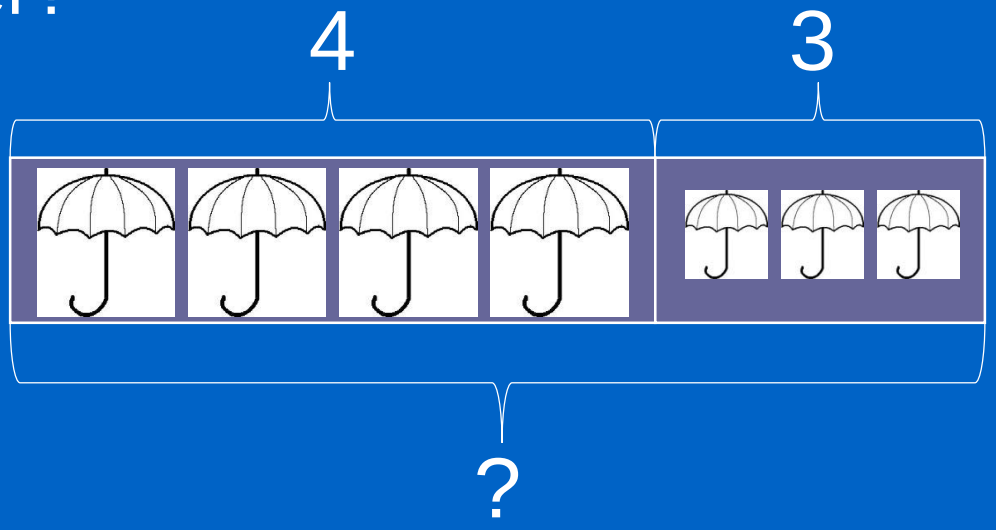


6 – 2 = ?

She has 4 umbrellas left.

Problem Solving: Addition

Leah has 4 big umbrellas. She also has 3 small umbrellas. How many umbrellas does she have altogether?

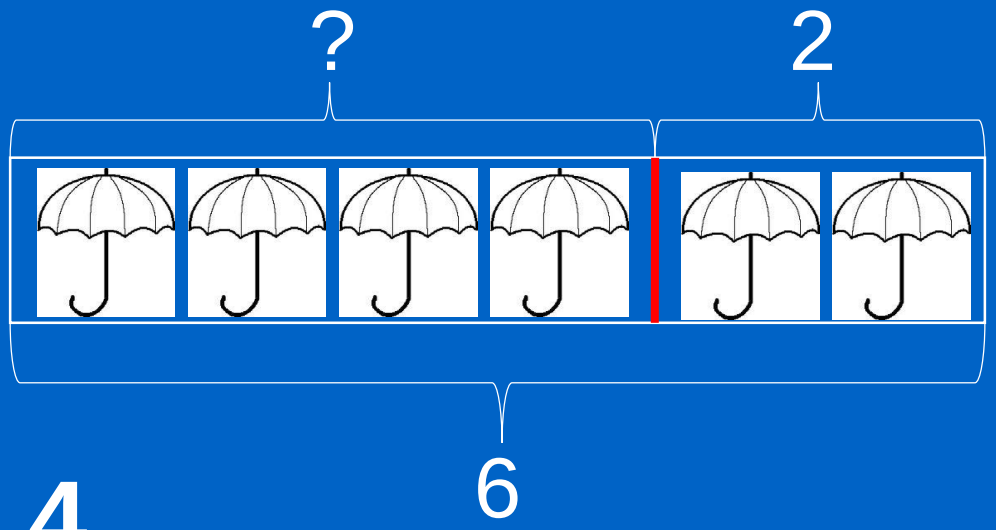


4+3= 7

She has 7 umbrellas altogether.

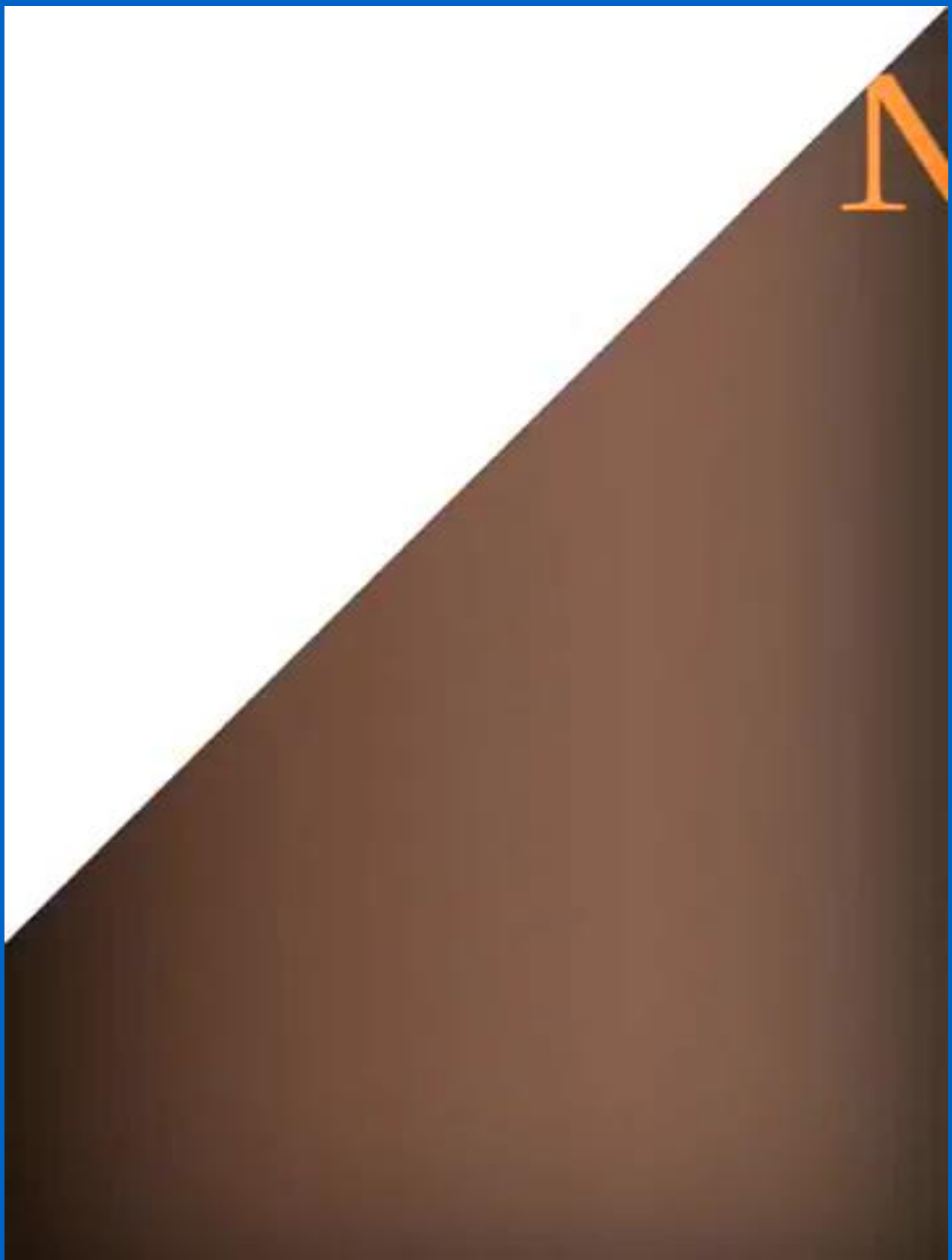
Problem Solving: Subtraction

Leah has 6 umbrellas. She gave her 2 umbrellas to Anne. How many umbrellas does she have left?



6 – 2 = 4

She has 4 umbrellas left.



Model Method

- Model drawing/bar modeling
- A systematic method of representing word problems and number relationships
- They create bars and break them into “units”. The units create a bridge to the concept on an “unknown” quantity that must be found.
- Spiral strategy

Benefits of Model Drawing

- Have visual to associate with numbers that can be abstract.
- Learn to translate the English into Math and then back into English.
- It starts to see the relationship behind numerical values.
- View all problems from an algebraic perspective beginning in early elementary grade levels.

Seven Steps for Model Drawing

1. Read the problem.
2. Identify the variables (the *who* and the *what*)..
3. Draw a unit bar or bars.
4. Chunk information by rereading the problem one sentence at a time, and adjust the unit bar or bars to match the information.
5. Decide on your question mark, and draw it in the appropriate place.
6. Work the computation.
7. Write a complete and grammatically correct sentence to answer your question mark.

Step 1 - Read The Problem

Mr. Hobart sells 6 pans of brownies every day. He makes $10 per pan. How much money does Mr. Hobart make in a day?

- We can write a problem on the board and ask the whole class to read it aloud together.
- We can ask each student to copy a problem from the board and read it to himself or herself silently.
- We can ask each student to read the problem from his or her own paper in a low voice.
- We can alternate calling on different students to read problems we put on the board.
- We can read a problem to students.

Step 2 Identify the Variables

Who does or has what?
How does that relate to what the other person or people do or have?

Mr. Hobart sells 6 pans of brownies every day. He makes $10 per pan. How much money does Mr. Hobart make in a day?

Step 3 Drawing Unit Bars

Unit bars provide the visual.
In early grade students can draw individual unit s, like fish, for unit bars
We would like students to draw squares or rectangles of the same size for each unit bar.

Mary's Money

Wendi's brownies

Sue's brownies

Step 4 Reread Each Sentence and Adjust Unit Bars

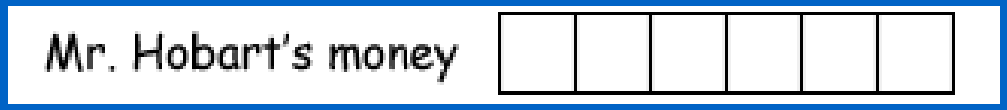
Chunk information to make it more manageable.

Adjust the unit bar or bars to match the information in the problem.

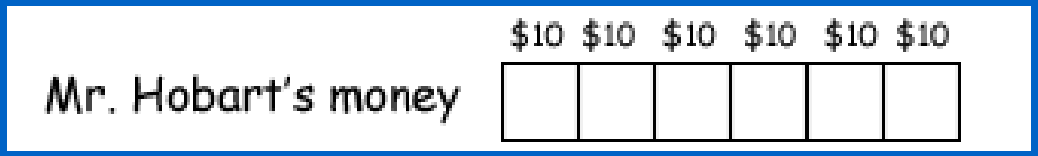
This is where it is easy to make a mistake, work slowly.

Mr. Hobart sells 6 pans of brownies every day. He makes $10 per pan. How much money does Mr. Hobart make in a day?

The first sentence tells us he sold 6 pans of brownies every day.



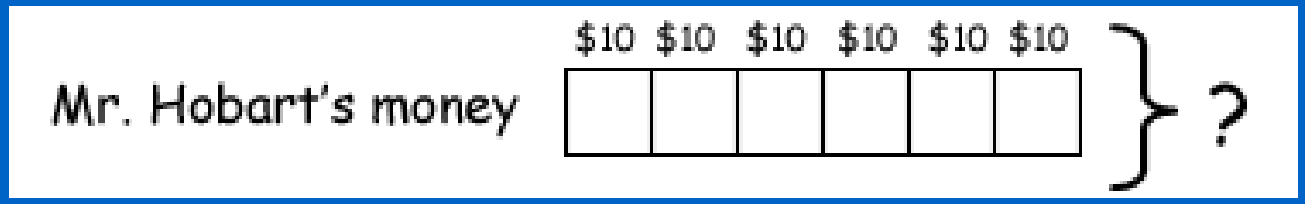
Next sentence tells us he makes $10 per pan.

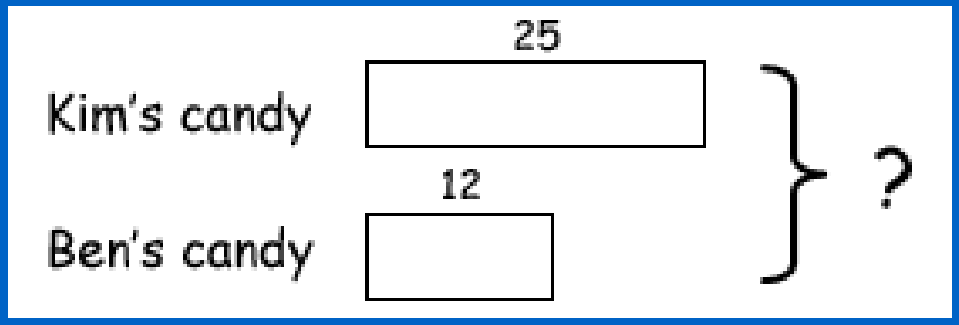


You want to write appropriate quantities either right above or below the bars in grades 3 and up. You can write inside the bars in lower grades.

Step 5 Adding the Question Mark

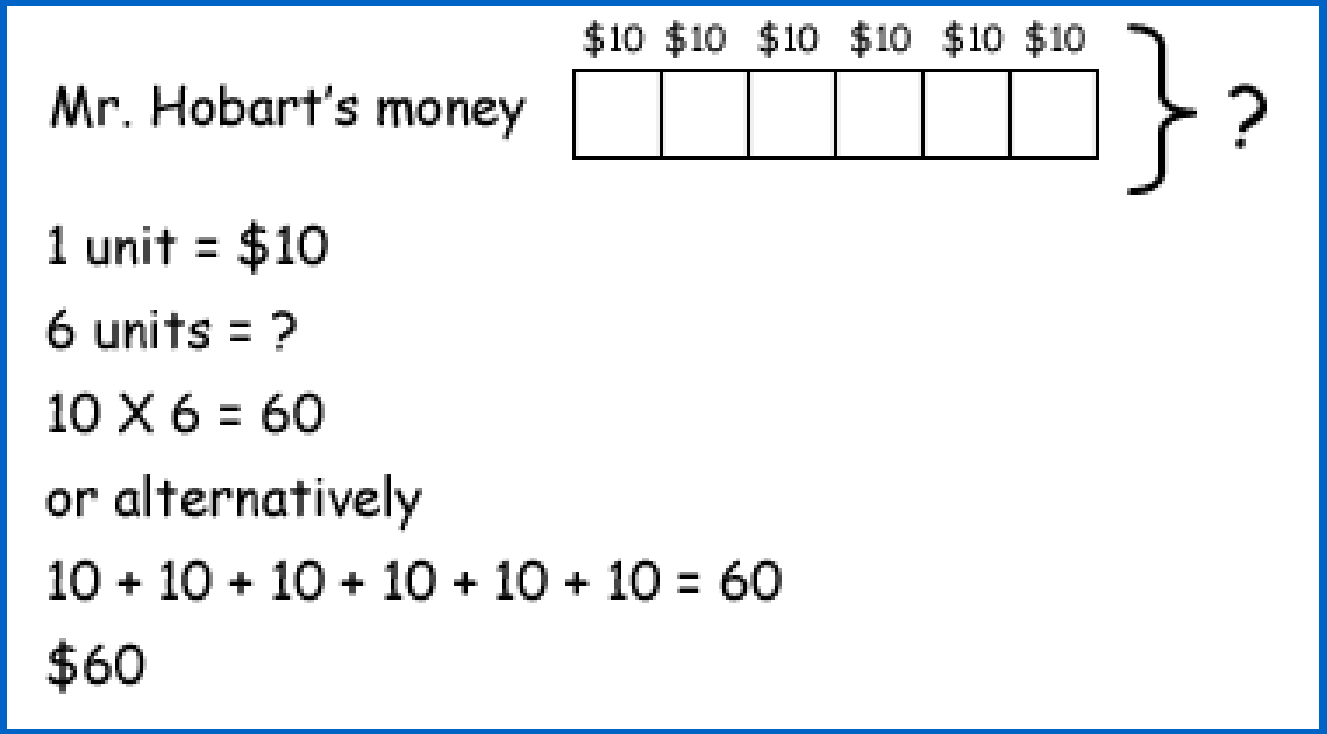
We add our question mark to indicate what we need to find out and where. Sometimes it surrounds multiple unit bars with a big bracket, and other times, it just relates to one part of one unit bar with a small bracket or no bracket at all.





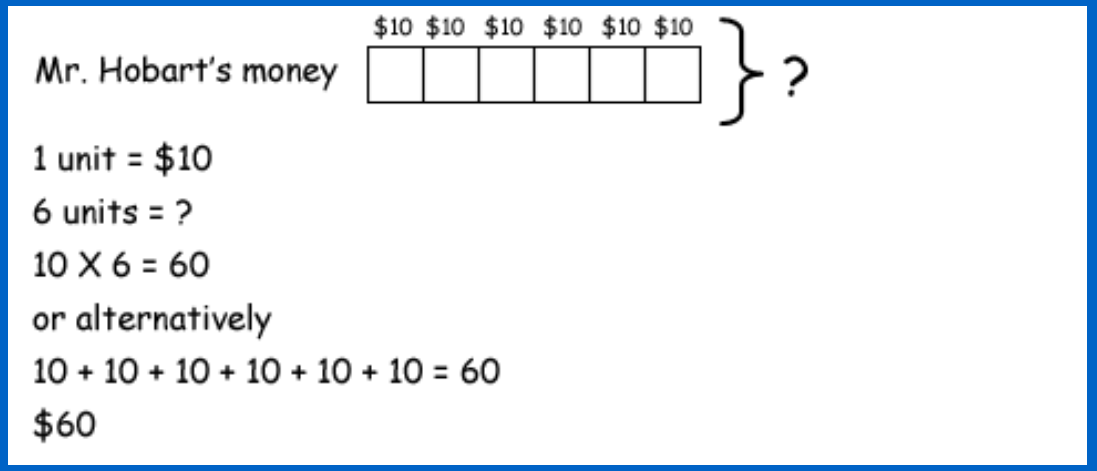
Step 6 Work the Computation

Computations are done horizontally to match how we wrote it out in our model drawing.



Step 7 Write a Sentence

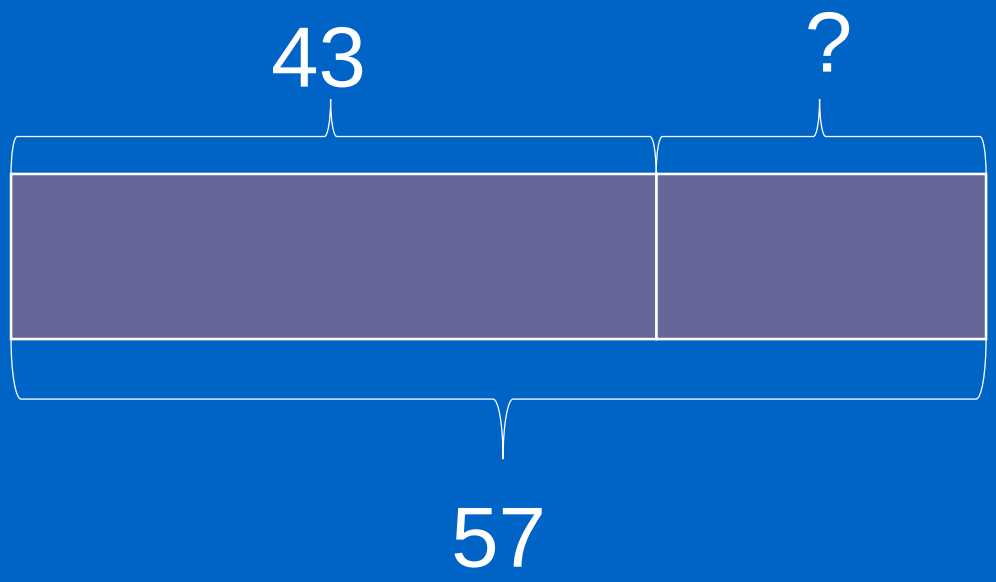
The sentence has to be complete.
The sentence has to address the who and the what and the question mark.
The sentence should be written underneath all the work.



Mr. Hobart makes $60 in a day.

Model Method

Leah has 43 big umbrellas and some small umbrellas. She has 57 umbrellas altogether. How many small umbrellas does she have?



She has 14 small umbrellas.

Model Method

Leah has 43 big umbrellas and some small umbrellas. She has 57 umbrellas altogether. How many small umbrellas does she have?

x = number of small umbrellas

43 + x = 57

x = 57-43

x = 14

She has 14 small umbrellas.

Differences between Model Method and Algebraic Method

Model Method	Algebraic Method
Pictorial representation	Abstract reasoning
More effective for younger pupils who need to see to understand	More suitable for older pupils
Foundation for algebraic thinking	Use of abstract symbols

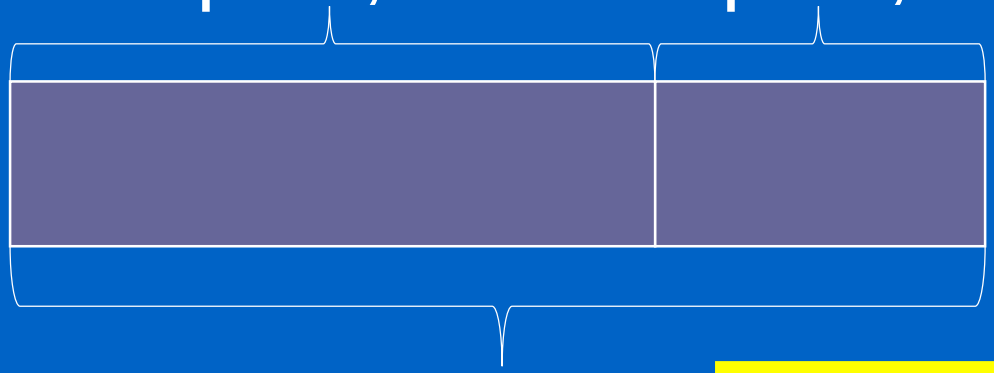
Adding on Structure

Bantay Bata was able to collect Php 28,750 during the fundraising event. Mr. Sy donated Php 25,000 more. How much money did Bantay Bata get during the event?

Adding on Structure

Bantay Bata was able to collect Php 28,750 during the fundraising event. Mr. Sy donated Php 25,000 more. How much money did Bantay Bata get during the event?

Php 28,750 Php 25,000



?

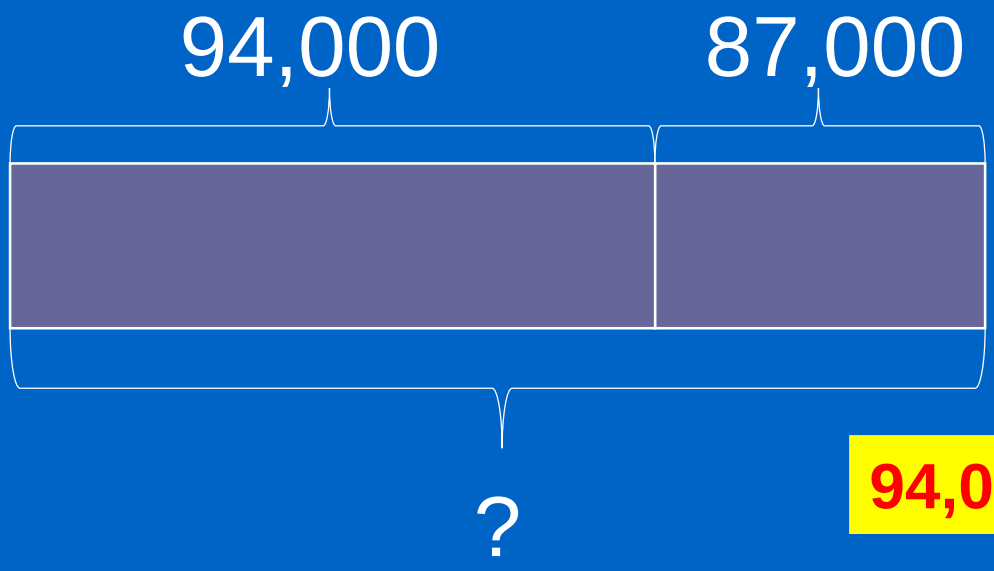
Php28,750+Php25,000 = Php53,750

Putting Together Structure

Kelly has 87,000 Twitter followers. Andrea has 94,000 followers on Twitter. How many Twitter followers do they have altogether?

Putting Together Structure

Kelly has 87,000 Twitter followers. Andrea has 94,000 followers on Twitter. How many Twitter followers do they have altogether?



94,000+87,000 = 181,000

Comparing Structure

Kelly has 87,000 Twitter followers. Andrea has 94,000 more Twitter followers than Kelly. How many Twitter followers does Andrea have?

Comparing Structure

Kelly has 87,000 Twitter followers. Andrea has 94,000 more Twitter followers than Kelly. How many Twitter followers does Andrea have?

94,000+87,000 = 181,000

Addition Problems-Golden Rules

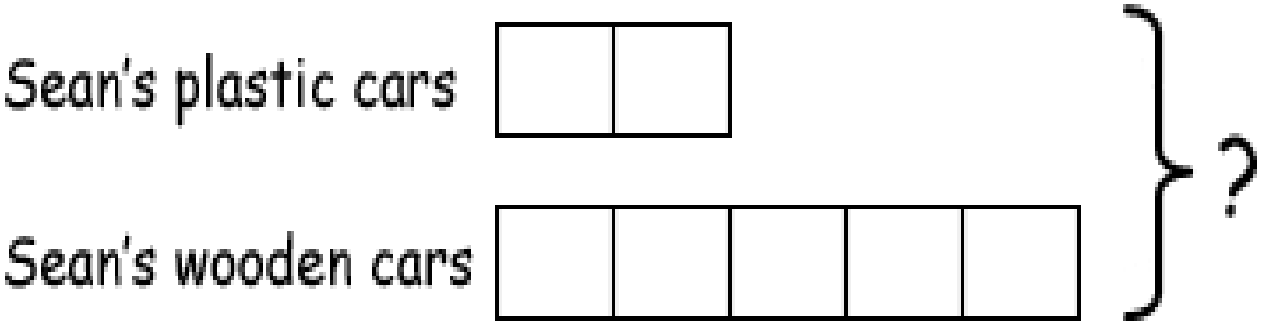
- Draw unit bars on the smaller side so you can add to them
- You can also use pattern blocks for younger students to represent the units.

Sean has 2 plastic cars. He also has 5 wooden cars. How many cars does Sean have altogether?

Try It!

Does your Model Drawing look something like this?

Sean has 2 plastic cars. He also has 5 wooden cars. How many cars does Sean have altogether?



2 + 5 = 7

Sean has 7 cars altogether.

Comparing Structure

Model drawing promotes understanding via visual representation rather than “cue words” method.

Word Problems Involving Subtraction

- Comparing Structure (to find the difference)
- Set and Subset Structure

Comparing Structure (to find the difference)

Kelly has 87,000 Twitter followers. Andrea has 94,000 Twitter followers. How many more Twitter followers does Andrea have than Kelly?

Comparing Structure
(to find the difference)

Kelly has 87,000 Twitter followers. Andrea has 94,000 Twitter followers. How many more Twitter followers does Andrea have than Kelly?

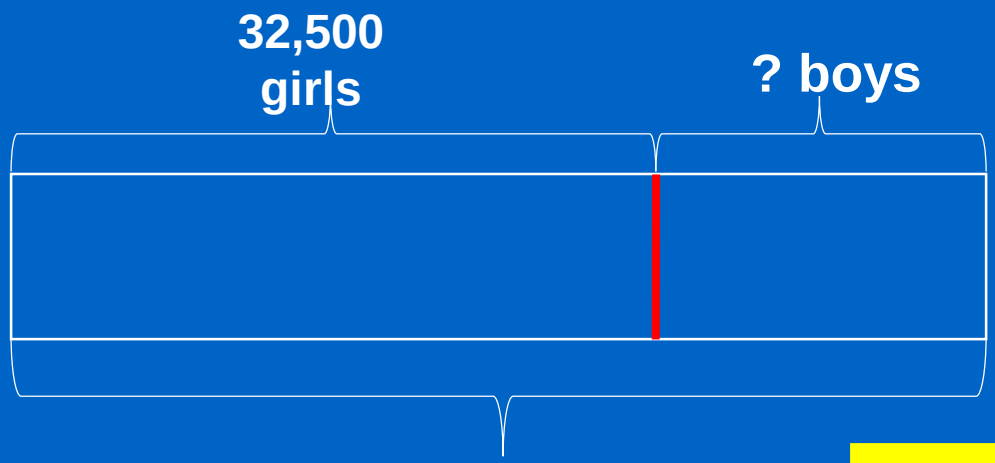
94,000-87,000 = 7,000

Set-And-Subset Structure

48,000 people went to church last Sunday. If 32,500 of them were girls, how many boys were there?

Set-And-Subset Structure

48,000 people went to church last Sunday. If 32,500 of them were girls, how many boys were there?



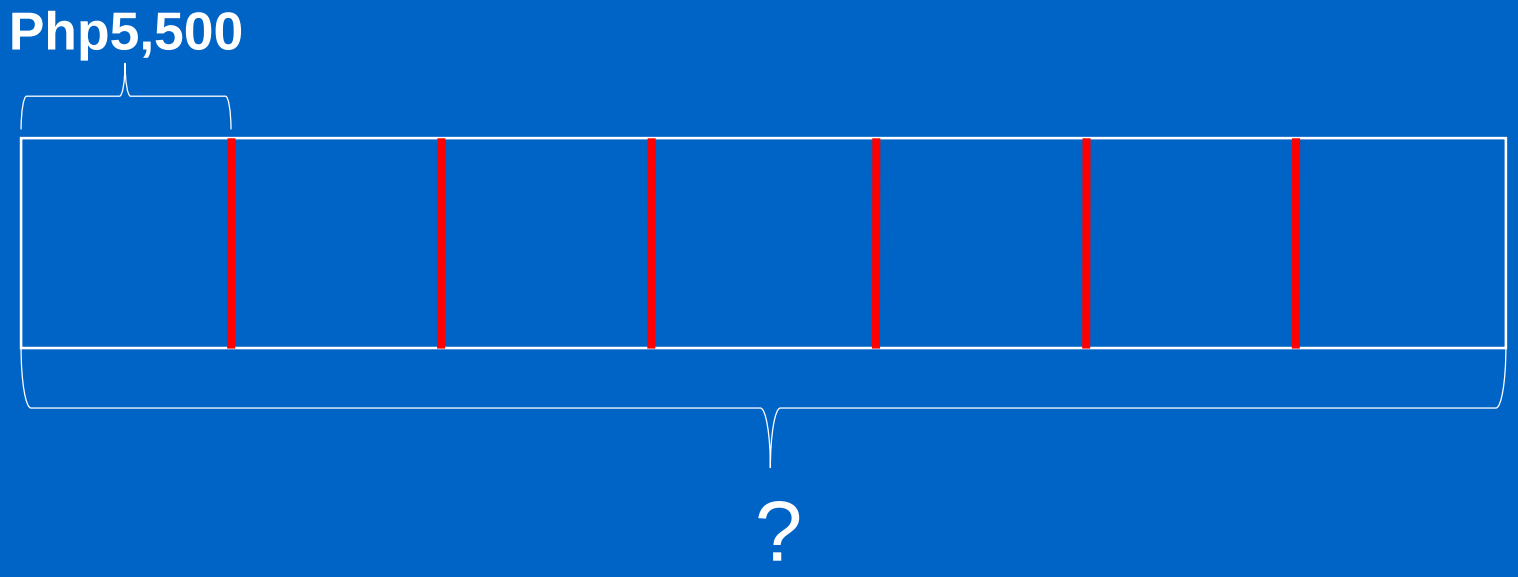
48,000-32,500 = 15,500

Word Problems Involving Multiplication

A digital camera costs Php5,500. The store owner ordered 7 cameras. How much did he pay altogether?

Word Problems Involving Multiplication

A digital camera costs Php5,500. The store owner ordered 7 cameras. How much did he pay altogether?



Php5,500 x 7= Php38,500

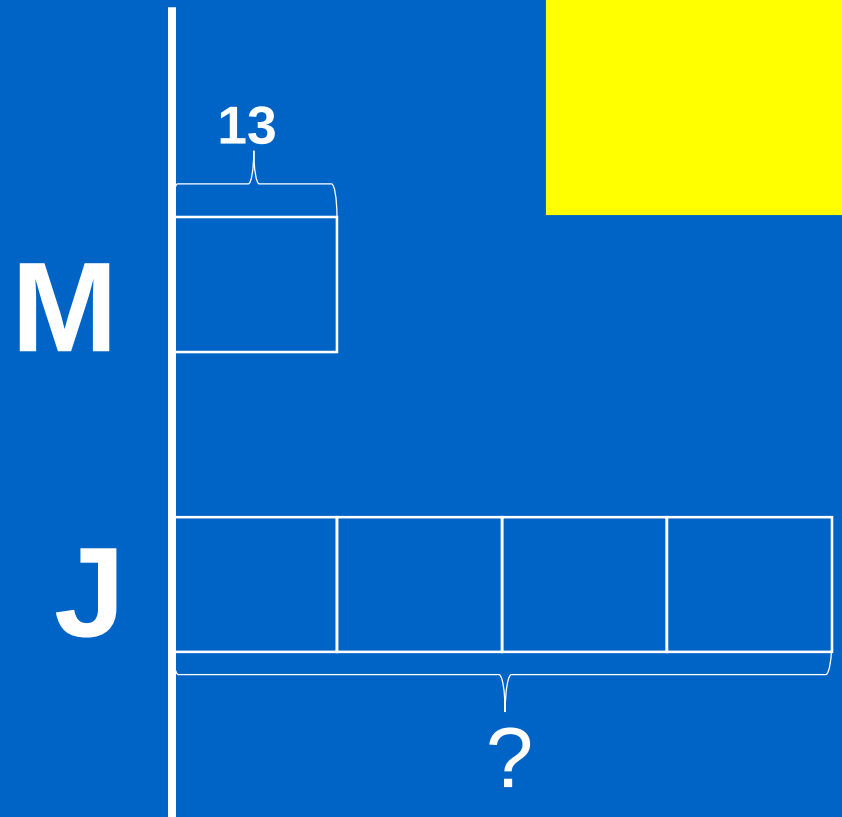
Word Problems Involving Multiplication

Jessica is 4 times as old as Marie. Marie is 13 years old. How old is Jessica?

Word Problems Involving Multiplication

Jessica is 4 times as old as Marie. Marie is 13 years old. How old is Jessica?

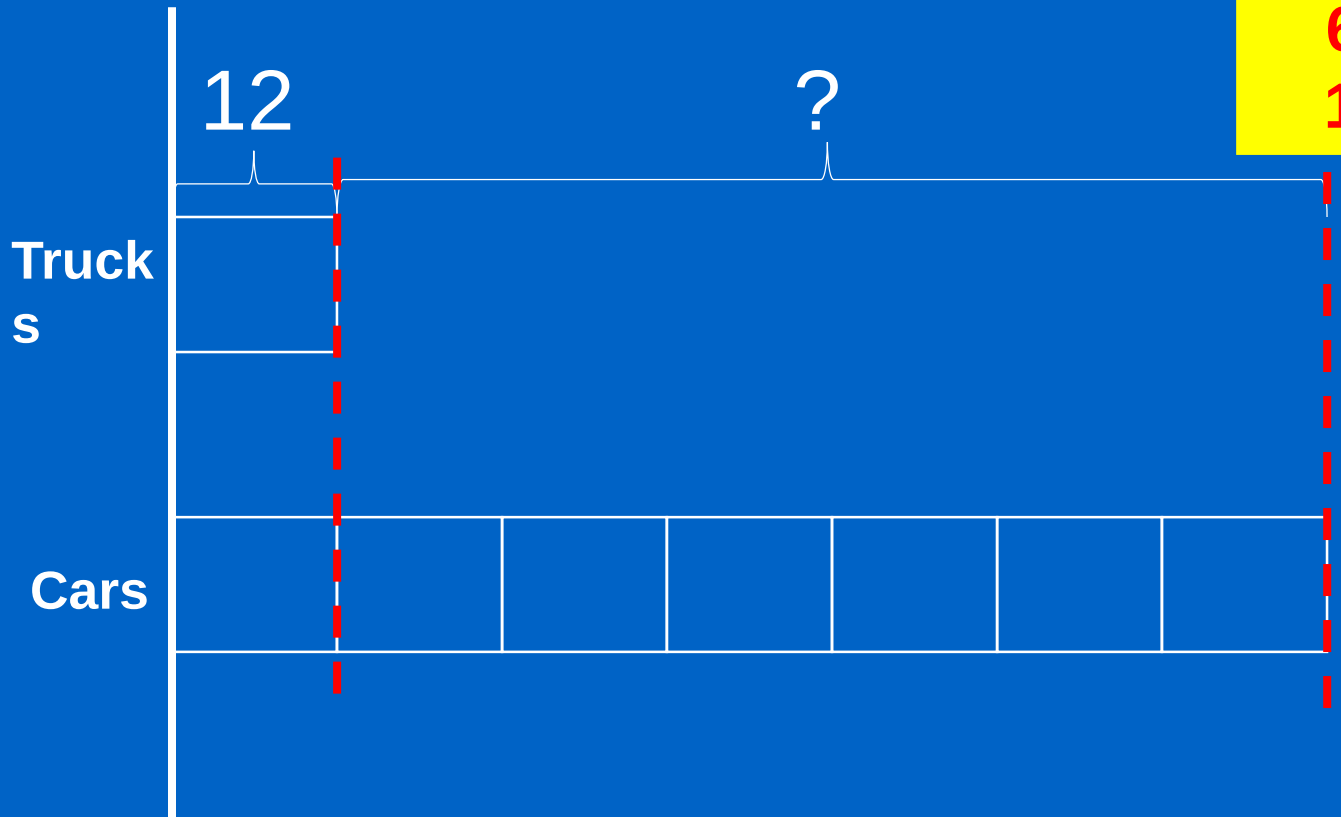
1 unit = 13
4 units = ?
13 x 4 = 52



Word Problems Involving Multiplication

Tom has 12 toy trucks. He has 7 times as many toy cars as toy trucks. How many more toy cars than toy trucks does he have?

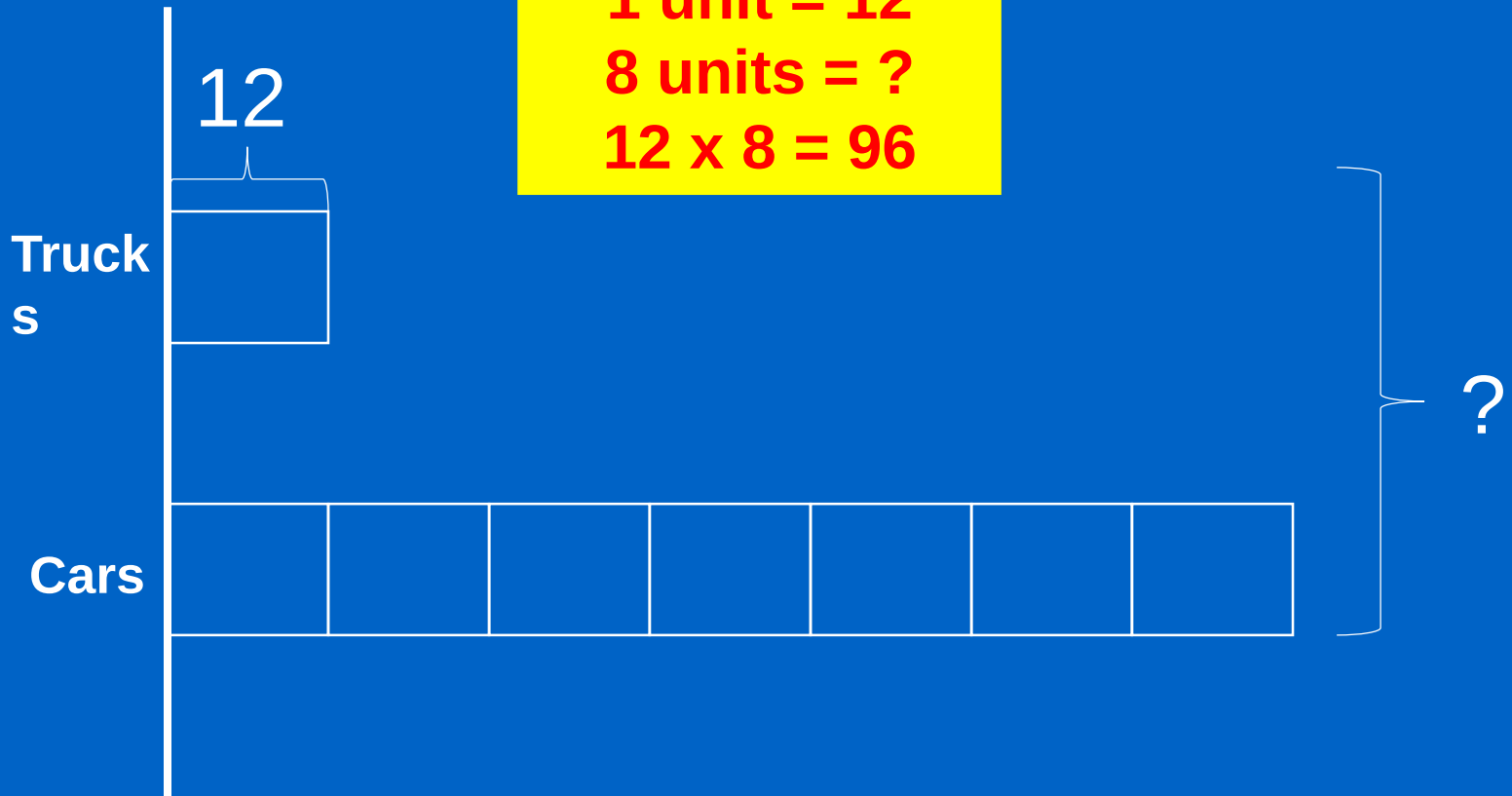
1 unit = 12
6 units = ?
12 x 6 = 72



Word Problems Involving Multiplication

Tom has 12 toy trucks. He has 7 times as many toy cars as toy trucks. How many toy cars and toy trucks does he have altogether?

1 unit = 12
8 units = ?
12 x 8 = 96



Exercise

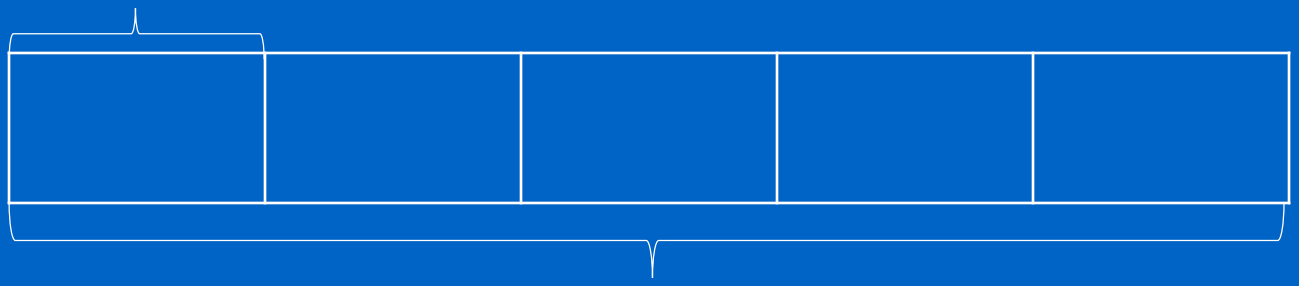
Billy’s age is twice the age of Erick. Erick’s age is 3 times the age of Gina. If their total age is 70, what is the age of Erick?

Word Problems Involving Division

Lisa, Luke, Sally, Ben and Mark bought a present for Php1,500. How much did each of them pay?

Word Problems Involving Division

Lisa, Luke, Sally, Ben and Mark bought a present for Php1,500. How much did each of them pay?



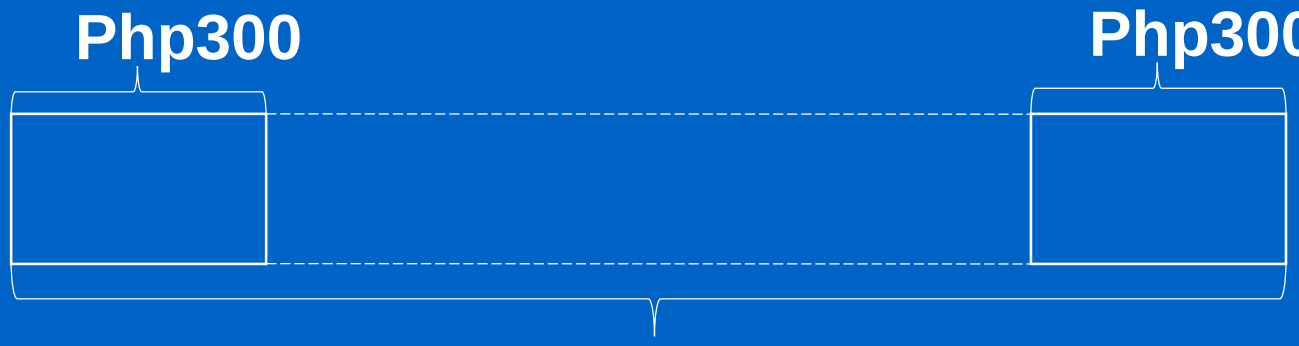
1,500 ÷ 5 = 300

Word Problems Involving Division

Some children bought a present for Php1,500. Each of them paid Php300. How many children shared the cost of the gift?

Word Problems Involving Division

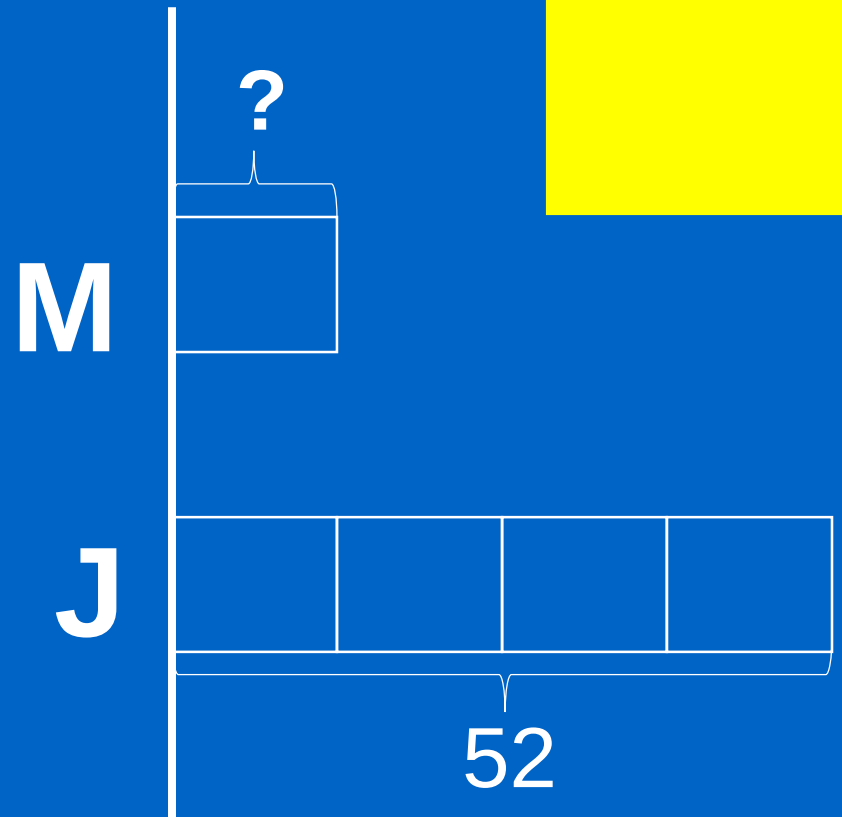
Some children bought a present for Php1,500. Each of them paid Php300. How many children shared the cost of the gift?



1,500 ÷ 300= 5

Word Problems Involving Division

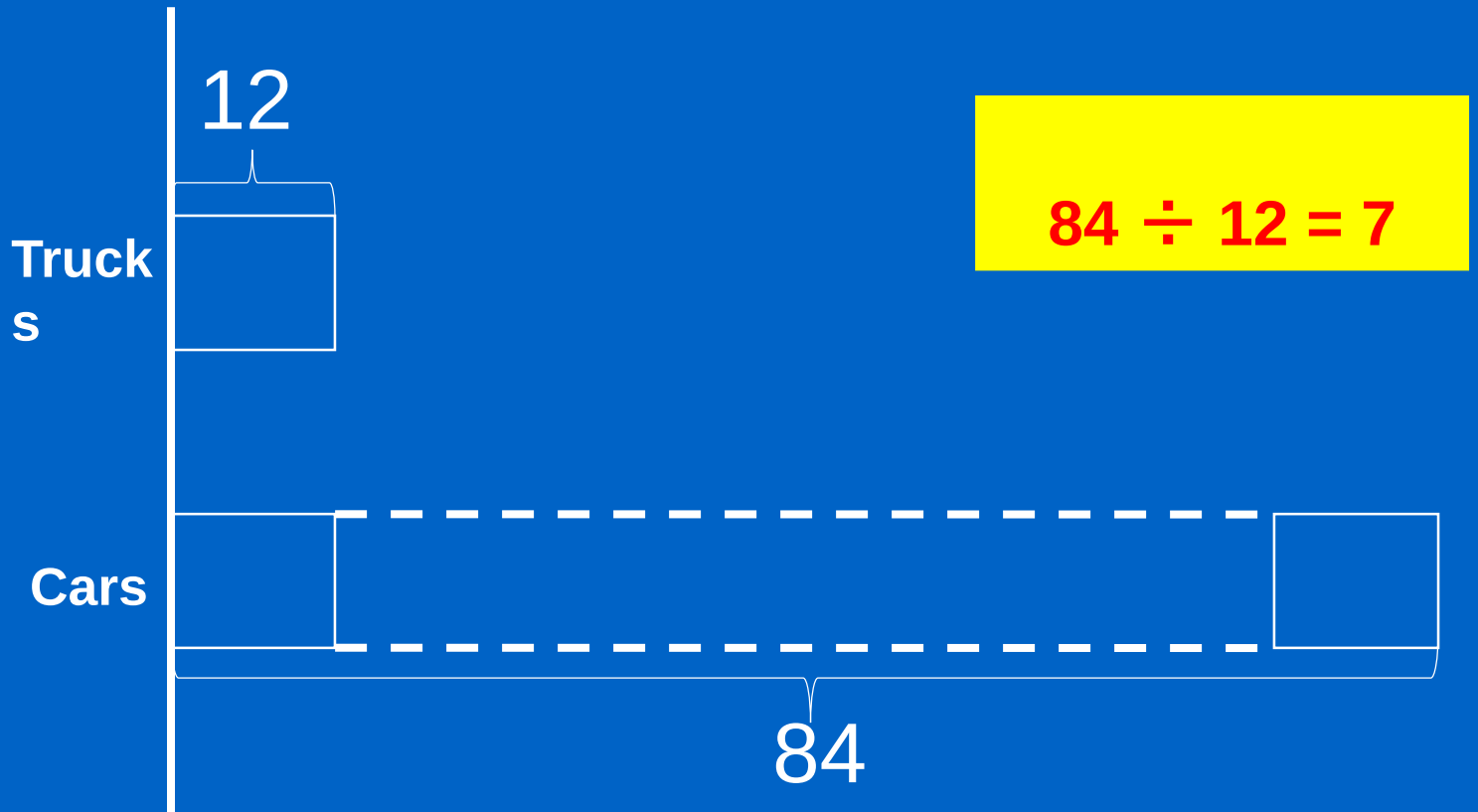
Jessica is 52 years old. She is 4 times as old as Marie. How old is Marie?



4 units = 52
1 unit = ?
52 ÷ 4 = 13

Word Problems Involving Division

Tom has 84 toy cars and 12 toy trucks. How many times as many toy cars as toy trucks does Tom have?

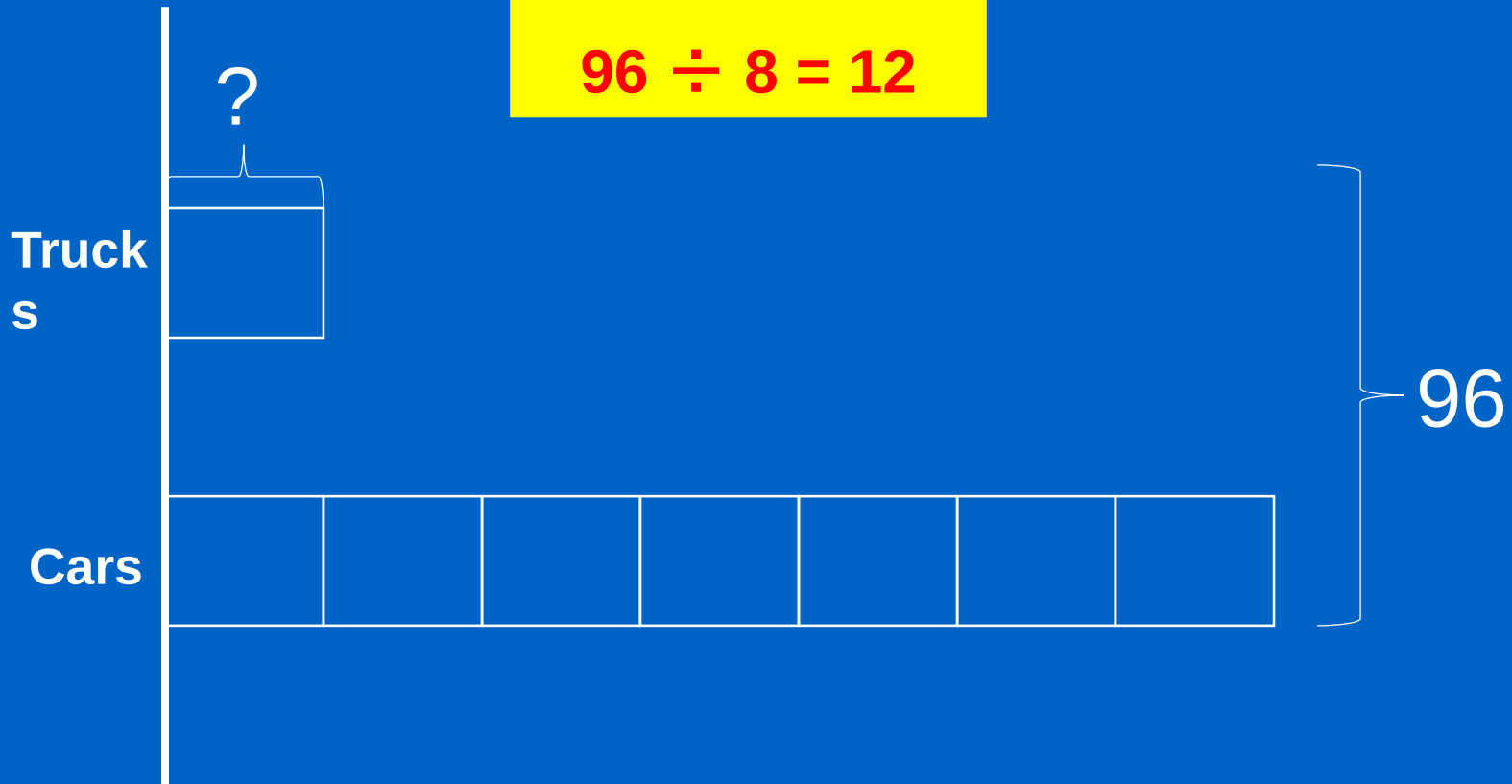


84 ÷ 12 = 7

Word Problems Involving Division

Tom has 96 toy cars and toy trucks. He has 7 times as many toy cars as toy trucks. How many toy trucks does he have?

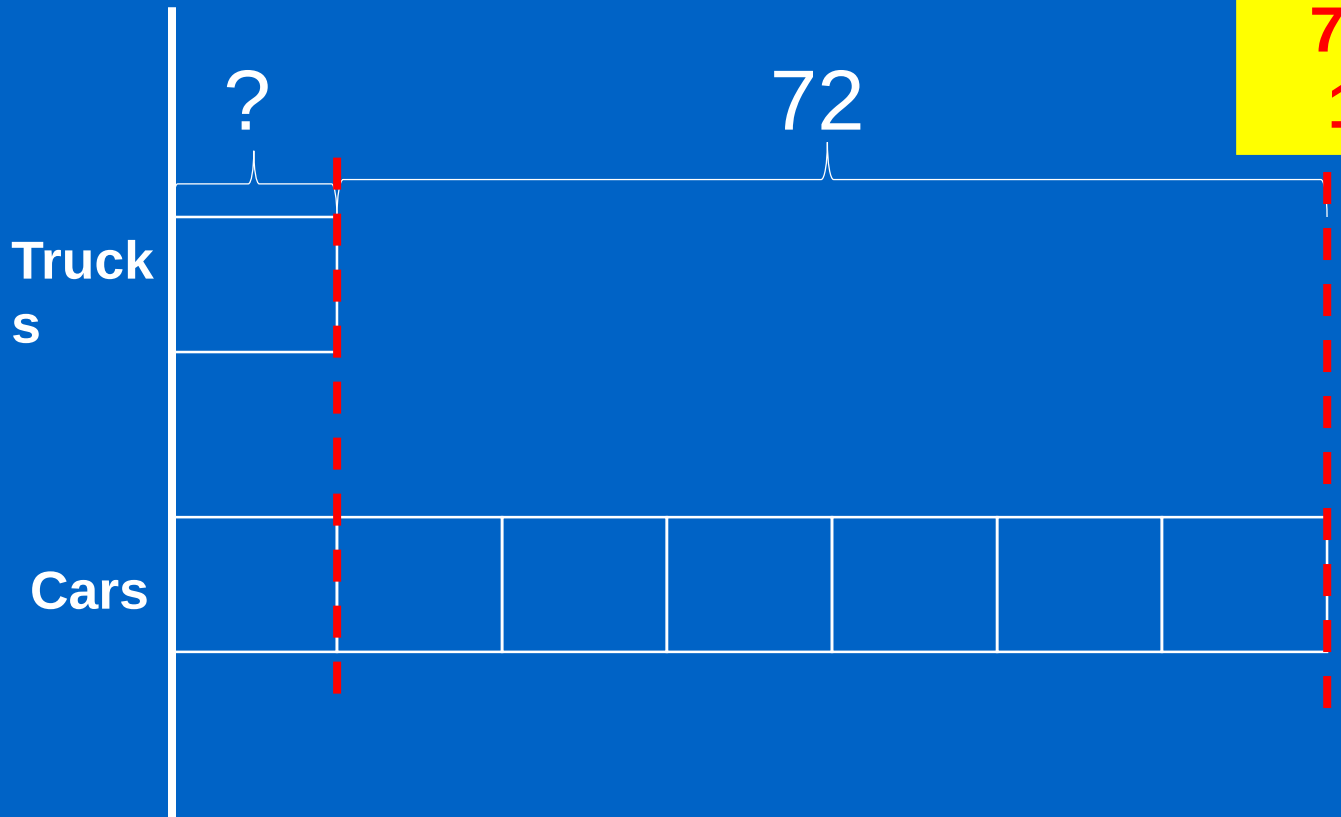
96 ÷ 8 = 12



Word Problems Involving Division

Tom has 72 more toy cars than toy trucks. He has 7 times as many toy cars as toy trucks. How many toy trucks does he have?

6 units= 72
72 ÷ 6 = 12
1 unit = 12



Word Problem Exercises

852 children took part in an art exhibit. If there were 678 boys, how many girls were there?

Word Problem Exercises

9 children shared the cost of a present equally. Each of them paid Php90. How much was the present?

Word Problem Exercises

Len baked 8 cookies. She baked 5 times as many cupcakes as cookies. How many cookies and cupcakes does she have altogether?

Word Problem Exercises

Nina saved Php550 and Annie saved Php780. How much less did Nina save than Annie?

Word Problem Exercises

Ericka and John saved Php940. John saved Php48 less than Ericka. How much did John save?

Model Drawing Steps

Condensed Form with Grading

1. Read the entire problem.
2. Decide who and what is involved in the problem. _____ (2 points)
3. Draw unit bar(s) of equal length. _____ (2 points)
4. Read each sentence, one at a time. _____ (1 point)
5. Put the question mark in place. _____ (1 point)
6. Work computation. _____ (2 points)
7. Answer the question in a complete sentence. _____ (2 points)

Total Points: _____ (10 points)

Comments:

Problem-Solving Rubric

Name: _____

Date: _____

Score: _____

1. Unit bar labeled and a bracket with a ? clearly labeled by the part to solve. _____ / (10 points)

2. Computation neatly and accurately worked out. _____ / (10 points)

3. Answer in a complete sentence. _____ / (10 points)

Total Points: _____ / (30 points)

Journal Writing

Journal writing reinforces the learning and provides pupils with opportunities to engage in reflection, question their own understanding, connect the abstract and the concrete, and apply the knowledge they have acquired to solve problems.

Journal Writing

- Journal writing is a complex process that requires effort and patience.

Three types of general prompts:

1. Affective or Attitudinal (How do you feel?)
2. Mathematical content (What is it about?)
3. Process (Explain how!)

Affective or Attitudinal (How do you feel?)

My best kept secret about math is …

If math could be a color (shape, sound) it would be … because…

Mathematical content (What is it about?)

How would you describe a …

What patterns do you notice in …

Process (Explain how!)

Find something that you learned today that is similar to something you already knew.

You know several ways to … Which method is you favorite? Why?

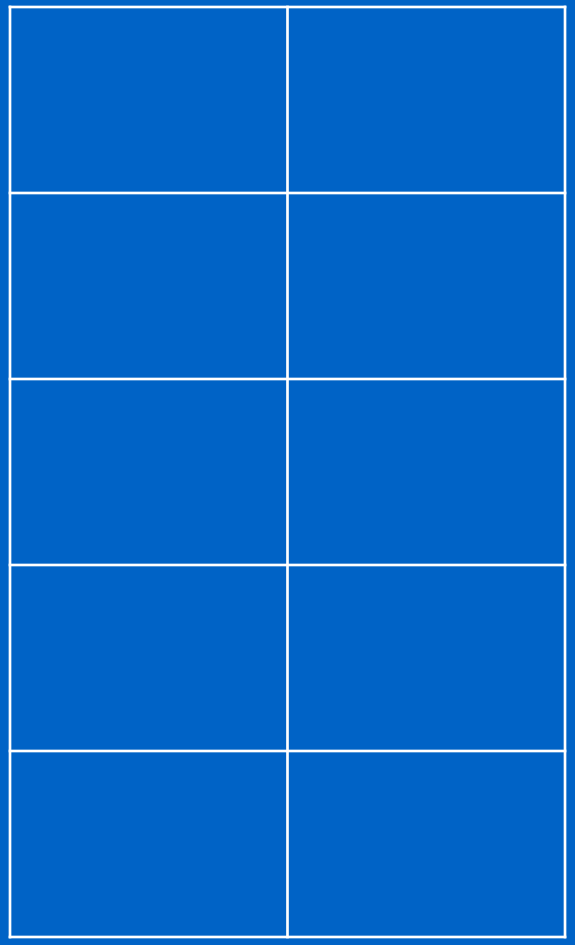
Sample prompts:

- I knew I was right when.....
- If I missed_____ I would have to_____.
- The thing you have to remember with this kind of problem is.....
- Tips I would give a friend to solve this problem are.....
- I wish I knew more about.....
- How many times did you try to solve the problem? How did you finally solve it?
- Could you have found the answer by doing something different? What?
- What method did you use to solve this problem and why?
- Was this hard or easy? Why?

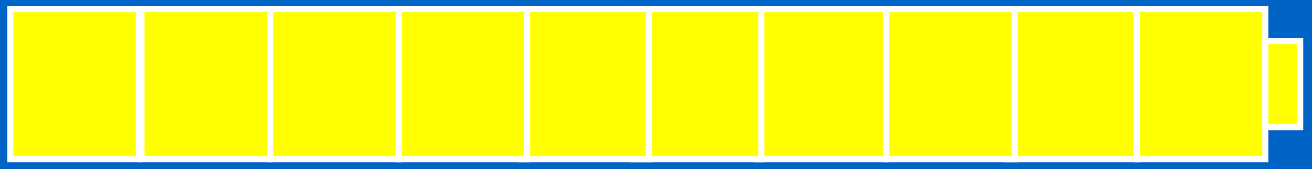
Sample prompts:

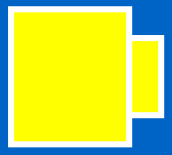
- Where else could you use this type of problem solving?
- What would happen if you missed a step? Why?
- What other strategies could you use to solve this problem?
- Write 4 steps for somebody else that will be solving this problem.
- What would you like to do better next time?
- Were you frustrated with this problem? Why or why not?
- What decisions had to be made when solving this problem?
- What do you like about math? What don't you like about math?

Use of Materials in Singapore Math

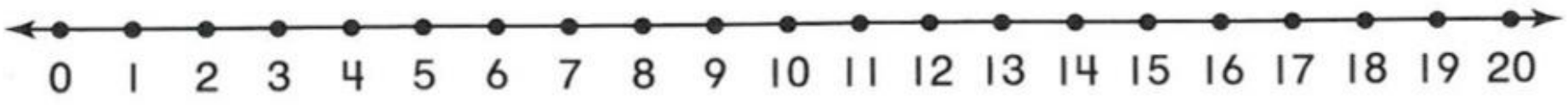


Base Ten Blocks





Number Line



NUMBERS 1 TO 100

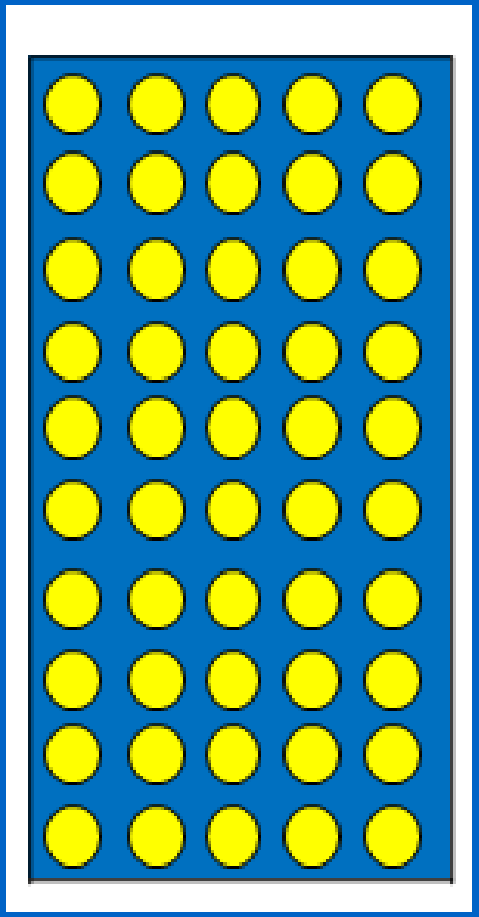
Square

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

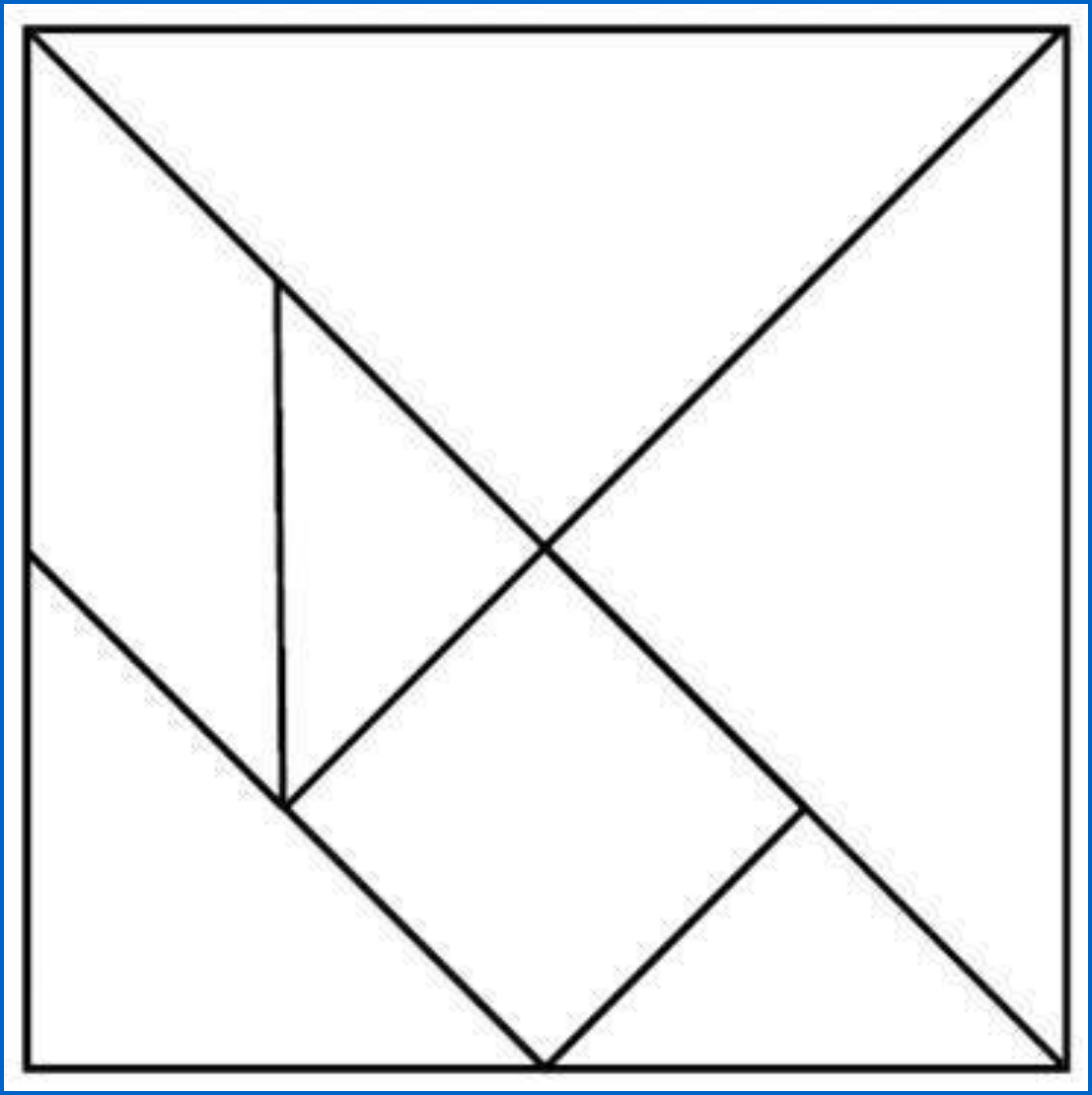
Place Value Chart

Hundreds	Tens	Ones

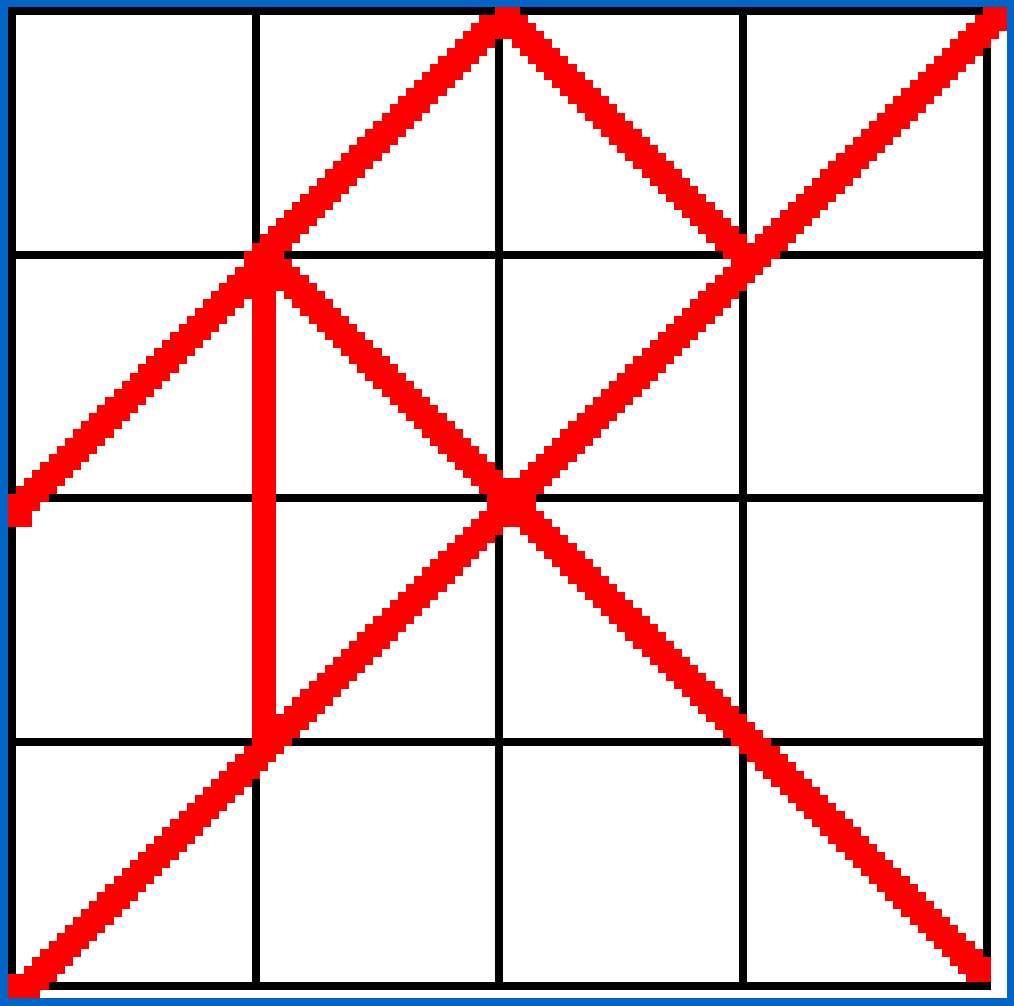
Dot Paper



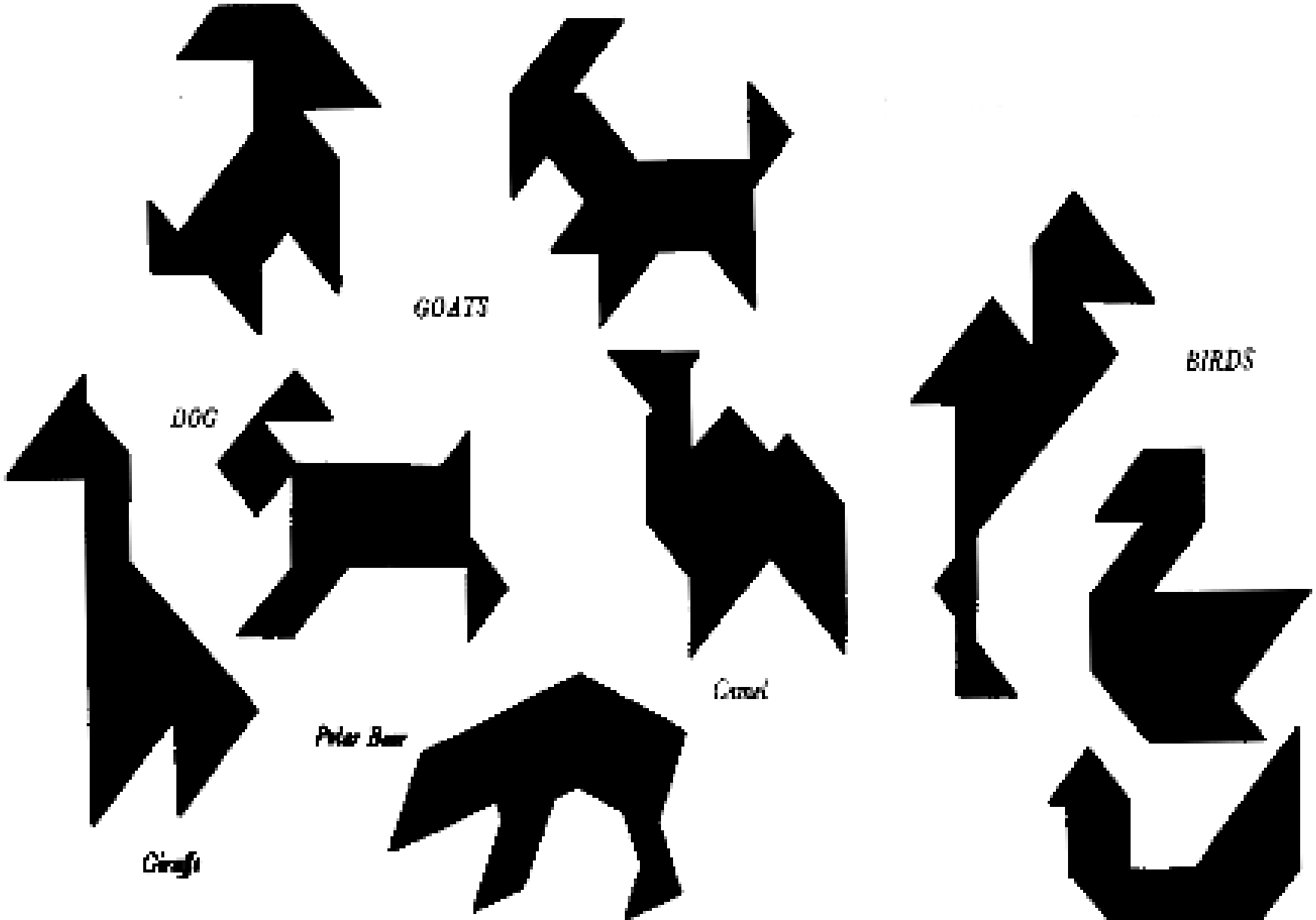
Tangram



How to make a tangram:



The Tangram Zoo

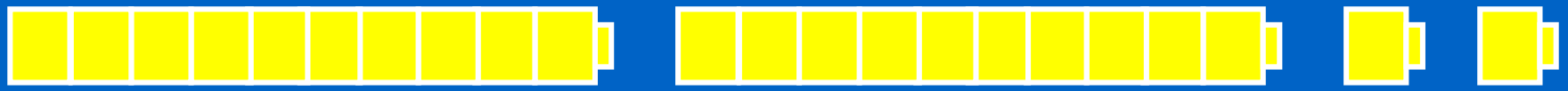


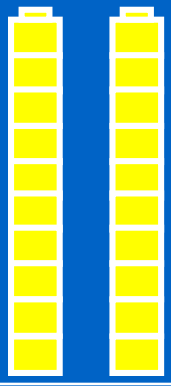
Reminder

- Make sure to train the children on how to use the materials.
- Choose wisely the best and age-appropriate material to use for a specific topic.
- C-P-A approach
- Always consider when is the best time to use a specific material.

Place Value

Differently sized, then differently labeled materials, allow students to tell the difference between the two digits used in writing 22.



TENS	ONES
	

TENS	ONES
2	2

Place Value

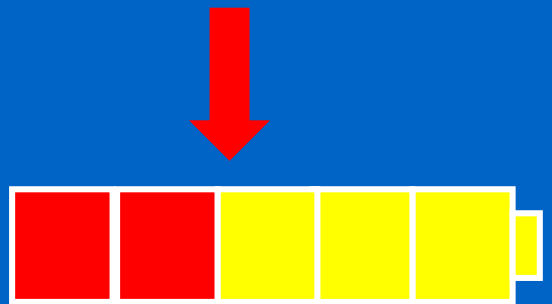
Differently sized, then **differently labeled** materials, allow students to tell the difference between the two digits used in writing 22.

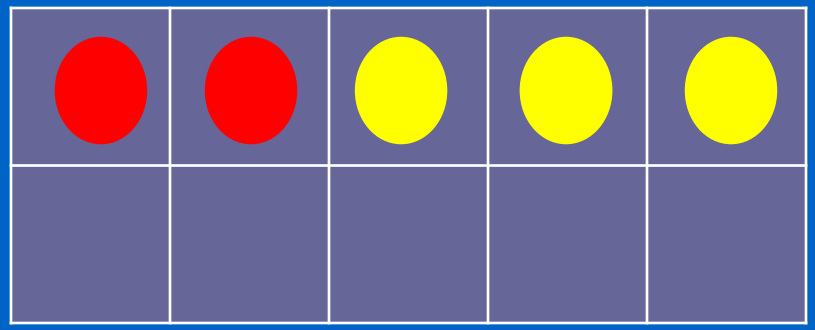
TENS	ONES
 	 

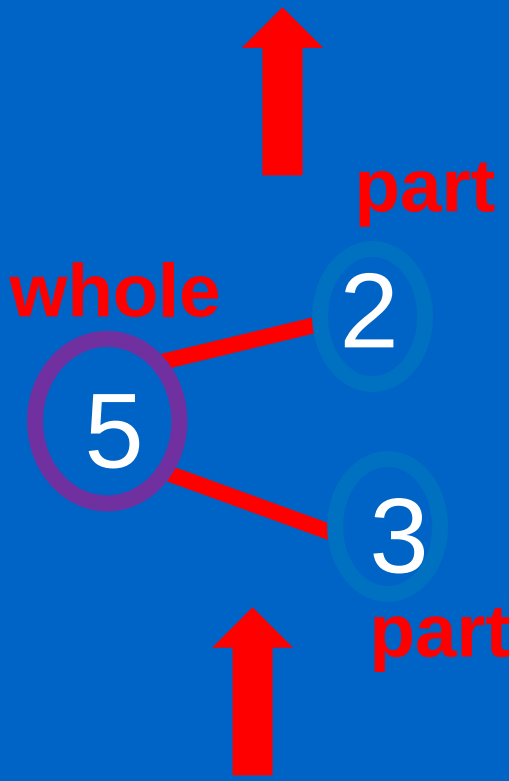
TENS	ONES
2	2

2+ 3 = 5

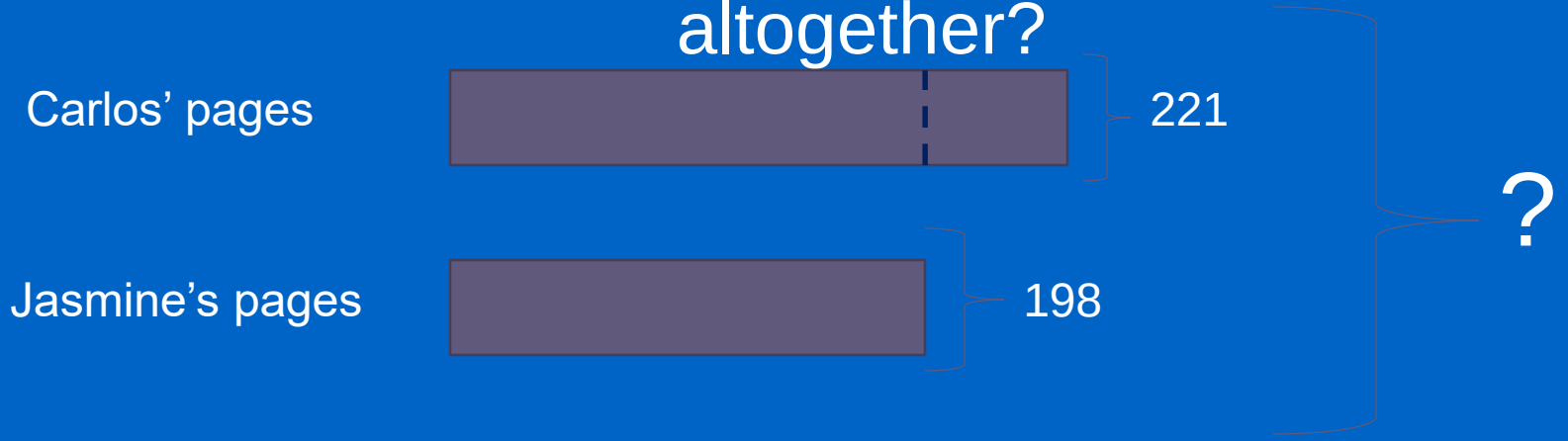
Real Objects







Carlos read 221 pages of his book over the weekend. Jasmine read 198 pages. How many pages did Carlos and Jasmine read altogether?



The Singapore Math program is rigorous!

It has over 20 years of proven success!!

It is time to move forward!!!

Websites

-Singapore Math Company, its products and information

http://www.SingaporeMath.com

-Document from the American Institutes for Research

http://www.air.org/news/documents/Singapore%20Report%20(Bookmark%20Version).pdf

Singapore Math