think! MATHEMATICS

SL Education

[Math]odology

PROGRAM BOOKLET

DATE
October 25 – 28, 2023

TIME
8:00 a.m. – 5:00 p.m.

VENUE
Booth 336, NCTM

LOCATION
Washington, D.C.

www.facebook.com/ThinkMathematicsSeries

https://www.facebook.com/Mathodology/

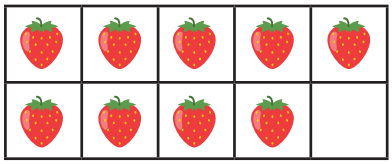
PAGE 6

DC Convention Center 203AB
Thursday, October 26
8:00 – 9:00 a.m.

Use of Bar Models to Solve Word Problems Grades 3-5

PAGE 9

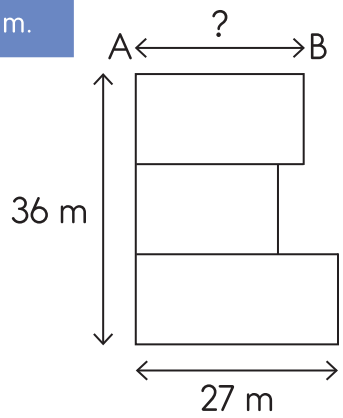
Marriott Liberty Ballroom L
Thursday, October 26
9:30 – 10:30 a.m.



The Powerful Tool of Math Journals Grades 3-5

PAGE 12

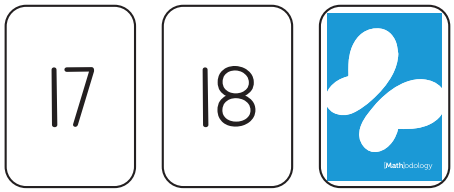
Room 158
Friday, October 27
8:00 – 9:00 a.m.



Managing High-Level Problems Math Problems from the Singapore Classroom Grades 3-5

PAGE 16

Exhibit Floor Workshop
Friday, October 27
11:00 a.m. – 12:00 p.m.



Power of Purposeful Play in Developing BIG IDEAS Grades PreK-K

Background and History of Singapore Mathematics

Until the 1980s, Singapore students performed poorly in mathematics.

Back then, rote memorization, rote procedures and tedious computations were the bane of mathematics learning in Singapore and the rest of Southeast Asia. The low performance was the impetus for a reform in mathematics teaching and learning in Singapore.

In the 1980s, what is now called Singapore Mathematics was researched by the Curriculum Development Institute of Singapore (CDIS) and introduced to Singapore schools. It was formally introduced to the system in 1992, and has since been revised in 2001, 2007, 2013 and 2021.

The Singapore system has come a long way. In the most recent TIMSS (Trends in International Mathematics and Science Study), an international benchmarking study, the proportion of Grade 4 and Grade 8 students in the so-called Advanced International Benchmark was way above the international average.

TIMSS 2019 International Results in Mathematics

Country	Percentage of students reaching Advanced Benchmark	
	4th grade	8th grade
Singapore	54%	51%
Republic of Korea	37%	45%
England	21%	11%
United States	14%	14%
International median	*7%*	*5%*
France	3%	2%
South Africa	1%	1%

Source: https://timss2019.org/reports/achievement/

About think! MATHEMATICS

think! MATHEMATICS (Common Core edition) is a series of **textbooks and workbooks** written to meet the requirements of the latest **Common Core State Standards**. It is adapted from approaches used in Singapore, to lay a strong foundation for students to achieve the highest possible level of mastery of mathematics.

This series adopts a **3-part lesson** structure and a **spiral design** within and across grade levels. The **concrete-pictorial-abstract** (C-P-A) approach and the infusion of fun-filled activities help develop students' **cognitive and metacognitive skills**. **New-trend** questions and **open-ended** questions are included throughout the series to encourage analytical and lateral thinking.

Teachers can expect the **guides** and the suite of **interactive applets** to support them in preparing, conducting, and consolidating each lesson. Using this series, the learning of mathematics will no longer be "a mile wide and an inch deep".

Features of this series:

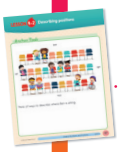
Textbook

Unit Opener
illustrates an often-familiar situation that introduces the unit.

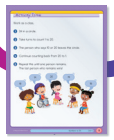
Recall
revisits prerequisite knowledge covered in a previous unit or grade.

Our Friends' Ideas
scaffolds conceptual development and encourages students to solve a problem in more than one way.

Anchor Task
provides opportunities for students to develop essential ideas related to the lesson objective(s).

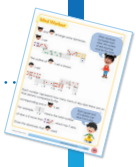


Activity Time
allows students to practice learned skills through collaborative games.

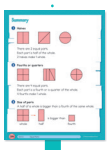


Guided Practice
comprises questions for consolidation and assessment of students' learning at the end of each lesson.

Math Journal
facilitates reflection, through the writing and communication of mathematical ideas.



Summary
shows the key concepts of each unit in a succinct manner.



Mind Workout
challenges students to apply higher-order thinking skills to solve non-routine problems.

Workbook

Practice
comprises questions that cater to students of varied learning abilities.

Fluency Task
consolidates students' learning and can be used as a summative assessment.

Unit Checklist
helps students to monitor their learning in a fun way.

Cumulative Review
contains questions from across units, and assesses students' learning after every few units.

CASE STUDY 1

Use of Bar Models to Solve Word Problems (Grades 3–5)

Problem solving is a major aspect of the teaching and learning of mathematics. The use of bar models can help students visualize the problem-solving process. We will demonstrate different strategies to support and challenge students, enabling them to solve problems effectively and efficiently.

Source: think! Mathematics (CCM, 2nd edition) Textbook 3A Unit 5 Lesson 5-1

Title: Solving word problems

Anchor Task

A fruit seller packs some bags of fruits.

There are 3 apples in a bag.

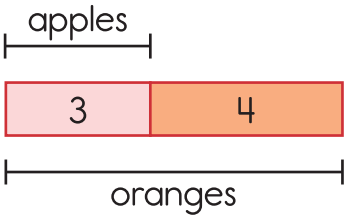
There are 4 more oranges than apples in the bag.

Ana buys 4 bags of fruits.

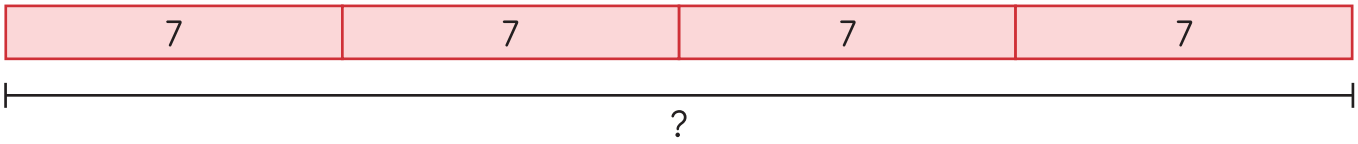
Think of ways to find the total number of oranges that Ana buys.

Our Friends' Ideas


's idea



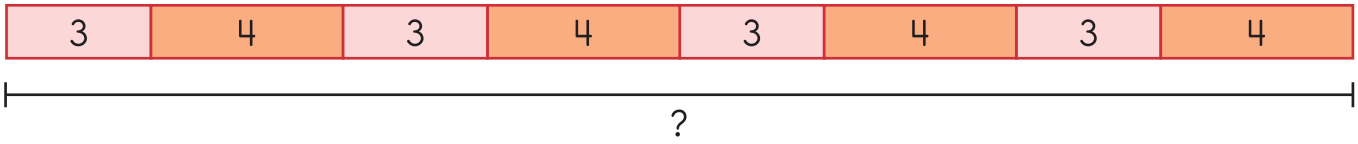
3 + 4 = 7



4 × 7 = 28

Ana buys 28 oranges altogether.


's idea



4 × 3 = 12

4 × 4 = 16

12 + 16 = 28

Ana buys 28 oranges altogether.

Problem 1

Source: think! Mathematics (CCM, 2nd edition) Textbook 2A Unit 2 Lesson 2-8

Title: Solving word problems

There are 58 cucumbers.
There are 19 more tomatoes than cucumbers.
How many tomatoes are there?

Problem 2

Source: think! Mathematics (CCM, 2nd edition) Textbook 3A Unit 5 Lesson 5-1

Title: Solving word problems

There are 3 times as many bananas as lemons.
There are 9 lemons.
How many bananas and lemons are there altogether?

CASE STUDY 2

The Powerful Tool of Math Journals (Grades 3–5)

Reflection and communication are two essential mathematical processes. We will discuss how journals can be useful in developing metacognition and in encouraging the expression of ideas.

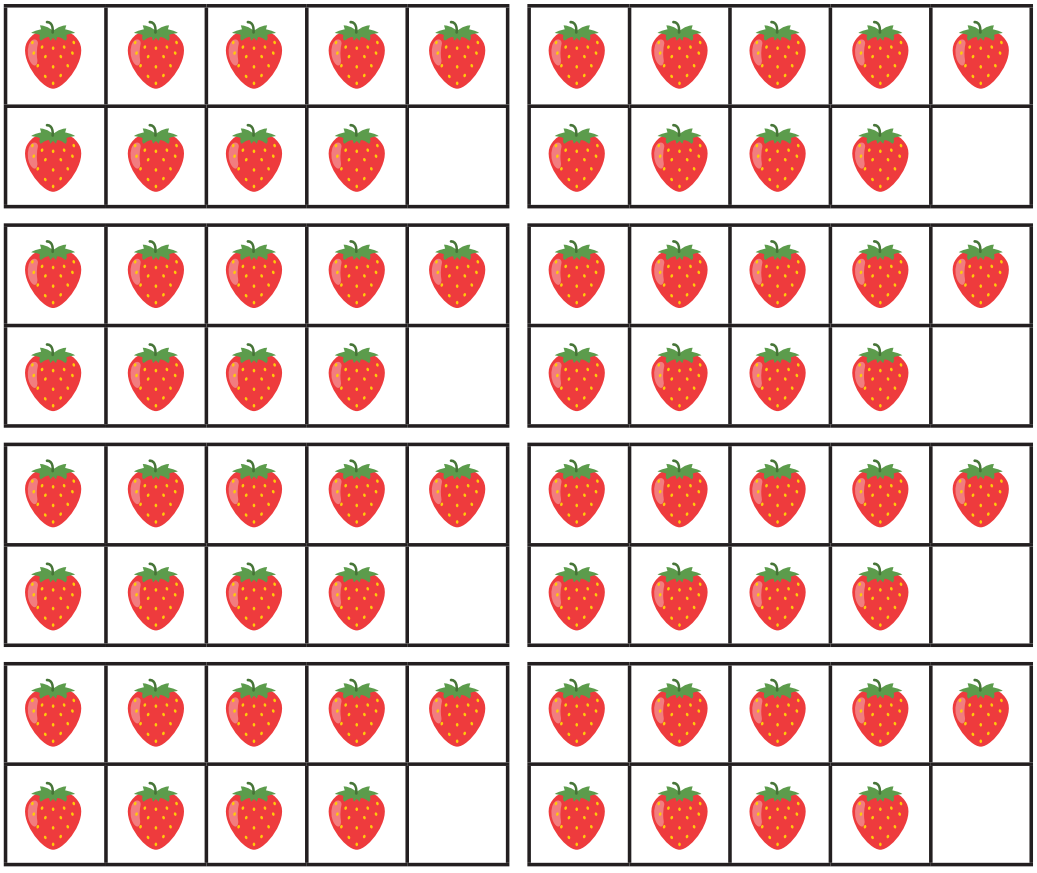
Source: think! Mathematics (CCM, 2nd edition) Textbook 3A Unit 3 Math Journal

Title: Multiplication

Math Journal

Find the product of any two 1-digit numbers.

Explain some ways you can use to figure out the value of 8 × 9 in a short amount of time.



Journal types

There are four basic types of mathematical journals. Each type offers different prompts to allow students to achieve a holistic understanding of the various topics.

Descriptive/Explanatory journals require students to describe ways to solve problems.
It is a useful tool to check for any gaps in understanding and clarify misconceptions.

CASE STUDY 2

Explain some ways you can use to figure out the value of 8 × 9 in a short amount of time.

Other Examples

- Write a note to your friend to explain the difference between repeated addition and multiplication.
- List the properties of a square.

Evaluative/Comparative journals require students to make a judgment and evaluate the most effective method.
It is a useful tool to sum up problem-solving strategies and consolidate learning.

CASE STUDY 2 (modification)

What is the best way to evaluate 8 × 9?

Other Examples

- There are 23 rows of 21 seats in a hall. What is the most appropriate way to find the total number of seats?
- Why is the given method incorrect?

Investigative journals require students to record the findings of an investigation and draw connections.
It is a useful tool to build analytical and lateral thinking.

CASE STUDY 2 (modification)

Make 10 groups of 9 cubes. Show how you can use 10 × 9 to find 8 × 9.

Other Examples

- Record the number of cars that enter a carpark at different times of the day. Show your findings using a bar graph.
- Draw the layout of your room and label the parallel lines that can be observed.

Creative journals require students to pose a problem or write a story for a given calculation.
It is a useful tool to explore imaginative ways to apply a concept.

CASE STUDY 2 (modification)

Create a story problem that you can solve by finding 8 × 9.

Other Examples

- The answer to the problem is 10. What could the problem be?
- A customer received $2.50 change in coins. Tell a story of the coins he paid and received.

Think of some differentiated journal prompts for each journal type.

Descriptive/Explanatory journals require students to describe ways to solve problems.

Evaluative/Comparative journals require students to make a judgment and evaluate the most effective methods.

Investigative journals require students to record the findings of an investigation.

Creative journals require students to pose a problem or write a story for a given calculation.

CASE STUDY 3

Managing High-Level Problems
Math Problems from the Singapore Classroom (Grades 3–5)

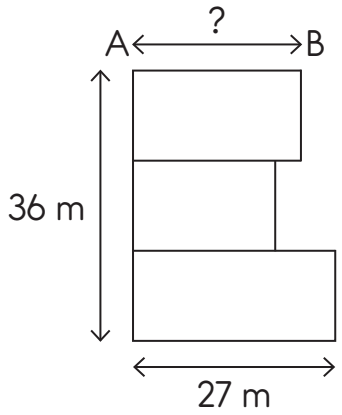
The learning experience is enhanced when students know how to apply prior knowledge to solve higher-order reasoning problems. We will introduce ways to expose and guide students in analyzing, synthesizing, and evaluating.

Problem 1

Source: Singapore Examinations and Assessment Board, PSLE 2022 P2 Q16

Title: Geometric properties of rectangles

A plot of land of area 876 m^2 is divided into three rectangular fields of equal width. The fields are fenced using 177 m of fencing.



(a) Find the length of AB.

(b) Find the perimeter of the plot of land.

Problem 2

Source: Singapore Examinations and Assessment Board, PSLE 2022 P1 Q29

Title: Observing repeated patterns

A pattern is formed using the letters A, B and C. The first 15 letters are shown.

A	B	A	C	A	A	B	A	C	A	A	B	A	C	A …
1st														15th

The letter A appears 137 times in the pattern. What is the greatest possible number of letters in the pattern?

Problem 3

Source: Singapore Examinations and Assessment Board, PSLE 2022 P1 Q30

Title: Formulating and solving algebraic equations

At first, a bag contained 9 red beads and some blue beads. After some red beads were added to the bag, $\frac{2}{5}$ of the beads were blue. Then, 56 yellow beads were added to the bag and now, $\frac{2}{9}$ of the beads are blue. How many red beads were added to the bag?

Problem 4

Source: Singapore Examinations and Assessment Board, PSLE 2021 P2 Q15

Title: Formulating and solving algebraic equations

Helen and Ivan have the same total number of coins. Helen has a number of fifty-cent coins and 64 twenty-cent coins. The total mass of her coins is 1.134 kg. Ivan has a number of fifty-cent coins and 104 twenty-cent coins.

(a) Who has more money in coins?

How much more?

(b) Each fifty-cent coin is 2.7 g heavier than each twenty-cent coin.

What is the total mass of Ivan's coins in kg?

CASE STUDY 4

Power of Purposeful Play in Developing BIG IDEAS (Grades PreK–K)

A meaningful learning environment can encourage curiosity and inculcate confidence and independent thinking in young learners. We will illustrate how purposeful play can lay strong foundations to promote core mathematical ideas.

Source: Developing Roots (Kindergarten edition) Chapter 1 Topic 1

Title: Verbal Counting

Big Idea 1

Big Idea 2

Big Idea 3

Big Idea 4

Professional Development Courses

We offer a wide range of professional development courses to support educators during their teaching journey. Concept-based courses and content-based courses are specially designed and conducted by experts in mathematics education to provide educators with a greater insight into the fundamentals of mathematics instruction and the confidence to deliver effective lessons in the classroom.

PRIMARY MATHEMATICS

For PD workshops within the US:

https://mathodology.com/institutes-and-workshops/

Concept-Based Courses

Core Courses

PMC1001 Key Learning Theories for the Teaching and Learning of Primary Mathematics
PMC1002 Effective Lesson Planning for High Quality Learning
PMC1003 Learning Mathematics through Reasoning and Communication
PMC1004 Using Heuristics to Solve Challenging Problems
PMC1005 Use of Model Method in Problem Solving
PMC1006 Summative Assessment - An Integral Component of Learning and Teaching
PMC1007 Techniques for Effective Mathematics Classroom Management

Elective Courses

PMC1101 Transition from Early Childhood Numeracy to Primary Mathematics
PMC1102 Differentiated Instruction for Mixed Ability Learners
PMC1103 Enhancing Mathematical Thinking using Thinking Routines
PMC1104 Alternative Assessments
PMC1105 Teacher as a Reflective Practitioner through Lesson Study

Content-Based Courses

PMC1201 Teaching of Addition and Subtraction of Whole Numbers
PMC1202 Teaching of Multiplication and Division of Whole Numbers
PMC1203 Teaching of Fractions and Decimals
PMC1204 Teaching of Geometry
PMC1205 Teaching of Measurement
PMC1206 Teaching of Statistics

For further details, please visit
https://www.think-mathematics.com/training/professional-development/primary-courses

A complete suite of textbooks, workbooks, teachers' guides, and digital resources aligned to the Common Core State Standards

Interaction and collaboration to LEARN concepts
• Lev Vygotsky

Use of Concrete Materials for Abstract Concepts
• Jerome Bruner

PROLONGED engagement with single ideas
• Jean Piaget

EMPHASIS ON RELATIONAL UNDERSTANDING
• RICHARD SKEMP

EXPLORATION BEFORE STRUCTURED LEARNING
• Zoltan Dienes

HQ Singapore

Shing Lee Publishers Pte Ltd
120 Hillview Avenue #05-06/07
Kewalram Hillview
Singapore 669594
Tel: +65 6760 1388
Email: info@sl-education.com
www.think-mathematics.com

Distributor/Partner

think! Mathematics Inc
1122 3rd Street Suite 7
Neptune Beach FL 32266
United States
Tel: +1 904 853 6628
Email: office@mathodology.com
www.thinkmathematics.com

PD Partner

Mathodology
1122 3rd Street Suite 7
Neptune Beach FL 32266
United States
Tel: +1 904 853 6628
Email: office@mathodology.com
www.mathodology.com