

Marbles, Alleys, Mibs, and Guli!

Teacher's Guide



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Line Masters

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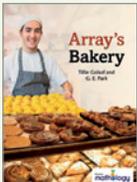
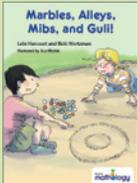
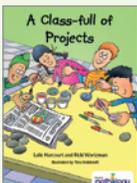
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Mathology Little Books

This series recognizes that children’s understanding of maths concepts develops over time, and so the series allows you to choose the book that best matches a child’s or group’s level of mathematical understanding. The books engage children at just the right level in a wide range of mathematical ideas, thinking, and activities in a variety of real world and imaginary contexts.

Marbles, Alleys, Mibs, and Guli! engages children in conversations, investigations, and activities that help to develop their understanding of the big maths idea that “Quantities and numbers can be added and subtracted to determine how many and how much.”*

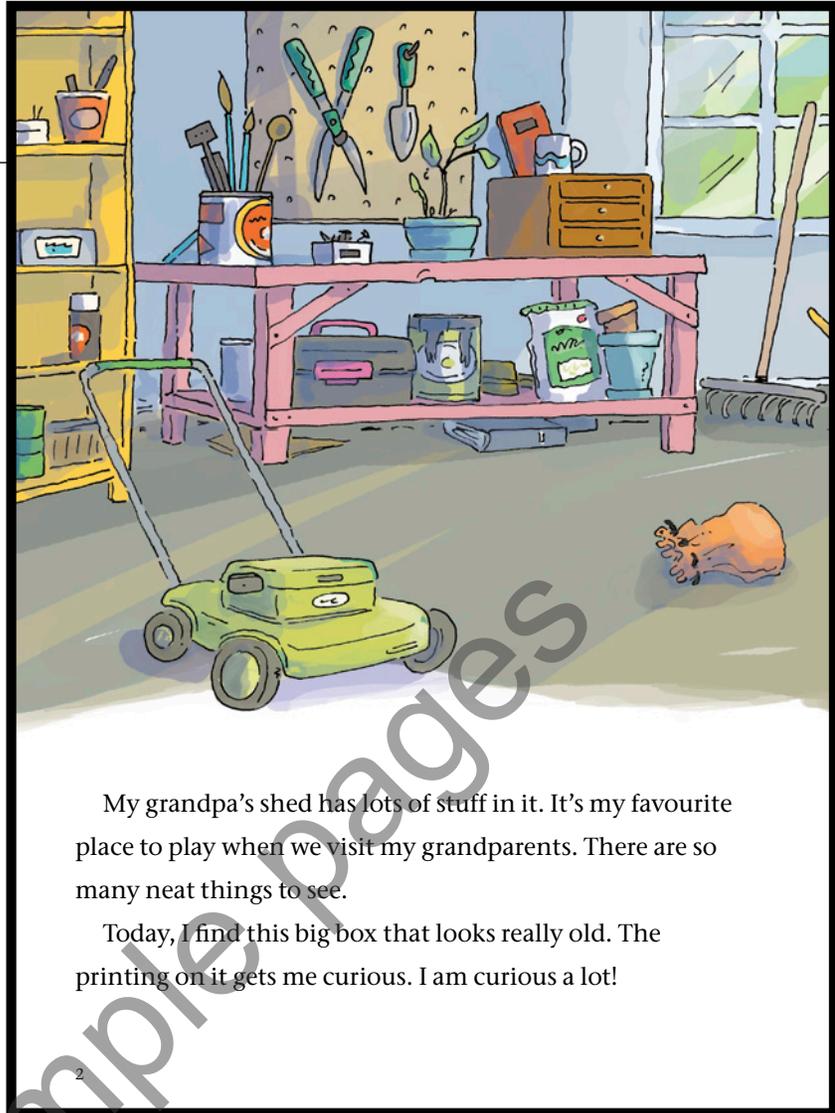
Big Idea: Quantities and numbers can be grouped by units or split into units (Addition and Subtraction concepts and strategies)

TITLE	KEY MATHS FOCUS	MATHS SKILLS	STRATEGIES	ADDITIONAL FOCUS
	Solve addition/ subtraction problems Solve equal grouping/ sharing problems	Estimate sums and differences Model and symbolize repeated addition Create and describe equal groups of objects Model and solve equal grouping and sharing problems	Arrays Equal grouping Skip count Repeated addition Estimate Share groups equally Use number sentences	Equality Model and write time Features of 3-D objects
	Add/subtract 2-digit numbers Solve equal grouping/ sharing problems	Create and solve addition and subtraction problems Use appropriate symbols to express addition and subtraction Add and subtract fluently with quantities to 20 Create and solve equal grouping and sharing problems	Estimate Skip count Mental addition and subtraction strategies Repeated addition Arrays Grouping into sets Sharing groups equally	Compare distance Identify 2-D shapes Features of triangles
	Add/subtract to 100 Compare/order numbers	Model and symbolise addition and subtraction Develop complements of 100 Write, read and compose numbers to 100 with 2-digit numbers as 10s and 1s Determines 10 (other multiples of 10) more/less than a given number	Estimate Skip count Grouping Place value Use mental and personal addition and subtraction strategies	Identify units of time
	Add/subtract to 100 Compose/decompose based on units of 10	Extend known sums and differences to solve other equations Model and symbolize addition and subtraction Compare quantities to 100 Order three or more quantities Find how many more/less one quantity is compared to another	Use friendly numbers Make 10 Develop mental maths and personal strategies Estimate sums and differences	Describe and continue patterns Measuring in kms Organising information Interpreting charts Creating graphs

* This book can also be used to address the big idea that “Quantities and numbers can be multiplied (by grouping units) and divided (by splitting into units) to determine how many or how much.”

Adding and subtracting

- Do you think there are more than 50 marbles? What makes you think so? (e.g., *I think there are about 20 yellow/multicoloured marbles and 20 dark blue marbles, $20 + 20 = 40$ and there are more than 10 other marbles, so there are more than 50 altogether*)
- Suppose the boy makes and counts piles of marbles and finds that there are 35 dark-coloured marbles and 40 light-coloured marbles. How many marbles is that altogether? (75) How do you know? How many less than 100 is 75? (25) How can we check to make sure?

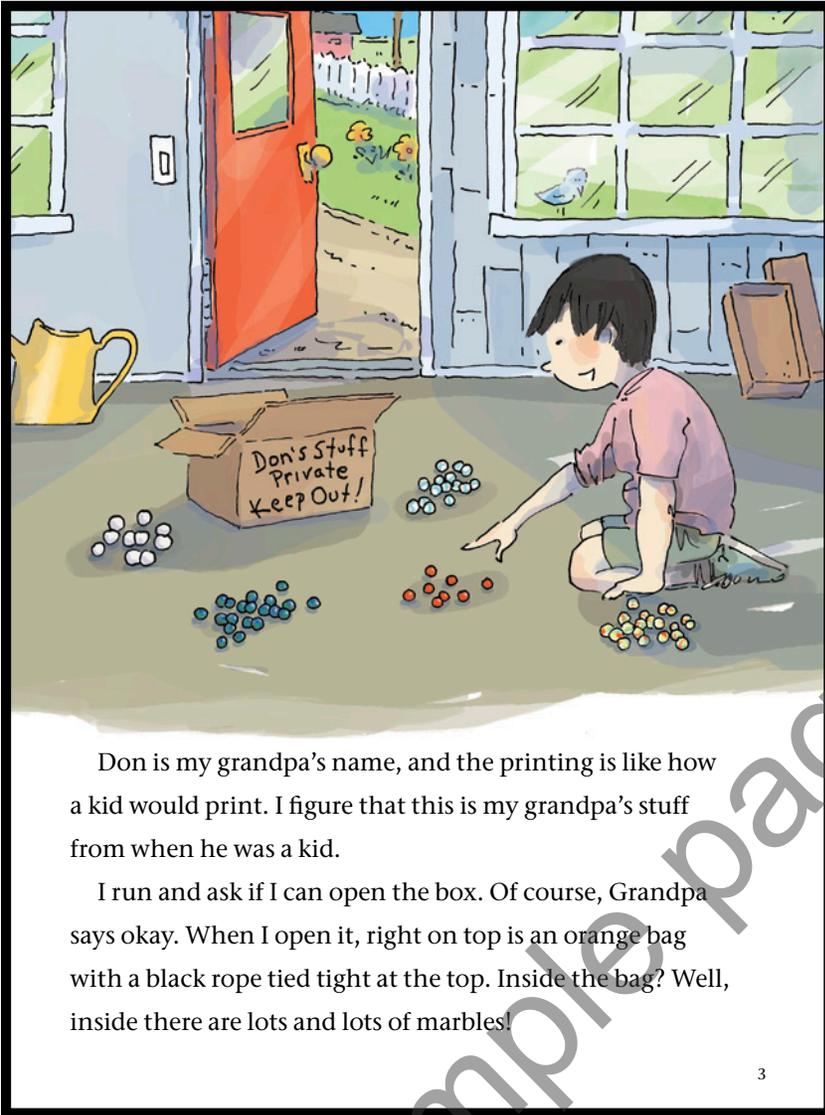


My grandpa's shed has lots of stuff in it. It's my favourite place to play when we visit my grandparents. There are so many neat things to see.

Today, I find this big box that looks really old. The printing on it gets me curious. I am curious a lot!

WATCH FOR...

- Do children offer reasonable estimates that demonstrate a relative sense of numbers (e.g., 35 and 40 are both less than 50 and so combined must be less than 100)?



Don is my grandpa's name, and the printing is like how a kid would print. I figure that this is my grandpa's stuff from when he was a kid.

I run and ask if I can open the box. Of course, Grandpa says okay. When I open it, right on top is an orange bag with a black rope tied tight at the top. Inside the bag? Well, inside there are lots and lots of marbles!

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Equal grouping and sharing

- Which groups of marbles seem to be equal in number? (*accept any answer the child can justify*)
- If you had a group of 10 marbles, could you share it with a friend so that you each have the same number? (*yes*) How many do you think you would each have? (*5*) How can we check out your ideas? What if you had a group of 18 marbles—how could you share that fairly with a friend? (*each person would get 9 marbles*)

Large Group Options

If you read *Marbles, Alleys, Mibs, and Guli!* to a large group or whole class, you might project the book to facilitate reading aloud and better engage children in solving problems. These activities engage children in adding and subtracting to find how much and how many, as well as modelling and solving equal sharing and grouping problems; choose the activities that best address your children's learning needs.

MARBLE SCORES

ENGAGE

Display pages 6–7 of *Marbles, Alleys, Mibs, and Guli!* You might draw larger versions of the targets to help focus discussion. Remind children that Grandpa used the dark marbles and the boy used the light ones. Ask:

- **The first game is tied at 11 points each. How did Grandpa score 11?** ($5 + 5 + 1 = 11$) **How did the boy score 11?** ($5 + 2 + 2 + 1 + 1 = 11$)
- **Can you think of another way to score 11 with 5 marbles?** (Assume not all marbles land on the target.)

Repeat for games two and three. Children can work in pairs or small groups to find each score, and then share it with the larger group. Record scores and the corresponding addition sentences as children agree on them. (Remember: Game three has a bonus of 10 points!) Depending on the length of the discussion, you might continue on another day.

WORK ON IT

Provide pairs or groups of children with a target (see the Maths Mat, LM 3), the recording sheet Marble Scores (LM 4), and 5 counters. Children record the numbers 5, 2, and 1 on the target. Work together to figure out the highest possible score and the lowest possible score. That is, all 5 marbles land on 5 for the highest possible score of 25 ($5 + 5 + 5 + 5 + 5$) or on 1 for the lowest possible score of 5 ($1 + 1 + 1 + 1 + 1$). Introduce the problem:

- **We found the highest and lowest scores for 5 marbles. What are other possible scores? Record each score you find using an addition sentence. All 5 marbles land on the target.**

SHARE AND REFLECT

Post a hundred chart or number line for reference. Ask questions such as:

- **Who found scores between 20 and 25? How did the marbles land?** (e.g., score of 22: $5 + 5 + 5 + 5 + 2$) **What is a fast and easy way to add these numbers? Let's use the hundred chart (number line) to track our adding.**

In discussion, highlight skip-counting as a strategy. Repeat for other totals (e.g., a score between 10 and 20, a score less than 10).

MATHS FOCUS: add multiple addends; skip-count by 2s and 5s; count on from given numbers; add 10

MATERIALS: *Marbles, Alleys, Mibs, and Guli!*, pp. 6–7; Maths Mat (LM 3); Marble Scores (LM 4); counters

Game 2

Grandpa

$$2 + 2 + 2 + 2 + 2 + 1 + 1 = 12$$

Boy

$$5 + 2 + 1 + 1 + 1 + 1 = 11$$

WATCH FOR...

- Does the child group like addends, skip-count, and then count on to find totals? Or, does the child use another strategy?
- Does the child create appropriate number sentences to express her/his ideas?

DIFFERENTIATE: Have children find scores for a lesser or greater number of marbles, and/or change the numbers in the target to increase or decrease the difficulty. Modify LM 4 accordingly to create corresponding recording sheets.

