

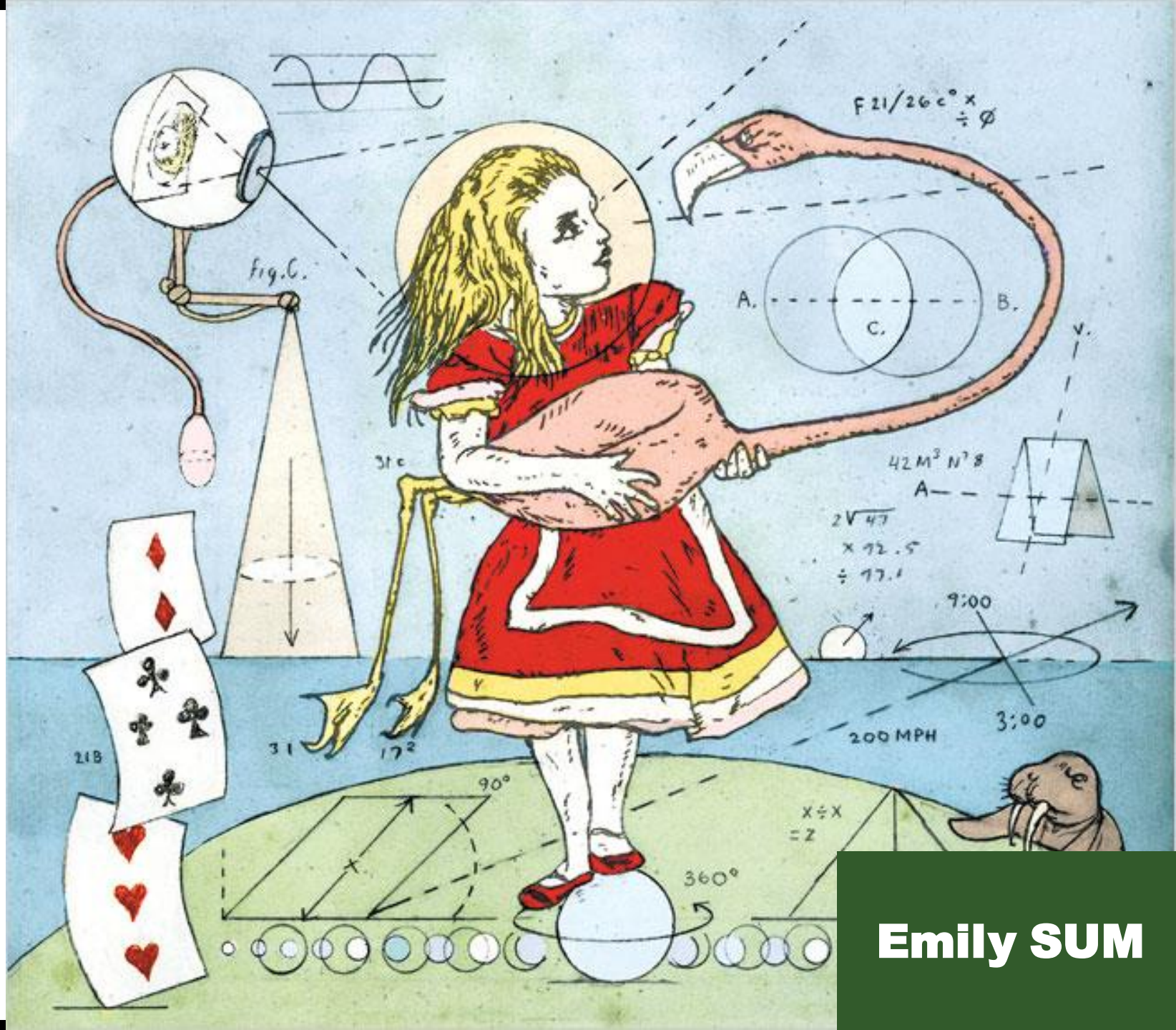


# CULTURE MATTER

TEACHING MATHS TO LANGUAGE

LEARNERS IN MULTICULTURAL

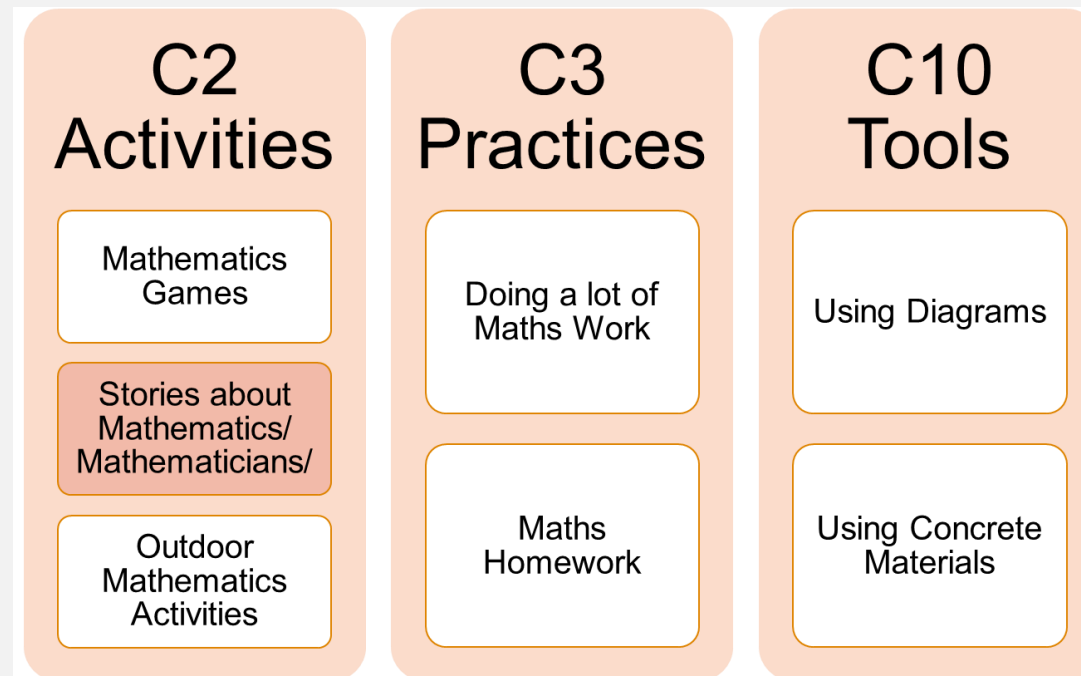
CLASSROOMS



Emily SUM

# DIFFERENCE IN VALUING BETWEEN EM & EC

*Value components*



# MATHEMATICS-LITERATURE CONNECT

## *Ethnic Minorities and their Values*

- N5 Robin (N7) teaches me a lot. He teaches about other things I didn't know.
- I How did he explain things better than...
- N5 He checks out other books, like **maths related books** and tell me about it. He also tells me about space.
- P2 Even me and Robin (N7) like talking about Albert Einstein.
- I Do you think maths stories would actually help you to learn more?
- P2 Yes. **That's the easiest way for me to learn Maths** and my favourite thing.
- N5 I actually watch TV or YouTube.
- P2 Same.

# STORYTELLING AS A PEDAGOGICAL STRATEGY

## *Multiculturalism & multilingualism in mathematics classrooms*

- “The story is not just some casual entertainment; it reflects a basic and powerful form in which we make sense of the world and experience” (Egan, 1988, p. 2).
- “Many children’s books present interesting problems and illustrate how other children solve them. Through these books, students see mathematics in a different context while they use reading as a form of communication” (National Council of Teachers of Mathematics, 1989, p.27).
- “Storytelling is a very important process. It is through stories that customs and values are taught and shared” (Little Bear, 2000, p.81).

# SELECTING STORIES FOR CLASSROOM TELLING

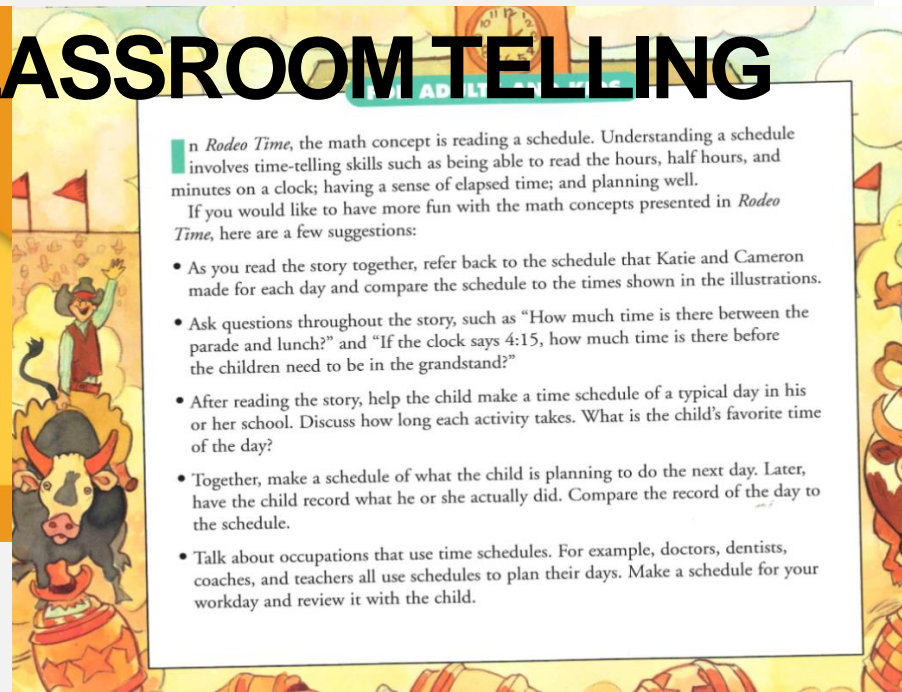


Stuart J. Murphy's  
**MathStart**

14 Million Books Sold!

HarperCollins Publishers

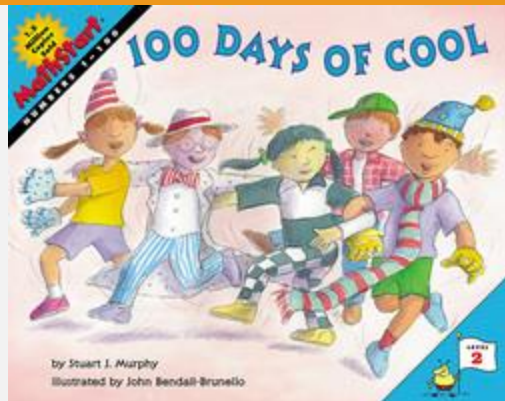
63 books      3 levels      Pre-K through Grade 4



In *Rodeo Time*, the math concept is reading a schedule. Understanding a schedule involves time-telling skills such as being able to read the hours, half hours, and minutes on a clock; having a sense of elapsed time; and planning well.

If you would like to have more fun with the math concepts presented in *Rodeo Time*, here are a few suggestions:

- As you read the story together, refer back to the schedule that Katie and Cameron made for each day and compare the schedule to the times shown in the illustrations.
- Ask questions throughout the story, such as "How much time is there between the parade and lunch?" and "If the clock says 4:15, how much time is there before the children need to be in the grandstand?"
- After reading the story, help the child make a time schedule of a typical day in his or her school. Discuss how long each activity takes. What is the child's favorite time of the day?
- Together, make a schedule of what the child is planning to do the next day. Later, have the child record what he or she actually did. Compare the record of the day to the schedule.
- Talk about occupations that use time schedules. For example, doctors, dentists, coaches, and teachers all use schedules to plan their days. Make a schedule for your workday and review it with the child.

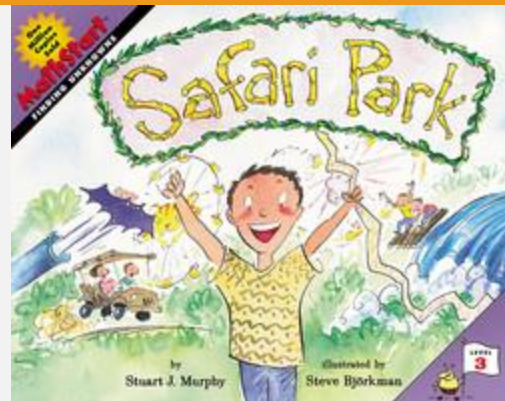


**MathStart**  
READING READER

100 DAYS OF COOL

by Stuart J. Murphy  
Illustrated by John Bendall-Brunello

LEVEL 2

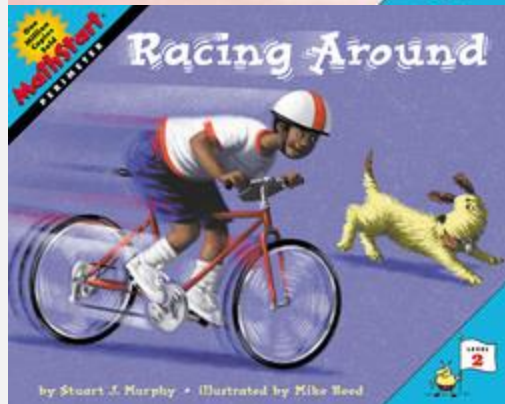


**MathStart**  
READING READER

Safari Park

by Stuart J. Murphy  
Illustrated by Steve Björkman

LEVEL 3

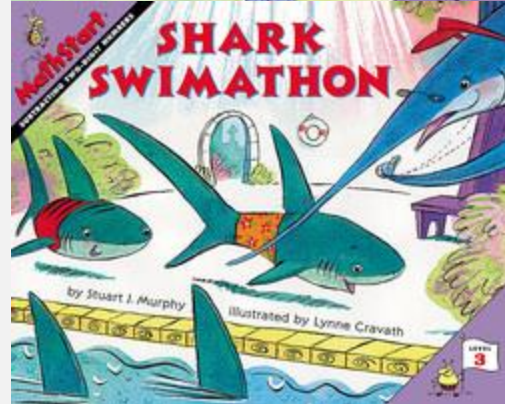


**MathStart**  
READING READER

Racing Around

by Stuart J. Murphy • Illustrated by Mike Wood

LEVEL 2

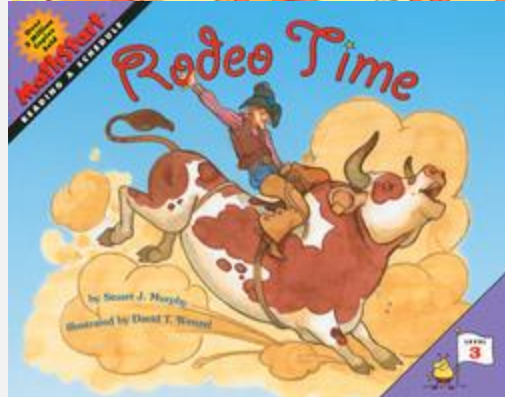


**MathStart**  
READING READER

SHARK SWIMATHON

by Stuart J. Murphy  
Illustrated by Lynne Cravath

LEVEL 3



**MathStart**  
READING READER

Rodeo Time

by Stuart J. Murphy  
Illustrated by Daniel T. Weston

LEVEL 3

Following are some activities that will help you extend the concepts presented in *Rodeo Time* into a child's everyday life:

**Making Plans:** Plan a visit to an amusement park or a fair. Make a time schedule of what you would like to see and do.

**Watching TV:** On index cards, write the names and times of TV programs the family views on any given day. Mix the cards up and have the child put them in order from earliest to latest. Then figure out how long each program airs. How much time is there between programs?

**Estimating Time:** Have the child write down the beginning time of an activity, such as taking a bath or doing homework, and estimate how much time it will take. When he or she is finished, check the actual time to see how close the estimate was. Repeat with other activities.

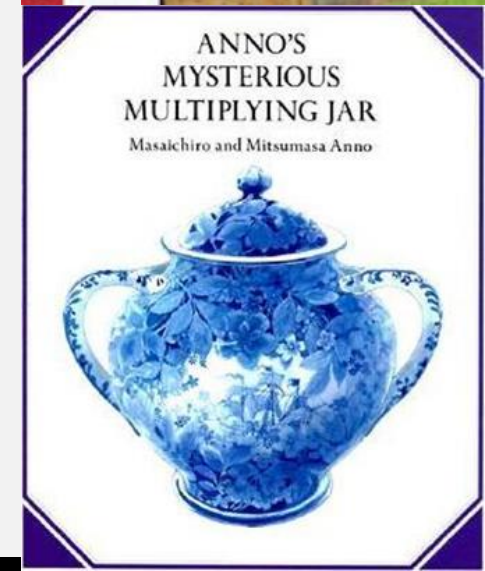
The following books include some of the same concepts that are presented in *Rodeo Time*:

- THE SUN'S DAY by Mordicai Gerstein
- PIGS ON A BLANKET by Amy Axelrod
- WHAT TIME IS IT, MR. CROCODILE? by Judy Sierra

# STORYTELLING AS A PEDAGOGICAL STRATEGY

*Multiculturalism & multilingualism in mathematics classrooms*

- *To make classrooms multicultural* by using children's literature from different parts of the world, and to share with students different culture's ways of thinking mathematically and using mathematics (Zaslavsky, 1996);
- *To bridge students' home/community cultures and highly literate culture of school mathematics* that reflects our own culture (learning styles, thinking styles, problem solving styles, teaching styles and knowledge bases); and
- *To help student in transiting from their home language to mathematical language.* Mathematical and story language can work together to support children's understanding, thinking and explanation.



# CHILDREN'S LITERATURE/STORY

## *Multiculturalism & multilingualism in mathematics classrooms*

- Provides **a context** through which mathematical concepts, patterns, problem solving, and real-world contexts can be explored, which caters for **learner diversity** (cultural, linguistic, religious, social class, diversity of every kind imaginable);
- Promotes mathematical communication, to improve mathematics learning **through language** especially for students who are learning the instructional language (English/Cantonese).
- Places mathematics in the familiar context makes sense to students and allows them to see solving problems (and the use of language) as an integral part of their everyday experiences, which cater for implementing a **culturally and linguistically responsive mathematics curriculum** (teaching strategies, language of instructions, resource materials).

# STORYTELLING AS A PEDAGOGICAL STRATEGY

*Multiculturalism & multilingualism in mathematics classrooms*

“Many teachers think that storytelling will take out of class time, but it doesn't. It is part of your lesson, and makes the actual lesson much more powerful. By about the third time that I start my sixth grade class by saying, “*I am going to tell you a story*”; they'll settle down and listen ... I don't have to fight for their attention. I've got it. Even when I get to the academic part I don't lose them. and their retention of the stories is amazing. Even not the dedicated students will remember those stories and at the end of the year they are still referring to them (Hamilton & Weiss, 1990, p.1)



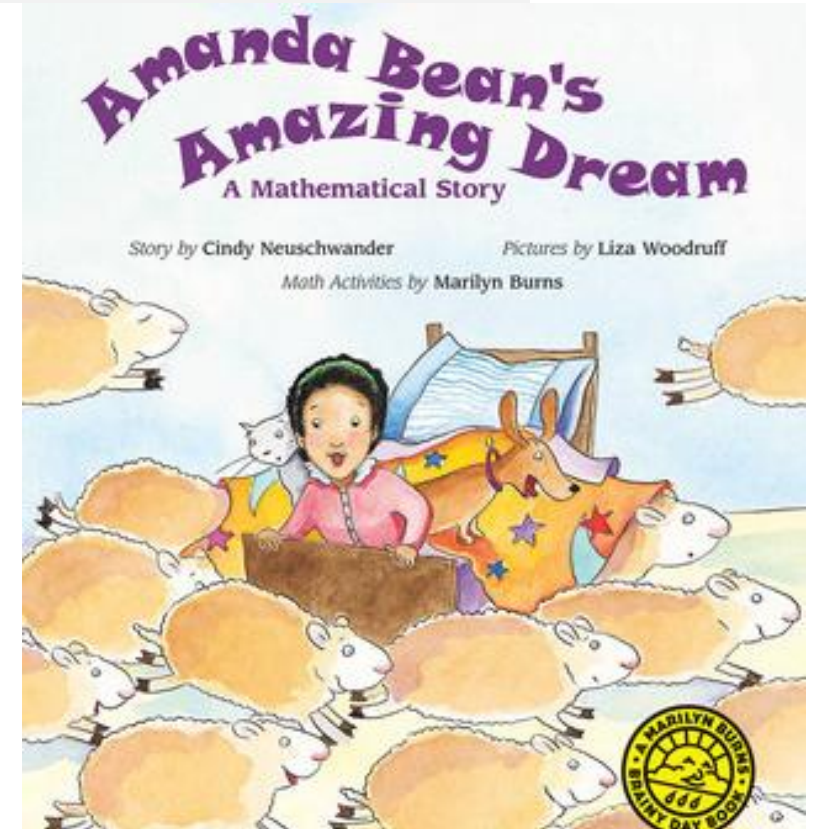


# FOUNDATIONAL INQUIRIES: AMANDA BEAN'S AMAZING DREAM

*Children's book: Meaningful mathematical contexts*

## Learning objectives

- Explore multiplication and how it relates to the world around them;
- Understand multiplication as repeated addition of the same quantities;
- Model multiplicative situations as rows and columns in array models/diagrams; and
- Understand and use the language of multiplication.



# DIAGNOSTIC ASSESSMENT

*To understand students' prior knowledge of multiplication and division.*

1. Amanda has 5 jars of teabags. There are 2 teabags in each jar. How many teabags does Amanda have? (equal groups, multiplication)
2. Amanda has 5 jars of candies. There are 5 candies in each jar. How many candies does Amanda have? (equal groups, multiplication)
3. Amanda has 15 gherkins/cucumbers. She puts the gherkins into the jars. Each jar can hold 3 gherkins. How many jars does Amanda need? (equal groups, division)
4. Look at the picture. How many jars are there altogether? (arrays, multiplication)
5. Can you suggest any other arrangement? (arrays, multiplication and division)



This mixed-race student used repeated addition strategy to solve all problems.

$2+2+2+2+2=10$

Amanda needs 5 jars.  
 $3+3+3+3+3=15$

$5+5+5+5+5=25$

There are 15 jars altogether,  
 $5+5+5=15$

### Additive thinking

10 5 jars

$2+2+2+2+2=10$  (teabags)  
Amanda has 10 teabags altogether

### Multiplicative thinking

$5 \times 3 = 15$   
There are 15 jars altogether

### Repeated subtraction

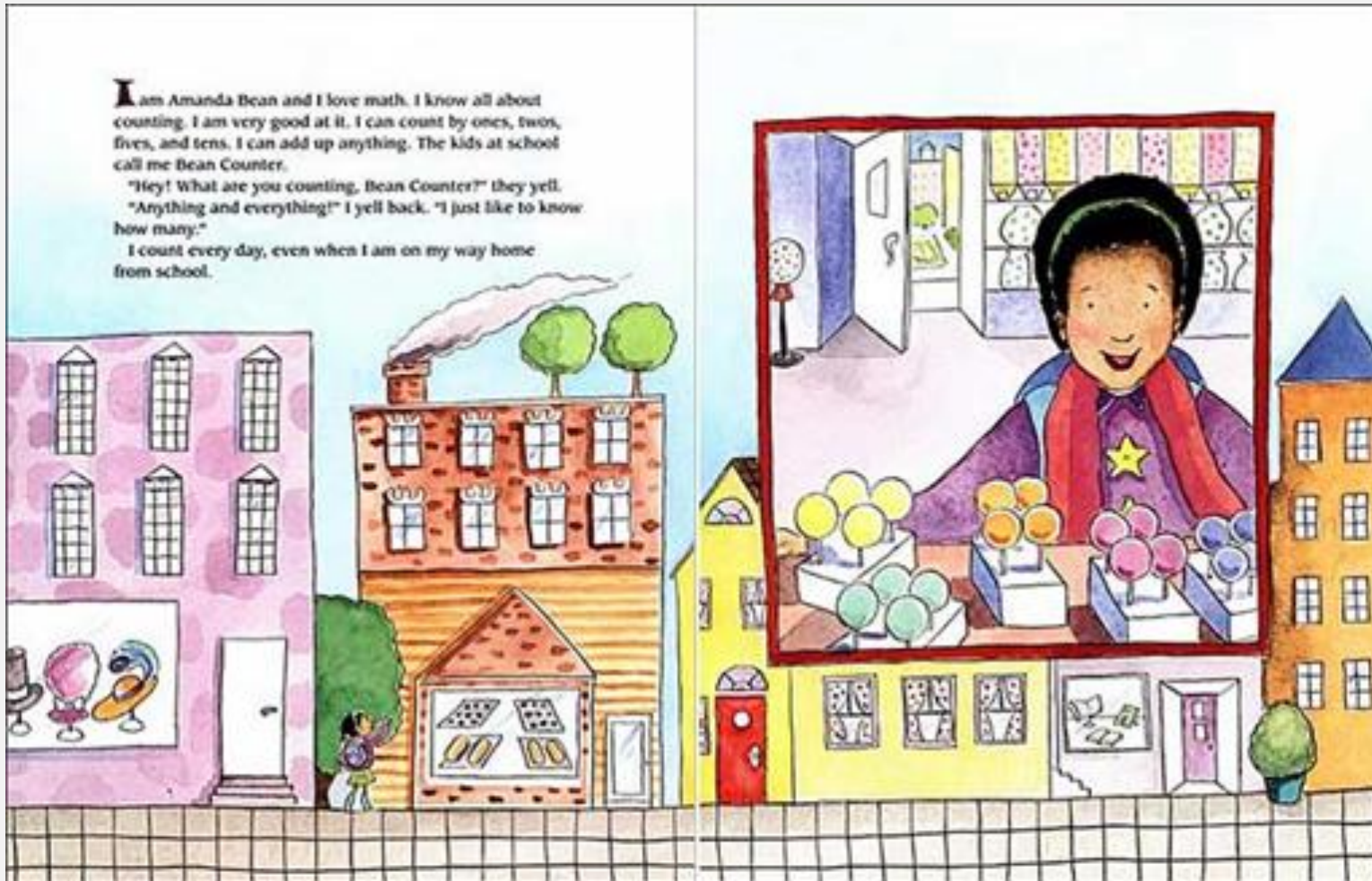
$15 - 3 - 3 - 3 - 3 - 3 = 0$  (cucumbers)  
5  
She need 5 jars.


### Reasoning

1 jar holds 3 cucumbers. 2 jars can hold 6 cucumbers. 3 jars can hold 9 cucumbers. 4 jars can hold 12 cucumbers. 5 jars can hold 15 cucumbers. (jars)  
She need 5 jars.

# DIRECTIONS

*Read the story. The context lends itself to students modelling multiplicative situations as arrays*



 **Hku NcsMath**  
Admin · 6 January at 19:30

Interested in knowing "Teaching multicultural Maths As Storytelling" 🤔🤔

📅📅 Join us @ 10 Jan

- Connects students' experiences
- Caters for different linguistic levels
- Helps students to express their mathematical ideas/thinking

📄📄 QEF (QTN-T) Project: Supporting the Learning and Teaching of Mathematics for Non-Chinese Speaking (NCS) Students in Primary Schools

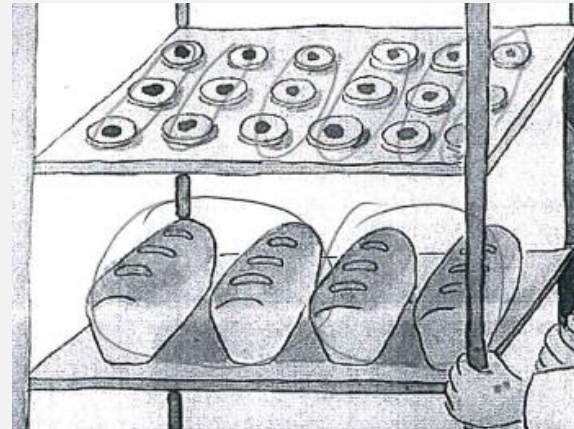
Thematic Sharing Session (I)







👤 Acknowledgement





... See more

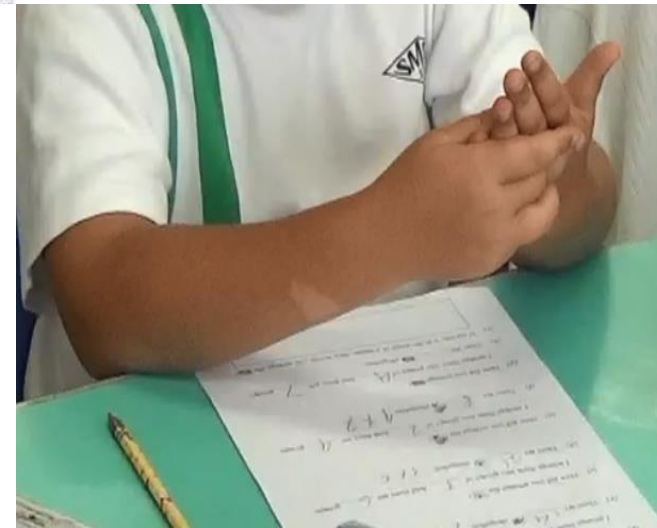
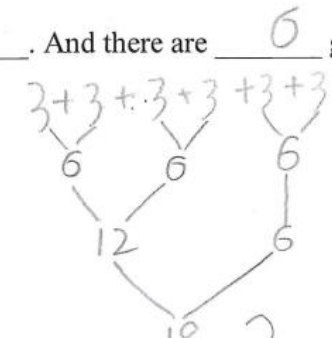


# PROBLEM SHEET

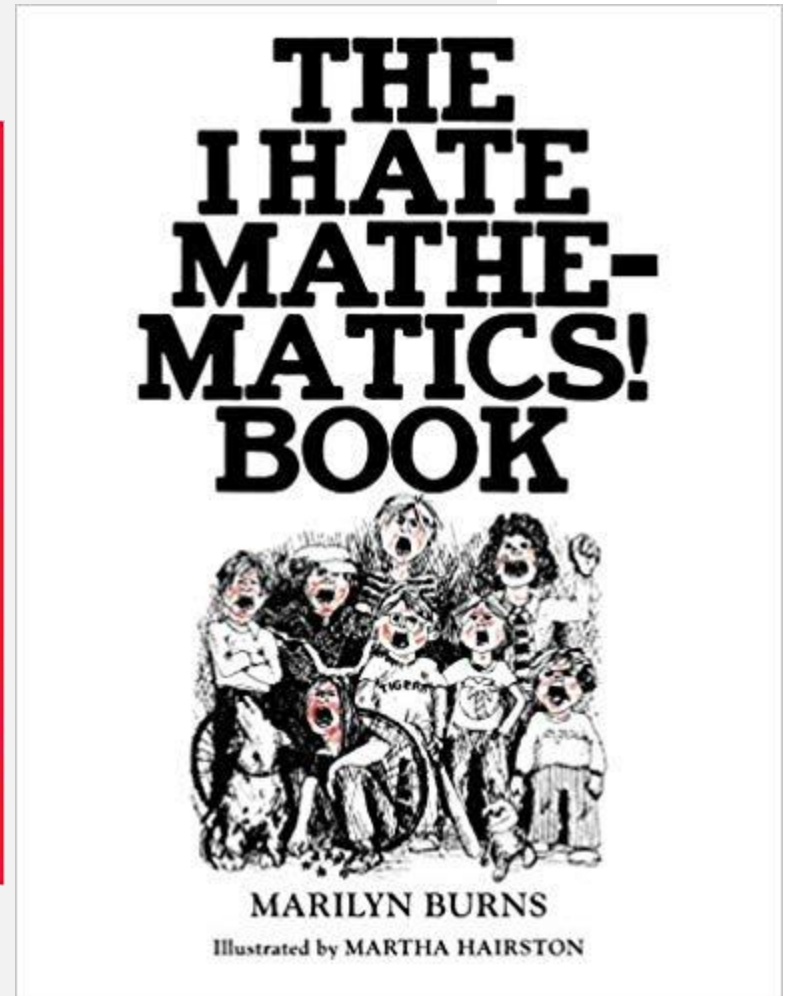
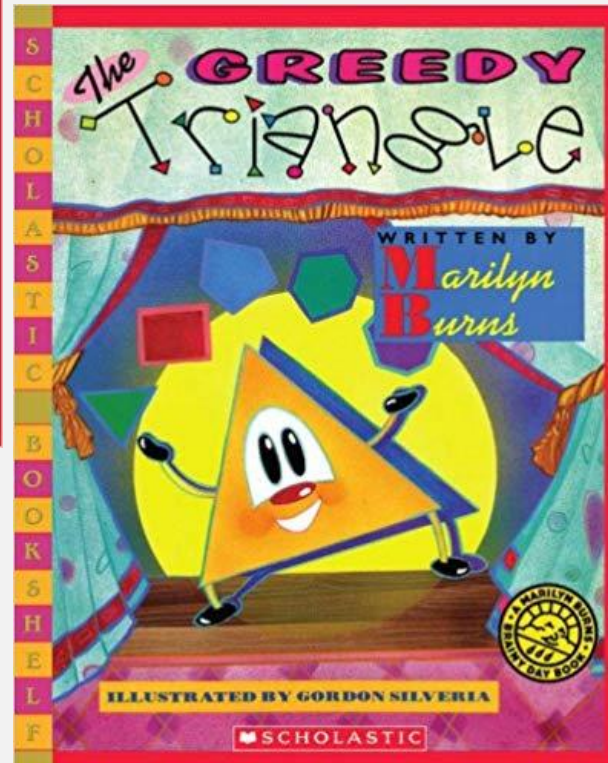
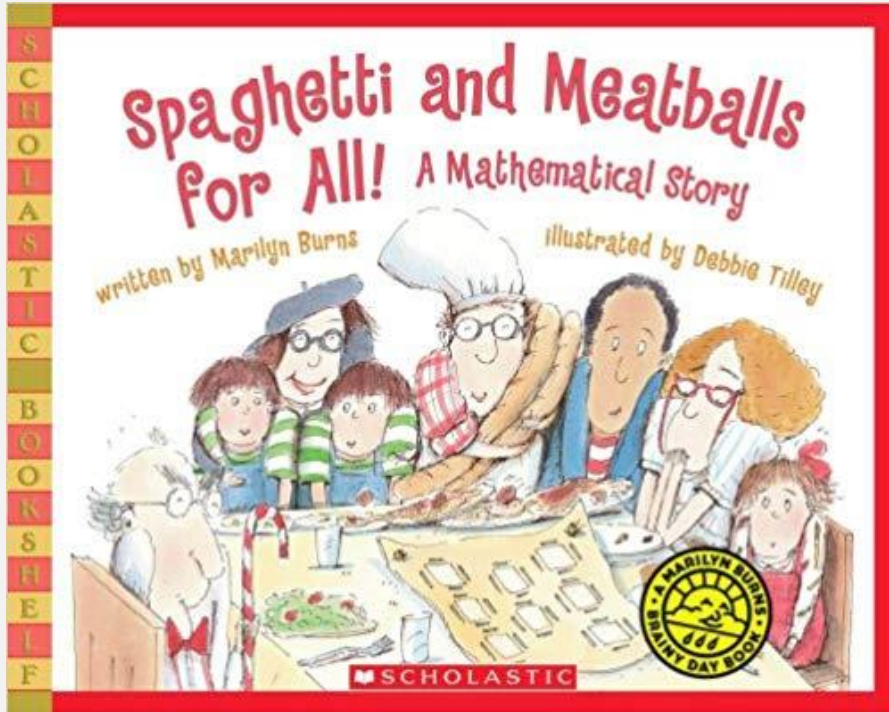


- (a) How did you arrange the ?  
I arrange them into groups of 2. And there are 7 groups.
- (b) There are 14  altogether.  $2 \times 7$
- (c) How did you arrange the ?  
I arrange them into groups of 3. And there are 6 groups.
- (d) There are 21  altogether.  $3 \times 7$
- (e) How did you arrange the ?  
I arrange them into groups of 2. And there are 4 groups.
- (f) There are 8  altogether.  $4 \times 2$

- (c) How did you arrange the ?  
I arrange them into groups of 3. And there are 6 groups.
- (d) There are 18  altogether.  $3+3+3+3+3+3$
- (e) How did you arrange the ?  
I arrange them into groups of 2. And there are 9 groups.
- (f) There are 4  altogether.



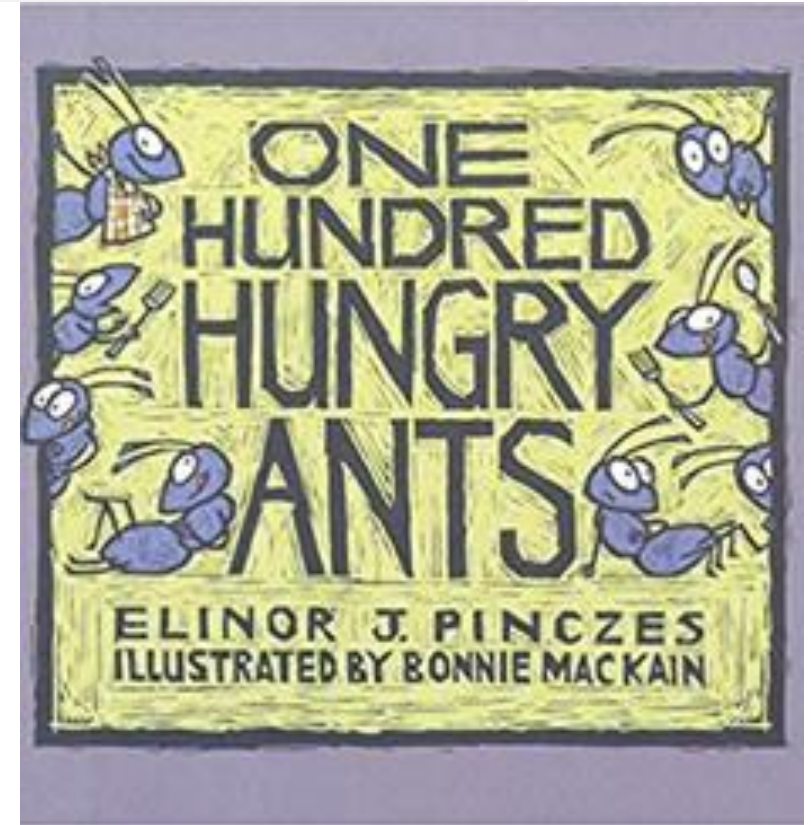
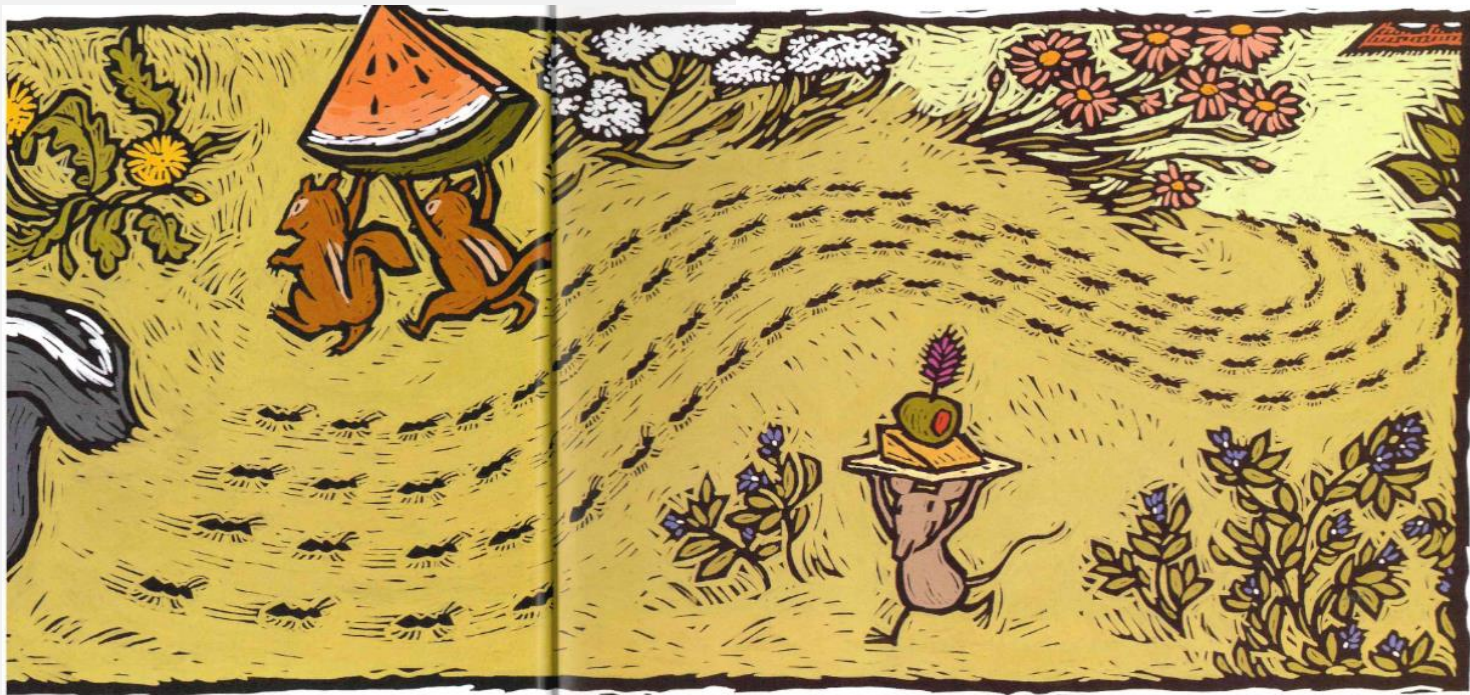
# BOOKS BY MARILYN BURNS



# PRACTICE & CONSOLIDATION: ONE HUNDRED HUNGRY ANTS

*Story both have underlying patterns and structures*

**"Stop!" yelled the little ant.  
"We're moving way too slow!  
More of the food will be gone  
unless we hurry up. So ... with  
4 lines of 25 we'd get there  
soon. I know."**



# MANIPULATIVES

*Concrete and multiple representations*

- To support the construction of mathematical understanding and to advance mathematical thinking;
- To sense the mathematical pattern and explore rules:
  - Associative rule:  $a \times (b \times c) = (a \times b) \times c$
  - Communitive rule:  $a \times b = b \times a$
- To organize and internalize mathematical ideas; and
- To experience mathematics and enhance the appreciation of mathematical concepts.

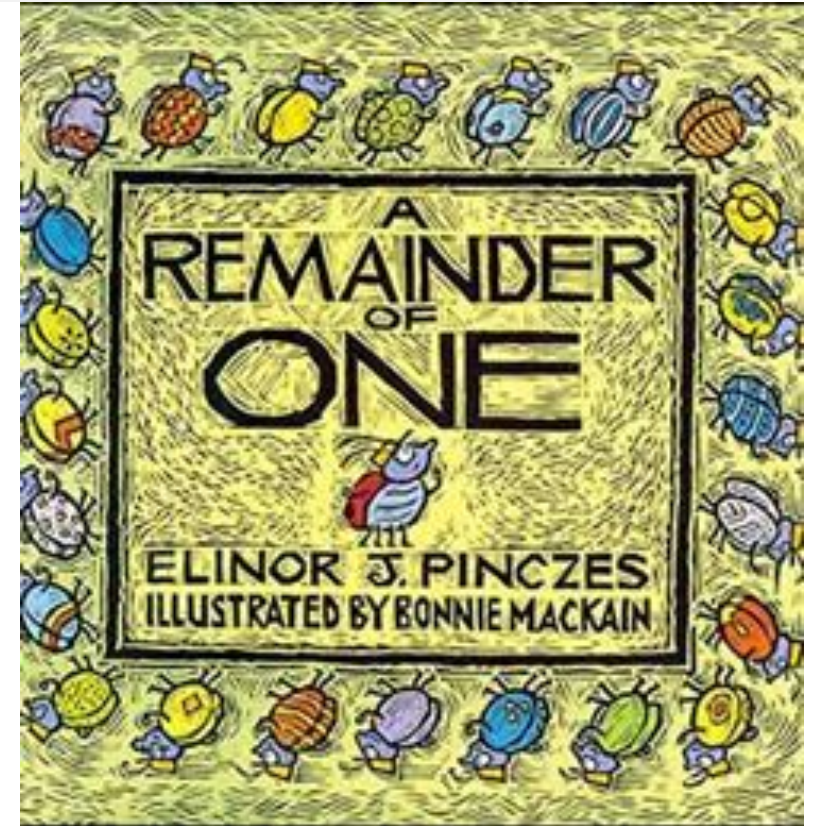




# EXTENSION CHALLENGES: A REMAINDER OF ONE

*To resolve a personal and a mathematical problem.*

- Soldier Joe wants to participate in the parade as a member of the 25<sup>th</sup> squadron, but the rows are not even. *Students can relate to this feeling of “wanting to belong”,* and so are motivated to solve the problem so that he can participate in the parade.
- Through systematic use of number and language, students begin to understand and employ problem solving strategies in real-world situations.



# EXTENSION CHALLENGES: A REMAINDER OF ONE

## *Questions for Students*

- *What is a remainder?*
- *How did the bugs arrange themselves?*
- *How should we arrange the blocks?*
  - With 2 lines
  - With 3 lines
  - With 4 lines

*Modeling “One for you and one for me” in which all bugs are distributed until one was left as the remainder.*



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**THANK YOU**