

VISIBLE THINKING in Mathematics Making Mathematics Visual





Ammiel Wan

VISIBLE THANKING IN MATHEMATICS VISUAL



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_ Class: _

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Foreword

The focus of the series **Visible Thinking in Mathematics** is consistent with the 'Thinking Schools, Learning Nation' philosophy adopted by the Ministry of Education, Singapore. The role of mathematics in developing and improving the child's ability to think cannot be over-emphasised. I am glad parents and teachers have a valuable resource to complement programmes in schools to help the child consolidate his learning.

Mathematics is an excellent platform for the child to think; and also to think about his thinking. One of the ways to acquire these competencies is to model the process and, subsequently, to coach the child to engage in the process. Providing such an environment is critical in the development of good thinking in the child.

At Marshall Cavendish Institute, we focus on teacher professional development, and Visible Thinking in Mathematics provides teachers with good starting points to provide learning experiences that put thinking at the forefront. We believe that constant engagement with learning materials with cutting-edge pedagogies contributes to one's professional learning.

Yeap Ban Har, Ph.D. Principal Marshall Cavendish Institute

Preface

The **Visible Thinking in Mathematics** series promotes critical and creative thinking in mathematics. It is designed to help make thinking visible by providing the child with opportunities to think, explore and reflect.

While practice leads to better performance, practice without contextual and conceptual understanding prevents the child from thinking critically and creatively. In this series, instead of learning procedures and formulas by rote, the child masters concepts through:

Thinking routines: functional questions to direct the child's thinking on key concepts and cultivate the child's thinking skills.

Parallel questions: consecutive mathematical problems with the same context but different key words to highlight differences between problems; ensuring that the child understands and retains concepts and skills better.

This approach not only instills in the child mathematical skills but also inspires discipline in thinking and greater motivation for learning.

Additional support is provided to the child through Notes. Notes present opportunities for parents and teachers to clarify misconceptions, simplify difficult concepts and address areas of difficulty for the child.

At the end of each chapter, there is a Summative Test for the child to recap and practise what he has learnt throughout the chapter. The 'Think Out Of The Box' section, following the Summative Test, includes questions that stretch the child's thinking beyond the routine.

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Counting The Amount Of Money In A Given Set

Thinking Platform

Look at these notes and coins and their values.



Think! Have you ever wondered why there are no \$3, \$4 or \$7 notes?

Why are there coins for 5¢, 10¢, 20¢, 50¢ and \$1 but not for 6¢ or 9¢?



Teaching Tips

Point out that the notes and coins have their current values because the numbers 1, 2, 5, 10, 20 and 50 easily add up to form greater amounts. For example, we can obtain \$13 with a \$10 note, a \$2 note and a \$1 coin.

You can combine different notes and coins to show the same amount of money.

Look at these sets of money.







Both Set A and Set B show eight dollars and fifty cents. We write this amount as \$8.50.

Think! What other combinations of notes and coins can you make to show \$8.50?



Common Errors

This is the first time the child encounters the decimal notation. We should not approach this section in the same way we teach decimals. Instead, it should be highlighted to the child that the dot is used to separate the dollars and the cents. The correct way of writing money in decimal notation should also be emphasised to the child. For example, two dollars and forty cents should not be written as \$2.4, but \$2.40.



2. Count. Write the amount in words and in numbers.





(b)

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(g)



(h)



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3. Write the number of each type of notes and coins needed to make the given amount.

Amount	\$10	\$5	\$2	\$1	50¢	20¢	10¢
\$14.00	ęma		2				
		2	Ţ	2			
(a) \$19.00							
(b) \$23.00							
(c) \$1.90							
					8		
(d) \$2.30							

Changing Cents And Dollars Thinking Platform

We can change dollars to cents.

\$1 can be written as \$1.00. 1 = 1.00 = 100c

0.25 = 25c\$4.20 = 420c

Think! How do we change dollars to cents? What happens to the dot?

We can also change cents to dollars.

1c = \$0.01250c = \$2.5042c = \$0.42

Think! How do we change cents to dollars? What do we add to the digits?





Area of Difficulty

Explain to the child that when we change dollars to cents, we remove the dot. However, when we change cents to dollars, we add a dot. Lead the child to see that the dot is placed before the second digit from the right. Thus, to change 250¢ to dollars, we put the dot before 5, remove the ¢ and add the \$ sign before 2. We add 0 before the dot for amounts less than \$1. For example, we write 40¢ as \$0.40. We add 0 before and after the dot for amounts less than 10¢. For example, we write 5¢ as \$0.05.

1.	Writ	te the am	ount in	dollars.			
	(a)	30¢		_	(b)	28¢	
	(c)	3¢		-	(d)	103¢	
	(e)	250¢			(f)	345¢	
2.	Wri	te the am	nount in	cents.			
	(a)	\$8	-		(b)	\$12	
	(c)	\$9			(d)	\$5	
3.	Wri	ite the an	nount in	cents.			
	(a)	\$8.20	_	_	(b)	\$0.65	
	(c)	\$9.80			(d)	\$4.05	
	(e)	\$7.90			(f)	\$5.30	
	(g)	\$7.26			(h)	\$2.40	

Comparing Amounts Of Money ______ Thinking Platform

Look at these problems.

Problem 1

Jane has \$34.50. Mary has \$45.30. Who has more money?

-	Amount	Dollars	Cents
Jane	\$34.50	34	50
Mary	\$45.30	45	30

Problem 2

Jane has \$34.50. Mary has \$45.30. Fiona has \$53.40. Diana has \$54.30. Who has the greatest amount of money?

	Amount	Dollars	Cents
Jane	\$34.50	34	50
Mary	\$45.30	45	30
Fiona	\$53.40	53	40
Diana	\$54.30	54	30

Think! How do we compare amounts of money? Do we compare the dollars or the cents?



Teaching Tips

Point out to the child that when comparing amounts of money, he should begin by comparing the dollars. Also emphasise that dollars must be compared with dollars and cents with cents.

Complete the table. Then answer the questions.

1. (a) Debbie has \$25.80. Ashley has \$28.50. Who has more money? _____

ĺ	Amount	Dollars	Cents
Debbie	\$25.80		
Ashley	\$28.50		

(b) Debbie has \$25.80. Ashley has \$28.50.
Nicole has \$85.20. Gladys has \$82.50.
Who has the greatest amount of money? ______

ĺ	Amount	Dollars	Cents
Debbie			
Ashley			
Nicole			
Gladys			

Arrange the amounts of money in order. Begin with the smallest amount.

smallest

 (a) John bought a book for \$43.20. Bobby bought a book for \$24.30. Whose book is more expensive? _____

	Amount	Dollars	Cents
John			
Bobby			

(b) John bought a book for \$43.20.
Bobby bought a book for \$24.30.
Daniel bought a book for \$34.20.
James bought a book for \$32.40.
Whose book is the most expensive? _____

Ĺ	Amount	Dollars	Cents
John			
Bobby			
Daniel			<i>i</i> .
James			

Arrange the amounts of money in order. Begin with the greatest amount.

greatest

Word Problems Involving Money

Look at these word problems.

Problem 1

Benjamin buys a book and a file for \$24. The book costs \$4 more than the file. How much does the file cost?

Problem 2

Benjamin buys a book and a file for \$24. The book costs \$4 less than the file. How much does the book cost?

Problem 3

Benjamin buys a book and 3 files for \$24. The book costs \$4 more than a file. How much does the file cost?

Think! How are the problems similar? How are they different? Can you use the same model to solve these problems?

What operation should you use to solve each problem?



Teaching Tips

These word problems are similar to those that the child has learnt in addition, subtraction, multiplication and division of whole numbers. Ask the child which words help him decide which operation should be used to solve the problem.

Draw models and solve.

– Example ––––			
A toy car costs \$34. A doll house costs \$ How much do the to	516 more than the by car and the dol	toy car. house co	st altogether?
Toy car	34	- The second sec	
Doll house	34	16][*
\$34 + \$34 + \$16 = The toy car and th	\$84 e doll house cost	\$84 altog	ether.

 (a) A toy car and a doll house cost \$34. The toy car costs \$16 more than the doll house. How much does the toy car cost?

(b) A toy car and a doll house cost \$34.The toy car costs \$16 less than the doll house.How much does the doll house cost?

 (a) James has twice as much money as Brian. Luke has \$20 more than James. If Brian has \$65, how much money does Luke have?

(b) James has twice as much money as Brian.
Luke has \$20 less than James.
If Brian has \$25, how much money does Luke have?

(c) James has twice as much money as Brian.Luke has \$20 more than Brian.If Luke has \$80, how much money does James have?

 (a) Jenny has \$82. She spends \$24 on books. Then her mother gives her \$18. How much does Jenny have in the end?

 (b) Jenny has some money. She spends \$24 on books. Then her mother gives her \$18.
If she has \$82 in the end, how much did Jenny have at first?

 Jenny has some money. She spends \$18 on a book and twice as much on a school bag.
If she has \$42 in the end, how much did Jenny have at first?



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4. (a) Derrick pays \$45 for a glove and a bat. The glove costs \$29 more than the bat. How much does the bat cost?



(b) Derrick pays \$30 for 2 gloves and a bat. A glove costs as much as a bat. How much does the glove cost?

(c) Derrick pays \$45 for 2 gloves and a bat. A glove costs twice as much as the bat. How much does the bat cost? 5. (a) Jerry buys a book and a file for \$12. The book costs twice as much as the file. How much does the book cost?

(b) Jerry buys a book and a file.
The book costs twice as much as the file.
The book also costs \$12 more than the file.
How much do the book and the file cost altogether?

(c) Jerry buys a book and a file.
The book costs 3 times as much as the file.
The book also costs \$12 more than the file.
How much do the book and the file cost altogether?



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6. (a) 3 apples cost \$2. Susan buys 24 apples. How much does she pay?

(b) 3 apples cost \$4. Susan pays a total of \$24. How many apples does she get?

(c) 24 apples cost \$8. Susan buys 15 apples. How much does she pay?

Summative Test

Multiple-Choice Questions

Write the number of the correct answer in the brackets.

1. Forty dollars and four cents when written in figures is

(1)	\$14.04	(2) \$14.40		
(3)	\$40.04	(4) \$40.40	()

2. Jenny had some money. She spent \$24 on a book. Then, her mother gave her another \$18. In the end, she had \$82. How much did Jenny have at first?

(1)	\$40	(2)	\$76		
(3)	\$88	(4)	\$124	()

3.	The	The difference between six \$5 and eight \$2 notes is						
	(1)	\$3	(2)	\$14				
	(3)	\$30	(4)	\$46	()		

4. Tim had \$72. He distributed it equally to Peter and Jeremy. In the end, Peter had \$85. How much money did Peter have at the beginning?

(1)	\$24	(2)	\$37		
(3)	\$49	(4)	\$109	()

5. I have 7 fifty-cent coins and 2 twenty-cent coins. They add up to

(1)	\$0.70	(2)	\$2.40		
(3)	\$3.50	(4)	\$3.90	()

Fill in the blanks.

6. Jenny had some money. She spent \$18 on a book and twice as much on a school bag. In the end, she was left with \$42. How much money did Jenny have at first?

 Four girls saved some money from their allowance. Jane saved \$25.80. Mary saved \$28.50. Fiona saved \$85.20. Diana saved \$82.50. Arrange the girls according to the amount of their savings. Begin with the greatest amount.

greatest

smallest

8. John bought a book and 3 files for \$24. If the book cost \$4 more than a file, find the cost of a file.

9. How much money is there altogether?



10. Mrs Lim bought some beef and chicken for \$42. The cost of the chicken is \$16 more than the beef. How much did she pay for the chicken?

Think Out Of The Box!

 Jerry bought a bag, a shirt and a racket for \$148. The racket cost \$22 more than the bag and the shirt cost \$12 less than the bag. How much did he spend on the racket?

2. Study the picture below.



3. For every 3 chickens Tom sells, he earns \$5. How many chickens must he sell in order to earn \$45?



Link For more reading and practice, you may also refer to chapter 12 of My Pals Are Here Maths 2B (3rd Edition).



Measuring And Comparing Lengths

Thinking Platform

The arrow below shows how long 1 centimetre is.

Ш	IIII	пп	Ш	ПШ	ПП	ТШ	ПП	ппп	Ш	ηπ	ηπ	Π
5	1	2	3	4	5	6	7	8	9	10	11	12

Estimate the length of your hand, arm and foot in centimetres. Then, use a measuring tape to find the actual length in centimetres. How close was your estimate?

Body part	My estimate	Actual length

Think! Can you estimate how long 1 metre is?



Teaching Tips

Many children do not have an idea of how long a centimetre or a metre is. Before the child starts doing computations involving centimetres and metres, this activity should give him a sense of these units of measurement.

Look at the pencils below. Which is longer? How much longer?



Think! Is it difficult to tell which pencil is longer? Why?

Now look at the pencils below. Which is longer? How much longer?



- (e) Pencil D is _____ cm long.
- (f) Pencil _____ is ____ cm longer than Pencil _____.

Think! Is it easier to tell which pencil is longer? Why?



Teaching Tips

Remind the child that in measuring length, the starting position of an object against a ruler is just as important as its ending position.

1. Look at the picture below and fill in the blanks.



- (a) The pencil is _____ cm long.
- (b) Each clip is _____ cm long.
- (c) The pencil is _____ cm longer than a clip.
- (d) The pencil is _____ times as long as a clip.
- 2. Look at the picture below and fill in the blanks.



- (a) The pencil is _____ cm long.
- (b) The eraser is _____ cm long.
- (c) The pencil is _____ cm longer than the eraser.
- (d) The total length of _____ erasers is the same as the total length of 2 pencils.

3. Look at the picture below and fill in the blanks.



- (a) The clip is _____ cm long.
- (b) The pin is _____ cm long.
- (c) The pin is _____ cm longer than the clip.
- (d) The total length of 4 pins is the same as the total length of

_____ clips.

(e) The total length of 3 pins and 4 clips is _____ cm.

4. Look at the picture below and fill in the blanks.



- (a) The pin is _____ cm long.
- (b) The pencil is _____ cm long.
- (c) The total length of 2 pins and 3 pencils is the same as the total length of _____ pins.
- (d) The total length of 3 pencils is the same as the total length of _____ pins.

5. Look at the picture below and fill in the blanks.



- (a) The clip is _____ cm long.
- (b) The pin is _____ cm long.
- (c) The pin is _____ cm longer than the clip.
- (d) The total length of 3 pins is the same as the total length of ______ clips.

(e) The total length of 2 pins and 2 clips is _____ cm.

6. Look at the picture below and fill in the blanks.



- (a) The pin is _____ cm long.
- (b) The pencil is _____ cm long.
- (c) The total length of 3 pencils is the same as the total length of _____ pins.
- (d) The total length of 3 pins and 3 pencils is the same as the total length of _____ pins.
7. Look at the picture below and fill in the blanks.



- (a) _____ is the tallest.
- (b) _____ and _____ have the same height.
- (c) Ben is _____ cm taller than Leon.
- (d) The total height of all the boys is _____ cm.
- (e) Leon has to stand on _____ 20-cm stools so that he is as tall as Eric.

8. Look at the picture below and fill in the blanks.



- (a) _____ is the shortest.
- (b) Diana is _____ cm shorter than Jane.
- (c) Celine is _____ cm taller than Mary.
- (d) The total height of all the girls is _____ cm.
- (e) Celine has to stand on _____ 20-cm stools so that she is as tall as Jane.

9. Look at the heights of the buildings below.



- (a) What is the total height of Building B and Building D?
- (b) What is the total height of Building A and Building D?
- (c) How much shorter is Building D than Building C?
- (d) How much taller is Building A than Building B?

10. Look at the heights of the towers below.



- (a) What is the total height of Tower B and Tower C?
- (b) What is the total height of Tower A and Tower C?
- (c) How much shorter is Tower A than Tower D?
- (d) How much taller is Tower B than Tower C?

Problem Solving Involving Length

Thinking Platform

Look at these problems.

Problem 1

John has a ribbon that is 82 cm long. Janice has another ribbon that is 25 cm longer. What is the total length of their ribbons?

Problem 2

John has a ribbon that is 82 cm long. Janice has another ribbon that is 25 cm shorter. What is the total length of their ribbons?

Problem 3

John has a ribbon that is 82 cm long. Janice has another ribbon that is 25 cm long. What is the total length of their ribbons?

Think! How are these problems similar? How are they different?



Teaching Tips

These parallel questions help pupils see and understand the different concepts of addition and subtraction involved. With the non-essential terms kept constant, guide the child to highlight the key terms and solve the problems.

- 1. Hisham walked 240 m from his home to the park. He then jogged another 385 m to the mall from the park.
 - (a) What is the total distance that Hisham travelled?
 - (b) How much further did he jog than walk?

- 2. Malar had a ribbon measuring 14 cm long. Jaswant had another ribbon that is 8 cm longer.
 - (a) How long was Jaswant's ribbon?
 - (b) What was the total length of the two ribbons?



- 3. Glenn needed 240 cm of string to tie some parcels. He only had 182 cm of string.
 - (a) How much more string did he need?
 - (b) Glenn later bought another 180 cm of string.
 - What was the total length of string he had in the end?

- 4. Etienne is 163 cm tall. Weilong is 45 cm taller than him.
 - (a) How tall is Weilong?
 - (b) What is their total height?

5. Mr Tan needed to saw 8 pieces of wood, each measuring 4 m. What is the total length of wood Mr Tan needed?

6. Cempaka uses 3 m of tape to seal a carton. What is the length of tape she needs to seal 7 similar cartons?

 Yuwen cuts out 45 m of cloth to make some curtains. Each curtain uses 5 m of cloth. How many curtains can she make?

8. Rani had a roll of paper measuring 27 m long to make paper lanterns. She made 9 similar lanterns altogether. How much paper did she use for each lantern?

More Addition And Subtraction Of Length

Thinking Platform

Look at the problem below.

The distance between Dan's home and his school is 200 m. After walking a distance from his home to school, he stopped and walked back another 110 m to look for his missing wallet. He was 40 m from home. How far had he walked before he stopped and walked back?

Which of the solutions below is correct?

Solution A

40 + 110 = 150 Dan had walked 150 m.

Solution B

200 – 110 = 90 Dan had walked 90 m.

Solution C

200 - 150 = 50Dan had walked 50 m.

Think! How can you use a diagram to help you visualise and solve this problem?



Teaching Tips

The child may find it difficult to visualise distances from different starting points, especially when different directions are involved. In such word problems, drawing a diagram or other visual aids will make it easier to understand.

Solve these problems.



 The distance between Mahesh's home and the mall is 320 m. After walking 200 m from his home to the mall, he stopped and walked back to a cafe. If the cafe is 160 m away from the mall, what was the distance he walked back?



2. The distance between Kara's home and the park is 400 m. After walking a distance from her home to the park, she stopped and walked 80 m back to a library. If the library is 160 m away from the park, how far had she walked before she stopped and walked back?



3. The distance between Kara's home and the park is 420 m. After walking 240 m from her home to the park, she stopped and walked back to a library. If the library is 245 m away from the park, how far did she walk back?



4. Jasper was competing in a 400-m race with Derrick. When Jasper was 120 m away from the finish line, Derrick was 200 m away from the starting line. How far apart were they?



5. Jasper was competing in a 400-m race with Derrick. When Jasper was 120 m away from the finish line, Derrick was 310 m away from the starting line. How far apart were they? 6. Wani was running in a 300-m race with Gavin. When Wani was 245 m away from the finish line, Gavin was 150 m away from the starting line. How far apart were they?

7. Wani was running in a 300-m race with Gavin. When Wani was 245 m away from the finish line, Gavin was 150 m away from the finish line. How far apart were they?

- Wilson was running in a race with Ronald.
 When Wilson was 120 m away from the finish line, Ronald was 150 m away from the starting line.
 - (a) If Wilson was 40 m ahead of Ronald, how long was the race?
 - (b) If Wilson was 40 m behind Ronald, how long was the race?

Measuring Gaps and Intervals ______ Thinking Platform

Compare the problems and diagrams below.

Problem 1

Lamp posts are placed at an equal distance from one another. The distance between the 1st and the 2nd lamp post is 4 m. What is the distance between the 1st and the 4th lamp post?



Problem 2

Lamp posts are placed at an equal distance from one another. The distance between the 1st and the 5th lamp post is 16 m. What is the distance between the 1st and the 10th lamp post?



Think! How many lamp posts are there in the pictures? How many 4-m gaps can you see? What do you notice about the number of lamp posts and the number of gaps? Let us solve these problems.

Problem 1

Lamp posts are placed at an equal distance from one another. The distance between the 1st and the 2nd lamp post is 4 m. What is the distance between the 1st and the 4th lamp post?



Distance between 1^{st} and 4^{th} lamp post = $3 \times 4 = 12$ m

Problem 2

Lamp posts are placed at an equal distance from one another. The distance between the 1st and the 5th lamp post is 16 m. What is the distance between the 1st and the 10th lamp post?



Distance for 1 gap = $16 \div 4 = 4$ m Distance between 1st and 10th lamp post = $9 \times 4 = 36$ m



Teaching Tips

Have the child count the gaps and lamp posts. Lead him to conclude that the difference between the two numbers is 1. Then ask the child how he would find the number of gaps between the 5th and the 20th lamp post. Explain that he simply needs to subtract 5 from 20 to find the number of gaps between them.

 Some trees are equally spaced out along a road. The distance between the 1st and the 2nd tree is 3 m. What is the distance between the 1st and the 9th tree?



 Some trees are equally spaced out along a road. The distance between the 1st and the 5th tree is 20 m. What is the distance between the 1st and the 9th tree?



3. Some trees are equally spaced out along a driveway. The distance between the 1st and the 2nd tree is 4 m. What is the distance between the 1st and the 10th tree?

4. Some trees are equally spaced out along a driveway. The distance between the 1st and the 5th tree is 12 m. What is the distance between the 1st and the 8th tree? 5. Lamp posts are placed at an equal distance from one another along an expressway. The distance between the 1st and the 2nd lamp post is 3 m. What is the distance between the 1st and the 10th lamp post?

6. Lamp posts are placed at an equal distance from one another along an expressway. The distance between the 5th and the 10th lamp post is 25 m. What is the distance between the 1st and the 10th lamp post? 7. 10 pupils are standing in a row at an equal distance from one another. The distance between the 1st and the 5th pupil is 40 m. How far apart are the 1st and last pupils?



8. 10 pupils are standing in a row at an equal distance from one another. The distance between the 4th and the 8th pupil is 40 m. How far apart are the 1st and last pupils?



Summative Test

Multiple-Choice Questions Write the number of the correct answer in the brackets.

1.	Mary has a piece of raffia string 48 cm long. She cuts it into 6 equal pieces. What is the length of 2 pieces?				
	(1) 6 cm (3) 12 cm	(2) (4)	8 cm 16 cm	()
2.	A car is 6 m long. A bus is 5 m longer than the car. What is the total length of 4 cars and 5 buses?				
	(1) 11 m	(2)	49 m		
	(3) 50 m	(4)	79 m	()
3.	A piece of wood is cut length of two pieces is wood? (1) 30 cm (3) 105 cm	into 7 pie 30 cm, w (2) (4)	ces of equal lengt hat is the original 60 cm 210 cm	h. If the tota length of the (9)
4.	A matchstick has a len measures 19 matchstic (1) 5 cm (3) 95 cm	gth of 5 c ks long? (2) (4)	m. What is the ler 19 cm 145 cm	gth of a twig	g if it)
5.	A wooden plank is 129 the remainder is cut in 3 equal pieces? (1) 27 cm	cm long to 3 equc (2)	42 cm of wood is Il pieces. How long 29 cm	cut from it a g is each of t	and he
	(3) 87 cm	(4)	171 cm	()

Fill in the blanks.

6. The distance around an oval track is 109 m. Leonard ran around the track thrice. What is the total distance he covered? (Express your answer in metres.)

7. A rope is 350 m long. It is cut into 3 pieces. The longest piece is 125 m long. The shortest piece is 18 m long. The remaining piece is cut into 3 smaller pieces. What is the length of each of the 3 smaller pieces?

 Desmond has a wooden stick that is 410 cm long. He saws it into 4-cm pieces. What is the maximum number of pieces of 4-cm wood he can get? 9. Bryan is 140 cm tall. His brother, Gabriel, is 45 cm shorter than him. What is their total height?

10. Shaun is 162 cm tall. Wesley is 20 cm shorter than Shaun. Nathaniel is 18 cm taller than Wesley. What is the total height of the 3 boys?

Think Out Of The Box!

1. Oliver had a wooden stick that was 300 cm long. He made 4 cuts. If he were to make 5 cuts, how much shorter would each stick be?

2. The length of 2 poles and 4 rods is 78 cm. The length of 4 similar poles and 2 rods is 84 cm. What is the length of a pole?

3. 4 matchsticks are used to form a square. Each matchstick is 6 cm long. What is the total length of the matchsticks needed to form 5 squares as shown?







Link For more reading and practice, you may also refer to chapter 9 of My Pals Are Here Maths 2A (3rd Edition).



Measuring Mass

Thinking Platform

Look at the eggs on the weighing machines below.



Think! Which egg is heavier, A or B?

What do you notice about the scales on the weighing machines?

Why is it important to look at the scale or markings on the face of the weighing machine?



Teaching Tips

Point out to the child that the two weighing machines are different. Get him to observe the difference in the scale and the number of markings shown. Explain to the child that he should find the value of each marking to obtain the correct reading.

Let us look at the scale on each weighing machine.



Between each 100 g interval, there are 4 smaller markings and 5 gaps.

 $100 \div 5 = 20$

Each gap represents 20 g.



Between each 100 g interval, there are 3 smaller markings and 4 gaps.

 $100 \div 4 = 25$

Each gap represents 25 g.

Write the mass of the items below.



4.

3.





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7.

8.





Comparing Mass

Look at the balance below.

Think! Which box is heavier, Box A or Box B?



Look at the balances below.



Think! Which box is the heaviest, Box A, Box B or Box C? Why?



Teaching Tips

The balance is similar to a see-saw, where the heavier object will be lower than the lighter object. As no unit of measurement is involved here, the comparison of the masses of objects is relative. This means we can only conclude which object is heavier, and not find the exact difference in mass between them. Explain to the child that when the balance is level, the objects on each side of the balance have the same mass. 1. Look at the balances and answer the questions below.



Fill in the blanks with more than or less than.

- (a) The mass of Box A is _____ 1 kg.
- (b) The mass of Box B is _____ 1 kg.

Fill in the blanks with the correct letters.

- (c) Box B is lighter than Box _____.
- (d) Box B is heavier than Box _____.
- (e) Box _____ is the lightest.
- (f) Box _____ is the heaviest.

2. Circle the correct answers.



- (a) (Bag A | Bag B) is heavier.
- (b) Bag A is (heavier | lighter) than 2 kg.
- (c) Bag B is (heavier | lighter) than 2 kg.
- 3. Fill in the blanks.



- (a) Carton A is heavier than Carton _____.
- (b) Carton A is lighter than Carton _____.
- (c) Carton _____ is the heaviest.

4. Circle the correct answers.



(e) (Box A | Box B | Box C) is the heaviest.

Fill in the blanks.





5. The mass of the 3 batteries is _____ g.



6. The mass of the bag of seeds is _____ g.

7. Fill in the blanks.



(a) The mass of the small bottle is _____ g.



(b) The mass of the large bottle is _____ g.



(c) The mass of a small bag is _____ g.



(d) The mass of the large bag is _____ g.

Solve these problems.

8. Cindy's mass is 20 kg. She is twice as heavy as her sister. What is her sister's mass?

9. Cindy is twice as heavy as her sister. If their total mass is 27 kg, what is Cindy's mass?

10. Cindy is twice as heavy as her sister. If Cindy's mass is 12 kg more than her sister's mass, find Cindy's mass.

11. The mass of a papaya is 500 g. The mass of a watermelon is 300 g more than the mass of the papaya. What is the total mass of the papaya and watermelon?

12. The mass of a papaya is 500 g. The mass of a watermelon is 3 times the mass of the papaya. What is the total mass of the papaya and watermelon?

13. The mass of a box of watermelons is 2 kg more than the mass of a box of papayas. If their total mass is 14 kg, what is the mass of the box of watermelons?
14. The mass of a toy car is 50 g more than the mass of a doll. If the mass of the doll is 220 g, what is their total mass?

15. The mass of a toy car is 150 g and the mass of a doll is 3 times as much. What is their total mass?

16. The mass of a toy car is 20 g more than the mass of a doll. The mass of the toy car is 3 times the mass of the doll. What is their total mass? Solve.

17. There are 4 boxes labelled A, B, C and D.

Box D is not the heaviest. Box A is not the lightest. Box A is lighter than Box B. Box D is heavier than Box A.

Which box is the heaviest? _____

Which box is the lightest?

18. Matthew, Darren, Owen and Pat are standing in a row.

Owen is not the heaviest. Darren is not the lightest. Darren is lighter than Pat. Owen is heavier than Darren.

Arrange the boys' names in order. Begin with the lightest boy.

lightest

Summative Test

Multiple-Choice Questions Write the number of the correct answer in the brackets.

1.	A dictionary, a textbook and a pen weigh 560 g, 820 g and 2 respectively. What is their total mass?			25 g	
	(1) 865 g (3) 1670 g	(2) (4)	1405 g 3880 g	()
2.	Nathaniel, Wesley and Sh weighs 28 kg while Wesle Shawn's mass?	awn w ey is 12	veigh 100 kg altogether. Nat kg heavier than him. What	thanie is	el
	(1) 30 kg	(2)	40 kg		
	(3) 32 kg	(4)	44 kg	()
3.	The total mass of John ar 42 kg, how much heavier (1) 14 kg (3) 24 kg	nd his k r is Joh (2) (4)	picycle is 60 kg. If John weig n compared to the bicycle? 18 kg 42 kg	ghs ()
4.	A box of sweets weighs 9 640 g. If the sweets weig is the weight of the empty (1) 280 g	920 g c gh twice y box? (2)	and a box of chocolates wei as much as the chocolate 360 g	ghs s, wh	at
	(3) 560 g	(4)	1560 g	()
5.	The mass of 3 pens and weighs twice as much as	2 rulers a rule	s is 240 g altogether. If a pe r, what is the mass of 5 per	en is?	
	(3) 300 g	(2)	360 g	()

Fill in the blanks.

6. D is heavier than C. A is heavier than B. B is lighter than C. A is lighter than D. C is lighter than A. Arrange the letters starting with the lightest.

lightest

heaviest

7. The mass of a magazine is 3 kg lighter than a textbook. Given that the total mass of a magazine and a textbook is 7 kg, what is the total mass of 3 such magazines and 2 textbooks?

8. A wooden cube weighs 320 g. A plastic cube weighs 180 g lighter than the wooden cube. What is the weight of 2 wooden cubes and 2 plastic cubes?

9. Tom weighs 3 kg more than Clement. Clement weighs 5 kg more than Joel. Given that Tom and Joel weigh 28 kg altogether, what is the weight of Clement?

10. Container A can hold twice as much sand as Container B. If Container A can hold 420 g of sand, how much sand can the 2 containers hold?

Think Out Of The Box!

1. Victor weighs 38 kg. His father weighs thrice as heavy as him. How much lighter is Victor than his father?

2. A pear weighs 120 g more than an orange. A mango weighs twice as heavy as the pear. The mango is 270 g heavier than the orange. How heavy is the mango?

3. A wooden box containing 5 pencils weighs 470 g. The same wooden box containing 5 pens weighs 820 g. Given that a pen weighs 110 g, what is the weight of a pencil?



For more reading and practice, you may also refer to chapter 11 of My Pals Are Here Maths 2B (3rd Edition).



Comparing Volume

Thinking Platform

Look at the containers below.





Think! Which container has more water, A or B?



Think! Which container has more water, C or D?



Think! Which container has more water, E or F?

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Think! Which containers were easier to compare — A and B, C and D or E and F? Why?





Teaching Tips

Lead the child to infer that it is easier to compare amounts of water when the containers have the same shape and size — the container with the higher water level contains more water.

1. Arrange the containers in order.



(a) Begin with the container that has the greatest amount of water.



(b) Begin with the container that has the least amount of water.



(c) Begin with the glass that has the greatest amount of water.



Measuring In Litres

Which container below has more water, A or B?



Think! Is there a more accurate way to tell which container has more water?

Liquids can be measured in litres.





The symbol for litre is ℓ .



Teaching Tips

Point out to the child that using units of measurements such as litre is an accurate way of measuring the volume of liquids. Bring the child to a supermarket and point out labels of volume in litres on some of the items you will find.

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Look at the containers below. Can you tell which container has more water?



The markings on the containers above help us tell the volume of water more accurately.

In Container C, each marking represents 1 litre. The water level is at the 8th marking. So, there are 8 litres of water in this container.

In Container D, each marking also represents 1 litre. The water level is at the 6th marking. So, there are 6 litres of water in this container.

Container C has more water than Container D.



2. Match.



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3. Write the volume.



4. Write the volume.



Finding The Volume

Michael fills up a jug with 2 litres of water. All of the water in the jug fills up 4 large mugs.



Think! How many mugs are needed to hold 6 ℓ of water?





Teaching Tips Remind the child to always keep in mind the relationship between the volumes of the different containers to solve these problems.

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1. Find the volume of water the wooden tub can hold.



2. Find the volume of water a wooden tub can hold.



3. Look at the figures below and answer the questions.



- (a) How many bottles of water are needed to fill up the jug?
- (b) How many jugs of water are needed to fill up the tub?
- (c) How many bottles of water are needed to fill up the tub?

4. Look at the figures below and answer the questions.



- (a) How many bottles of water are needed to fill up 2 jugs?
- (b) How many jugs of water are needed to fill up the tub?
- (c) How many bottles of water are needed to fill up the tub?

5. Look at the figures below and answer the questions.



- (a) How many bottles of water are needed to fill up 2 jugs?
- (b) How many bottles of water are needed to fill up the tub?
- (c) How many jugs of water are needed to fill up the tub?

Word Problems Involving The Four Operations

Look at the amounts of water the two containers below can hold.



Henry wants to fill up the tub with water using the pail. **Think!** How many pails of water does he need to fill up the tub?

Henry fills up the pail with water. He pours all of the water into the tub. **Think!** How much more water does he need to fill up the tub?

Henry fills up the pail and the tub with water. **Think!** What is the total amount of water Henry has?





Teaching Tips

Guide the child to identify the operation to be used to solve the problem by pointing out the key phrases in the problem.

Solve. Show your work.

Example

A tub can hold 32ℓ of water. It can hold 8 times as much water as a pail. How much water can the pail hold?

 $32 \div 8 = 4$

The pail can hold 4 ℓ of water.

 (a) A tub can hold 32 ℓ of water more than a pail. It can also hold 5 times as much water as the pail. How much water can the tub hold?

 (b) A pail and a tub can hold 48 ℓ of water altogether. The tub can hold 28 ℓ more than a pail. How much water can the pail hold? 2. (a) Tank A contains 16 ℓ of water.

Tank B contains 24 ℓ of water more than Tank A. How much water do the tanks contain altogether?

 (b) Tank A contains 24 ℓ of water. Tank B contains 16 ℓ of water more than Tank A. How much water do the tanks contain altogether?

(c) Tank B contains 16 ℓ of water more than Tank A.
 Both tanks contain 24 ℓ of water altogether.
 How much water does Tank A contain?

(d) Tank B contains 3 times as much water as Tank A.
 Both tanks contain 24 ℓ of water altogether.
 How much water does Tank B contain?

 (a) Tank A contains 12 ℓ of water less than Tank B. Tank B contains 15 ℓ of water more than Tank C. Tank C contains 18 ℓ of water. How much water do the 3 tanks contain altogether?

 (b) Tank A contains 12 ℓ of water more than Tank B. Tank B contains 15 ℓ of water less than Tank C. Tank C contains 18 ℓ of water. How much water do the 3 tanks contain altogether?

 (c) Tank A contains 3 times as much water as Tank B. Tank C contains 12 ℓ of water more than Tank A. The 3 tanks contain 47 ℓ of water altogether. How much water does Tank A contain?

Summative Test

Multiple-Choice Questions

Write the number of the correct answer in the brackets.

1. The difference in the amount of water between the 2 beakers is



- (1) 3ℓ
- (3) 8ℓ

(2) 5 ℓ
(4) 13 ℓ

-)
- 2. A jug contains 2 ℓ of water and a pail contains twice as much water. How much water is there in 3 pails and 5 jugs?

(1)	8ℓ	(2)	16 ℓ		
(3)	22 ℓ	(4)	26ℓ	()

- 3. A bowl contains 1 l of water. A flask contains 3 l of water more than the bowl. A basin contains twice as much water as a flask. What is the total amount of water a bowl, a flask and a basin can contain?
 - (1) 8ℓ (2) 10ℓ (3) 13ℓ (4) 16ℓ
 - e

)

4. The picture on the right shows some water in a container. After 2 ℓ of water is poured out of the container, how much water is left in the container?



(1)	2 ℓ	(2)	6ℓ
(3)	8ℓ	(4)	4ℓ

- 5. A pail contains 6 ℓ of water more than a basin. The total amount of water in the pail and the basin is 20 ℓ . How much water is there in the pail?
 - (1) 6ℓ (2) 7ℓ (3) 13ℓ (4) 14ℓ
- 6. Shade to show the right volume for each container.



Fill in the blanks.

7. Calculate the difference in the amount of water between the 2 containers.



)

(

8. The diagrams below show the volume of water that some containers can hold. Calculate the volume of water a wooden tub can hold.



9. How much water should be poured from Beaker B to Beaker A so that they will have the same volume?



10. A pail contains twice as much water as a basin. After 15 ℓ of water is poured out of the pail, the amount of water in the pail is 3 ℓ more than the amount of water in the basin. How much water is there in the pail at first?

Think Out Of The Box!



The total amount of water that 4 bowls can hold is the same as

jugs. The total amount of water that 5 jugs can hold

is the same as _____ bottles.

2. 4 flasks, A, B, C and D, have the same shape and size. Dennis places some balls of the same size into the flasks with different amounts of water as shown.



Arrange the flasks according to the amount of water they have. Start from the flask with the greatest amount of water to the flask with the least amount of water.



3. Container A has twice the amount of water as Container B. Container B has twice the amount of water as Container C. Given that the total amount of water in the 3 containers is 28 ℓ, how much water is there in Container A?



Link For more reading and practice, you may also refer to chapter 17 of My Pals Are Here Maths 2B (3rd Edition).



The Minute Hand

Thinking Platform

Look at the clock.



The short hand tells the hour. It is also called the **hour hand**.

The long hand tells the minute. It is also called the **minute hand**.

The minute hand moves from one marking to the next every minute. It makes one complete round in 60 minutes.

Think! Look at the numbers outside the clock. How are the numbers outside the clock related to the numbers 1 to 12 on the clock? Each number on the clock represents the time in minutes.

1 stands for 5 minutes.
 2 stands for 10 minutes.
 3 stands for 15 minutes.
 4 stands for 20 minutes.

Think! Can you see a pattern?

The numbers follow the multiplication table of 5.

 $1 \times 5 = 5$ $2 \times 5 = 10$ $3 \times 5 = 15$ $4 \times 5 = 20$

Look at the clocks below.







Teaching Tips

In Primary 2, the child is expected to read and write time to 5 minutes. At this point, it is important for the child to understand what the numbers 1 to 12 stand for when the minute hand points at them. Committing the multiplication table of 5 to memory will help the child tell time more easily.

Fill in the blanks.

- When the minute hand points at 6, 6 stands for _____ minutes.
- When the minute hand points at 11, 11 stands for _____ minutes.
- When the minute hand points at 7,
 7 stands for _____ minutes.
- 4. When the minute hand points at 9,9 stands for _____ minutes.
- When the minute hand points at 10, 10 stands for _____ minutes.
- 6. When the minute hand points at 12, 12 stands for _____ minutes.
 - When the minute hand shows 35 minutes, it points at the number _____ on the clock.
 - When the minute hand shows 45 minutes, it points at the number _____ on the clock.
 - When the minute hand shows 50 minutes, it points at the number _____ on the clock.
 - When the minute hand shows 55 minutes, it points at the number _____ on the clock.

Reading And Writing Time To 5 Minutes

Look at these clocks.



Think! If you need to be in bed at 9 o'clock, which clock shows the correct time you should be brushing your teeth?

Write the time shown on each clock in numbers and in words.

Clock A	 		

Clock B	
---------	--



Teaching Tips

Emphasise to the child that when writing time in words, we write it as we say it. When writing time in numbers, we use a dot to separate the hour from the minutes.

The time is 3.40.

Think! Which clock shows the time correctly? Why?



Think! What do you notice about the position of the hour and minute hands at each time shown?



Teaching Tips

Lead the child to see that Clock A does not show 3.40 correctly as the hour hand is not in between 3 and 4. Guide the child to see the position of the hour and minute hands at each time shown from 3.00 to 4.00. Point out to the child that the hour hand only moves from 3 to 4 in one hour, whereas the minute hand makes one complete turn.

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1. Write the time.



2. Tick the clock that shows the time correctly.



(a) 9.25



(b) 4.35


(c) 8.15



(d) 3.55



(e) 5.10



3. Draw the minute hand to show the time.







8.10



2.45



11.20





4. Draw the hour hand to show the time.



3.15



3.45

(d)



6.05





5. Draw the hour hand and the minute hand to show the time.







1.40



7.10



7.50







8.25

Use Of a.m. And p.m.

There are 24 hours in one day. How can we tell the time in a 24-hour day with a 12-hour clock face?

We use a.m. and p.m.

a.m. is short form for **ante meridiem**. We use a.m. to talk about time just after midnight to just before noon. **p.m.** is short form for **post meridiem**. We use p.m. to talk about time just after noon to just before midnight.

Two o'clock in the afternoon can be written as 2 p.m. or 2.00 p.m.

Five o'clock in the morning can be written as 5 a.m. or 5.00 a.m.

Think! What is the time interval between 3 p.m. and 3 a.m.?

If an hour before noon is 11.00 a.m. and an hour after noon is 1.00 p.m., would you write noon as 12 a.m. or 12 p.m.?

If an hour before midnight is 11.00 p.m. and an hour after midnight is 1.00 a.m., would you write midnight as 12 a.m. or 12 p.m.?



Teaching Tips Point out to the child that we never say 12 a.m. or 12 p.m. Instead we only say 12 o'clock or noon or midnight. Write the time. Use **a.m.** and **p.m.**

Example _____ (a) 5 hours after midnight is <u>5.00 a.m.</u> (b) 5 hours before midnight is <u>7.00 p.m.</u> (a) 9 o'clock in the morning is _____. 1. (b) 9 o'clock in the afternoon is _____. (a) 8 o'clock in the morning is _____. 2. (b) 8 o'clock in the evening is _____. (a) 4 hours before noon is _____. 3. (b) 4 hours after noon is _____. (a) 6 hours before midnight is _____. 4. (b) 6 hours after midnight is _____. (a) 2 hours after 1.00 p.m. is _____. 5. (b) 2 hours before 1.00 p.m. is _____. (a) 3 hours after 1.00 a.m. is _____. 6. (b) 3 hours before 1.00 a.m. is _____

Time Taken In Hours And Minutes

Thinking Platform



Jeremy finished his remedial lesson at 3.20 p.m. It lasted for 3 h and 20 min. What time did Jeremy's remedial lesson start?

1 h before 3.20 p.m. is 2.20 p.m. 2 h before 3.20 p.m. is 1.20 p.m. 3 h before 3.20 p.m. is 12.20 p.m.

20 min before 12.20 p.m. is 12 o'clock or noon.

So, Jeremy's remedial lesson started at noon.

Think! What is the difference between these two numbers?

3.20

3 h 20 min



Teaching Tips

In this section, the child learns time duration expressed in hours and minutes. Point out to the child that 'h' stands for hour and 'min' stands for minutes. Guide the child to see that 3.20 states a specific time while 3 h and 20 min states duration.

Write the time.

 (a) Paul reaches home at 2.30 p.m. Then he takes half an hour to have his lunch. What time does he finish his lunch?

(b) Paul reaches home at 2.30 p.m.He leaves his school half an hour before that.What time does he leave his school?



2. (a) A clock shows 4.15 p.m. and is 30 minutes slow. What is the actual time?

(b) A clock shows 4.15 p.m. and is 30 minutes fast. What is the actual time? (a) Victor starts jogging at 5.50 p.m. He jogs for half an hour. What time does he finish jogging?

> (b) Victor finishes jogging at 5.50 p.m. He jogs for half an hour. What time does he start jogging?



 (a) Mary starts watching a show at 11.10 a.m. The show lasts for one hour. What time does the show end?

(b) Mary finishes watching a show at 11.10 a.m. The show lasts for one hour. What time does the show start?

Summative Test

Multiple-Choice Questions

Write the number of the correct answer in the brackets.

1.	Wh (1) (3)	en the minute hand moves ha 10 minutes 30 minutes	lf of (2) (4)	a circle, it is equivalen 20 minutes 60 minutes	t to ()
2.	Whe equ (1)	en the minute hand moves a d vivalent to 5 minutes	quar (2)	ter of a circle, it is 10 minutes		
	(3)	15 minutes	(4)	20 minutes	()
3.	A q (1) (3)	uarter past 9 in the morning is 8.45 a.m. 9.15 a.m.	s wri (2) (4)	tten as 8.45 p.m. 9.15 p.m.	()
4.	Dar	nny went for a half an hour ru	n. He	e started at 9.50 p.m. V	What	
	tim	e did he end his run?				
	(1)	9.20 p.m.	(2)	9.55 p.m.		
	(3)	10.20 a.m.	(4)	10.20 p.m.	()
5.	10 r (1) (3)	minutes to midnight is written 11.50 a.m. 12.10 a.m.	as _ (2) (4)	11.50 p.m. 12.10 p.m.	()

Fill in the blanks.

6. 5 minutes to 7 in the morning is written as _____ a.m./p.m.

7. John reached home at 2.30 p.m. He took half an hour to take his lunch. What time did he finish his lunch?

8. A clock which is showing 2.15 p.m. is half an hour late. What is the actual time?

9. Draw the minute and hour hands on each clock face to show the correct time.



10. Circle the clock that shows the time of 1.20.



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Think Out Of The Box!

 Celine went to watch a movie that was starting at 9.40 p.m. By the time she arrived, she was 10 minutes late. The time on her watch is 20 minutes late. If the movie lasted for 2 hours, what would be the time shown on her watch at the time the movie ended?

2. The clocks below show the time that John started on his English and Maths homework before he took his dinner. Did he spend a longer time doing his English or Maths homework? How much longer?



3. What is the time difference shown between the 2 clocks?





For more reading and practice, you may also refer to chapter 15 of My Pals Are Here Maths 2B (3rd Edition).



Reading And Making Picture Graphs With Scales

Thinking Platform

The picture shows all the fruits Daniel ate in a week.



Answer these questions. How many fruits of each type did Daniel eat? Did he eat more oranges or pears? Which fruits did he eat the same number of?

Think! Is it easy to answer the questions above? Why?



Teaching Tips

Before teaching your child to read and create picture graphs, you must first explain the advantages of presenting information in graphs. Point out that the above picture shows a disorganised set of information making it difficult to gather information from it.

Look at the table below.

It also shows all the fruits Daniel ate in the same week.



Fruits Daniel ate in a week

Think! Go back to the questions on the previous page. Is it easier to answer the questions using the table above? Why?

This is an example of a picture graph.

In this graph, each 🔷 represents 1 fruit.

Think! From the graph, how do you identify the fruit Daniel ate the most? How do you identify the fruit he ate the least? The same number of fruits can also be shown this way.



Fruits Daniel ate in a week

In this picture graph, each 🔷 also represents 1 fruit.

Think! From the graph, how do you identify the fruit Daniel ate the most? How do you identify the fruit he ate the least? The table below shows the number of fruits Kelly ate in a month.

Fruit	Strawberry	Pear	Banana	Apple	Mango	Orange
Number	10	4	6	8	6	6

We can also show the number of each type of fruit using the graphs below. Can you complete the graphs by drawing of for Orange?

Graph A

Fruits Kelly ate in a month

00000000000000	0000	000000	00000000	000000	
Strawberry	Pear	Banana	Apple	Mango	Orange
Each 🗢 stands for 1 fruit.					

Graph B

Fruits Kelly ate in a month

00000	00	000	0000	000			
Strawberry	Strawberry Pear Banana Apple Mango Orange						
Each C stands for 2 fruits.							

Think! How are the graphs similar? How are they different? Why are scales used?



Teaching Tips Point out to the child that we use a scale for larger groups of objects since not all the objects can be represented individually. Explain though that using a scale has its limitations. For example, if a \triangle represents 3 fruits, the same \triangle cannot be used to represent 2 fruits. Within a graph, the same symbols should follow the same scale. same \triangle cannot be used to represent 2 fruits. Within a graph, the same symbols should follow the same scale.

Use the graph to fill in the blanks.

1. The picture graph below shows the number of books a class borrowed from the library.

		AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA			
Monday	Tuesday	Wednesday	Thursday	Friday	
Each Stands for 1 book.					

Books borrowed

- (a) The class borrowed _____ books on Wednesday.
- (b) The class borrowed a total of _____ books on Monday and Thursday.
- (c) The class borrowed the same number of books on

_____ and _____.

- (d) The class borrowed _____ more books on Wednesday than on Thursday.
- (e) The class borrowed _____ books altogether from Monday to Thursday.

2. The picture graph below shows the number of pupils in different classes who wear spectacles.

60 <

Pupils who wear spectacles

- (a) _____ pupils wear spectacles in Class 3A.
- (b) _____ more pupils wear spectacles in Class 3A than in Class 3F.
- (c) There are _____ pupils who wear spectacles in Class 3D and Class 3B altogether.
- (d) Class _____ and Class _____ have the same number of pupils who wear spectacles.
- (e) There are _____ pupils who wear spectacles in Class 3A to Class 3F altogether.

3. The picture graph below shows the number of pupils in a class who have pets.



Pupils who have pets

- (a) There are _____ pupils in the class who have fish.
- (b) There are _____ more pupils who have a dog than pupils who have a rabbit.
- (c) There are _____ fewer pupils who have a cat than pupils who have a rabbit.
- (d) The total number of pupils who have a cat or a hamster is
- (e) If each pupil has only one type of pet, the total number of pupils in the class who have a pet is _____.

4. Some pupils in a class took part in a survey. The picture graph below shows the different means of transport these pupils use to come to school.

00000	000	00000		000		
Walk	Train	Car	Bus	Bicycle		
Each 💓 stands for 3 pupils.						

Means of transport to school

- (a) There are _____ pupils who walk to school.
- (b) There are _____ more pupils who come to school by bus than by bicycle.
- (c) The total number of pupils who come to school by train and car is _____.
- (d) There are _____ fewer pupils who come to school by train than by car.
- (e) _____ pupils in the class took part in the survey.

5. The picture graph shows the number of people inside a restaurant at different times of the day.

8 a.m. to 9 a.m.	9 a.m. to 10 a.m.	10 a.m. to 11 a.m.	11 a.m. to noon	Noon to 1 p.m.	1 p.m. to 2 p.m.	
Each 🚵 stands for 5 people.						

People in a restaurant

- (a) There are _____ people in the restaurant between 9 a.m. and 10 a.m.
- (b) There are _____ people in the restaurant between noon and 2 p.m.
- (c) There are 4 times as many people in the restaurant between noon and 1 p.m. as there are between _____ and
- (d) There are _____ fewer people in the restaurant between 9 a.m. and 10 a.m. than between 11 a.m. and noon.
- (e) There are _____ people in the restaurant altogether from 8 a.m. to 2 p.m.

6. The picture graph shows the number of books placed on each shelf, from A to E.

*****	****	**	*****	*****		
Shelf A	Shelf B	Shelf C	Shelf D	Shelf E		
Each 🧩 stands for 4 books.						

Books on different shelves

(a) There are _____ books on Shelf B.

- (b) There are _____ books on Shelf C and Shelf E altogether.
- (c) There are _____ more books on Shelf E than on Shelf B.
- (d) There are 3 times as many books on Shelf _____ as on Shelf _____.
- (e) There are _____ books on Shelf A to Shelf E altogether.

7. The picture graph below shows the number of different types of fish sold in a shop.

\$\$ \$\$ \$\$ \$\$ \$\$	\$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$			\$\$ \$\$ \$\$ \$\$ \$\$ \$\$ \$\$ \$\$ \$\$ \$\$ \$\$ \$\$ \$\$
Goldfish	Angelfish	Guppy	Clownfish	Swordtail

Types of fish sold in a shop

- (a) If 15 goldfish are sold in the shop, how many fish does each represent? _____
- (b) If 6 more clownfish than angelfish are sold in the shop, complete the graph for the clownfish.
- (c) The same number of ______ and _____ are sold in the shop.
- (d) There are _____ guppies and swordtails sold in the shop.
- (e) There are _____ fish sold in the shop altogether.

8. The table below shows the number of pupils in each class who visit the library in a week.

Class	2A	2B	2C	2D	2E
Number of pupils	8	12	4	8	4

(a) Complete the graph.





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(b) Redraw the graph on the previous page using to stand for 2 pupils.

Class 2A	Class 2B	Class 2C	Class 2D	Class 2E		
Each stands for 2 pupils.						

Pupils who visit the library

(c) Now redraw the graph using to stand for 4 pupils.

Pupils who visit the library

Class 2A	Class 2B	Class 2C	Class 2D	Class 2E		
Each stands for 4 pupils.						

9. The table below shows the number of pupils who attend a dance lesson from Monday to Saturday.

Day	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
Number of pupils	12	18	6	24	18	12

(a) Complete the graph.

Pupils who attend a dance lesson

Monday	Tuesday	Modpooder	Thursday	Friday	Caturday				
monday	wonday luesday wednesday Inursday Friday Safurday								
Each stands for 2 pupils.									

(b) Redraw the graph on the previous page using to stand for 3 pupils.

		~				
		-				
	-		T	E. L	Caturday	
Monday	luesday	Wednesday	Inursday	Friday	Saturday	
Each stands for 3 pupils.						

Pupils who attend a dance lesson



Multiple-Choice Questions

Write the number of the correct answer in the brackets.

Monday	$\overset{\texttt{P}}{\longrightarrow}\overset{\texttt{P}}{\longrightarrow}\overset{\texttt{P}}{\longrightarrow}$
Tuesday	
Wednesday	
Thursday	*
Friday	The second secon
Saturday	$^{\bigstar}$
Each	stands for 5 tomatoes.

Sales of Tomato

1. On which day was the number of tomatoes sold **twice** the number sold on Friday?

	(1) (3)	Monday Thursday	(2) (4)	Wednesday Saturday	()
2.	Hov	w many tomatoes were sold fr	om	Monday to Thursday?		
	(1)	10	(2)	40		
	(3)	50	(4)	60	()
3.	If tl We	here were 25 more tomatoes : dnesday, how many tomatoes	sold s we	on Sunday than on re sold on Sunday?		
	(1)	5	(2)	9		
	(3)	25	(4)	45	()

4. If each now stands for 4 tomatoes, how many tomatoes were sold from Monday to Friday?

(1)	13	(2)	52
(3)	65	(4)	80

()

Fill in the blanks.

The following picture graph shows the number of stickers received by 4 girls.

Siti	Anna	Mavis	Lynette

- 5. _____ earned the most stickers.
- 6. Siti and ______ earned the same number of stickers.
- 7. If Siti has earned 12 stickers, how many stickers did Anna and Lynette have altogether?

8. Siti must earn _____ more stickers to have 4 more stickers than Anna.

9. Colour the correct number of squares in the graph according to the data given below and answer the questions that follow.

10 girls like to wear skirts, 8 girls like jeans, 0 like to wear dresses and 4 like to wear shorts.

Number of girls who like to wear certain type of clothes

Skirts								
Jeans								
Dresses								
Shorts								
Each 🗌 represents 2 girls.								

(a) Most girls like to wear _____

(b) _____ more girls like to wear skirts than dresses.

(c) ______ fewer girls like to wear shorts than jeans.

Think Out Of The Box!

Draw circles to represent the correct number of fish according to the information given below.

James eats 6 fish. John eats 3 more fish than James. Jill eats 2 fish less than John. Jenny eats 4 fish less than Jill.

		×	
Jenny	James	John	Jill

Number of fish eaten

(a) _____ eats the most number of fish.

(b) _____ eats the least number of fish.

- (c) James eats ______ fewer fish than Jill.
- (d) John eats _____ more fish than Jenny.
- (e) They eat _____ fish altogether.





Shapes And Two-Dimensional Figures

Thinking Platform

Look at the pies below.

Pie A is a whole pie. What shape is it?

Pie B is a whole pie cut into 2 equal pieces. What shape is each piece?

Pie C is a whole pie cut into 4 equal pieces. What shape is each piece?



Think! What other things have these shapes?



Teaching Tips

The child learnt the four basic shapes in Primary 1: rectangle, square, circle and triangle. In Primary 2, he learns the semicircle and quarter circle. Teach the child that *semi* means half so a semicircle is one-half of a circle, while a quarter circle is one-fourth of a circle. Have the child identify objects around him which are semicircles or quarter circles.

The picture below shows the floor plan of a flat.



Think! What shapes are used in the floor plan of the flat?



Teaching Tips

Point out to the child that the floor plan is an example of how shapes are used in real life. Guide the child in identifying the shapes in the picture. Lead the child to see that the quarter circles are used to represent the door swing, which tells the extent and direction the door opens.

 Count the shapes that make up each figure. Write the number on the blanks.







(C)



2. Trace the given shapes twice and cut them out. Then use all the cut-outs to form two different figures. Paste the cut-outs in the boxes.




Figure 1	Figure 2
	-
	20 - 90 -





3. Draw lines on each figure to show how it is formed by these given shapes.



4. Each of the figures below is made up of two shapes. Name the shapes.





5. Copy the figures onto the dot grid.

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6. Copy the figures onto the square grid.









Three-Dimensional Figures

Thinking Platform

Look at these shapes.



Think! What objects have these shapes?



Note

Teaching Tips

Help the child name objects that have the same shape as the above figures. Have him describe each figure (for example, how many flat surfaces it has) and compare it with objects around him.

Count the objects that make up each figure. Write the number on the blanks.









3.





Summative Test

Multiple-Choice Questions

Write the number of the correct answer in the brackets.

- 1. Basketballs, marbles and tennis balls are examples of
 - (1) circles
 - (2) spheres
 - (3) cubes
 - (4) triangles

()

2. How many rectangle faces can you find in the following shape?



(1)	1	(2) 2	
(3)	3	(4) 4	()

3. Which of the following is changed, in order to form the pattern below?



4. How many straight lines are there in the figure below?

		0 0				
	(1) (3)	1 3	(2) (4)	2 4	()
5.	A c (1) (3)	ube is made up of s 2 6	quare fo (2) (4)	aces. 3 4	()

Fill in the blanks.

6. Count the number of each shape that makes up the figure on the right.



7. Look at the figure below.



8. Fill in the blank by drawing the next suitable shape.



9. Copy the figure onto the dot grid on the right.

e	0	0	0	0	a	0	0	0	0	0	0	9	¢,
a	0	0	_	-9	-1	0	0	٥	٥	ō	0	9	a
Q	<	0	0	9		ō	0	0	9	ō	ą	0	ð
0	•		0	9		0	9	9	9	0	0	0	Φ
1	•	-	7	8		0	0	0	0	9	0	0	ō
0	>	0	ð	3	ł	0	a	٥	0	0	0	9	0
Ð	ø	0	~	9		0	0	Ø	Θ	Ø	ø	9	9
Q	ø	0	0	9	0	0	0	٥	0	9	0	¢	9

10. Circle the shape that was wrongly drawn in the pattern below.



Think Out Of The Box!

1. How many squares can you find in the following figure?



2. Which rectangle is bigger, A or B?



3. Using only squares and triangles, draw 6 shapes to form a pattern formed by orientation and colour.



Link For more reading and practice, you may also refer to chapter 13 of My Pals Are Here Maths 2B (3rd Edition).

Answers

CHAPTER 8: MONEY

Counting The Amount Of Money In A Given Set (pp. 1-7)

Thinking Platform

- See Notes on p. 1.
- Some combinations to make \$8.50:

1.	1	1	1			5	
2.	1	1	1	1			
3.	1	1	1		2		2
4.	1	1	1	_	1		6
5.		4				5	
6.	_	4		1			
7.		4			2		2
8.		4			1		6
9.	1		3	1			_
10.	1		3	_		5	
11.	1		3		2		2
12.	1		3		1		6
13.			8			5	
14.			8	1			
15.			8		2		2
16.			8		1		6

Attaining Mastery

1.	(a)	\$55.05	(b)	\$5.05
	(c)	\$16.96	(d)	\$96.60
	(e)	\$42.24	(f)	\$24.04
	(g)	\$19.35	(h)	\$39.50
	(i)	\$26.40	(j)	\$46.20
2	(a)	Twenty-seven dollar	and sixty	cents \$27

2. (a) Twenty-seven dollars and sixty cents, \$27.60

- (b) Twenty-six dollars and ninety cents, \$26.90
- (c) Fifteen dollars and fifty cents, \$15.50
- (d) Twenty-eight dollars, \$28.00
- (e) Thirty-six dollars and fifty cents, \$36.50
- (f) Nineteen dollars, \$19.00
- (g) Eighty dollars and fifty-five cents, \$80.55
- (h) Eighty-three dollars and eighty-five cents, \$83.85
- 3. Answers vary.

Amount	\$10	\$5	\$2	SI	50¢	20¢	10¢
(a) \$19.00	1	1	1	2			
	1	1	2				
(b) \$23.00	2		1	1			
	1	2		3			
(c) \$1.90				1	1	1	2
					2	3	3
(d) \$2.30			1			1	1
				2			3

Changing Cents And Dollars (pp. 8-9)

Thinking Platform

• See Notes on p. 8.

Attaining Mastery

1.	(a)	\$0.30	(b)	\$0.28	(c)	\$0.03
	(d)	\$1.03	(e)	\$2.50	(f)	\$3.45
2.	(a)	800¢	(b)	1200¢	(c)	900¢
	(d)	500¢				
3.	(a)	820¢	(b)	65¢	(c)	980¢
	(d)	405¢	(e)	790¢	(f)	530¢
	(g)	726¢	(h)	240¢		

Comparing Amounts Of Money (pp. 10-12)

Thinking Platform

- Mary
- Diana
- See Notes on p. 10.

Attaining Mastery

1. (a) Ashley

Ĺ	Amount	Dollars	Cents]
Debbie	\$25.80	25	80	
Ashley	\$28.50	28	50	

1.1	- K I.	1 mm	٤
<u>nı</u>	- NI	ICO	le
u).		20	1.64

ĺ	Amount	Dollars	Cents
Debbie	\$25.80	25	80
Ashley	\$28.50	28	50
Nicole	\$85.20	85	20
Gladys	\$82.50	82	50

Debbie, Ashley, Gladys, Nicole

2. (a) John

1	Amount	Dollars	Cents
John	\$43.20	43	20
Bobby	\$24.30	24	30

(b) John

· · ·

ſ	Amount	Dollars	Cents
John	\$43.20	43	20
Bobby	\$24.30	24	30
Daniel	\$34.20	34	20
James -	\$32.40	32	40

John, Daniel, James, Bobby

. .

Word Problems Involving Money (pp. 13-19)

Thinking Platform

- All the problems involve the same numbers: 24 and 4.
- The operations involved are different. Problem 1 and Problem 2 involve subtraction and division. Problem 3 involves subtraction, division and multiplication.
- · No, we cannot use the same model to solve these problems.

Attaining Mastery





2. (3) \$82 - \$18 = \$64 \$64 + \$24 = \$88



\$24

Think Out Of The Box!



3. \$45 ÷ \$5 = 9 9 × 3 = 27 chickens Tom must sell 27 chickens.

CHAPTER 9: LENGTH

Measuring And Comparing Lengths (pp. 24-32)

Thinking Platform

- Accept all reasonable answers for the lengths.
- As a hint, show pupils a metre rule.
- (a) 8 (b) 7 (c) A, 1, B
- Yes, it is difficult to tell as the pencils are not aligned.
 (d) 7 (e) 5 (f) C, 2, D
- Yes, it is easier as the pencils are aligned to the zero mark.
- **Attaining Mastery** (c) 6 1 (a) 8 (b) 2 (d) 4 (c) 5 (b) 2 2. (a) 7 (d) 7 (c) 1 (b) 3 3. (a) 2 (d) $4 \times 3 = 12$ $12 \div 2 = 6$ (e) 3 × 3 = 9 $4 \times 2 = 8$ 9 + 8 = 17(b) 8 4. (a) 3 (c) $2 \times 3 = 6$ $3 \times 8 = 24$ 6 + 24 = 30 $30 \div 3 = 10$ (d) $3 \times 8 = 24$ $24 \div 3 = 8$ (c) 1 (b) 4 5. (a) 3 (d) 3 × 4 = 12 $12 \div 3 = 4$ (e) $2 \times 3 = 6$ $2 \times 4 = 8$ 6 + 8 = <u>14</u> (a) 4 (b) 8 6 (c) $3 \times 8 = 24$ $24 \div 4 = 6$ (d) $3 \times 4 = 12$ $3 \times 8 = 24$ 12 + 24 = 36 $36 \div 4 = 9$ 7. (a) Eric (b) Jason, Ben (c) 30 (d) 120 + 150 + 90 + 120 = 480(e) 150 - 90 = 602 3 in 20, 40, 60; 3 8. (a) Mary (b) 30 (c) 30 (d) 90 + 180 + 120 + 150 = 540 (e) 180 - 120 = 60 2 3 n 20, 40, 60; 3 9. (a) 83 + 115 = 198 Their total height is 198 m. (b) 125 + 115 = 240 Their total height is 240 m. (c) 140 - 115 = 25 Building D is 25 m shorter than Building C. (d) 125 - 83 = 42 Building A is 42 m taller than Building B. 10. (a) 159 + 135 = 294 Their total height is 294 m.
 - (b) 113 + 135 = 248 Their total height is 248 m.
 (c) 195 - 113 = 82
 - Tower A is 82 m shorter than Tower D. (d) 159 - 135 = 24
 - Tower B is 24 m taller than Tower C.

Problem Solving Involving Length (pp. 33-36)

Thinking Platform

 The same numbers are used. The length of John's ribbon is the same.
 The number 25 represents different amounts in the three problems.

Attaining Mastery

- 1. (a) 240 + 385 = 625 He travelled 625 m.
 - (b) 385 240 = 145
- He jogged 145 m further. 2. (a) 14 + 8 = 22
 - Jaswant's ribbon was 22 cm long. (b) 14 + 22 = 36
 - The total length of the two ribbons was 36 cm.
- (a) 240 182 = 58 He needed 58 cm more string.
 (b) 182 + 180 = 362
 - The total length of string he had in the end was 362 cm.
- 4. (a) 163 + 45 = 208 Weilong is 208 cm tall.
 (b) 163 + 208 = 371
 - Their total height is 371 cm.
- 5. 8 × 4 = 32
- The total length of wood Mr Tan needed is 32 m.
- 6. 3 × 7 = 21
- The length of tape she needs to seal 7 similar cartons is 21 m. 7. $45 \pm 5 = 9$
- She can make 9 curtains.
- 27 ÷ 9 = 3 She used 3 m of paper for each lantern.

More Addition And Subtraction Of Length (pp. 37-42)

Thinking Platform

- · Solution A is correct.
- I can draw a diagram showing the given distances of 200 m, 110 m and 40 m in the correct directions.

Attaining Mastery

- 200 + 160 = 360 360 - 320 = 40 The distance he walked back was 40 m.
 400 - 160 = 240
- 240 + 80 = 320 She had walked 320 m.
- 240 + 245 = 485 485 - 420 = 65 She walked back 65 m.
- 4. 400 200 120 = 80





Measuring Gaps And Intervals (pp. 43-48)

Thinking Platform

In Problem 1, there are 4 lamp posts and 3 gaps.
 In Problem 2, there are 5 lamp posts and 4 gaps.
 The number of gaps is always 1 less than the number of lamp posts.

Attaining Mastery

- $3 \times 8 = 24$ The distance between the 1st and the 9th tree is 24 m.
- 2. $20 \div 4 = 5$ $5 \times 8 = 40$ The distance between the 1st and the 9th tree is 40 m.
- 3. $4 \times 9 = 36$ The distance between the 1st and the 10th tree is 36 m.
- 4. $12 \div 4 = 3$ $3 \times 7 = 21$ The distance between the 1st and the 8th tree is 21 m.
- 3 × 9 = 27 The distance between the 1st and the 10th lamp post is 27 m.

- 6. 25 ÷ 5 = 5 5 × 9 = 45 The distance between the 1st and the 10th lamp post is 45 m.
 7. 40 ÷ 4 = 10
 - $10 \times 9 = 90$
 - The 1st and last pupils are 90 m apart.
- 8. 40 ÷ 4 = 10 10 × 9 = 90
 - The 1st and last pupils are 90 m apart.

Summative Test

- (4) 1 piece: 48 cm ÷ 6 = 8 cm 2 pieces: 8 cm × 2 = 16 cm
- 2. (4) 4 cars = 6 x 4 = 24 m 5 buses = 11 x 5 = 55 m 24 + 55 = 79 m
- (3) 2 pieces → 30 cm
 1 piece → 15 cm
- 7 pieces \rightarrow 7 x 15 cm = 105 cm 4. (3) 19 x 5 cm = 95 cm
- 5. (2) 129 cm 42 cm = 87 cm 87 cm ÷ 3 = 29 cm
- 109 m × 3 = 327 m Leonard covered a distance of 327 m.
- 350 m 125 m 18 m = 207 m 207 m ÷ 3 = 69 m Each of the 3 smaller pieces is 69 m long.
- Each of the 3 smaller pieces is 69 m long 8. 410 cm \div 4 cm = <u>102</u> remainder 2
- He can get 102 pieces of 4-cm wood. 9. Bryan → 140 cm
- Gabriel → 140 cm 45 cm = 95 cm Total → 140 cm + 95 cm = 235 cm Their total height is 235 cm.
- Shaun → 162 cm
 Wesley → 162 cm 20 cm = 142 cm
 Nathaniel → 142 cm + 18 cm = 160 cm
 Total → 162 cm + 142 cm + 160 cm = <u>464</u> cm
 Their total height is 464 cm.

Think Out Of The Box!

- 300 cm ÷ 5 (4 cuts) = 60 cm
 300 cm ÷ 6 (5 cuts) = 50 cm
 60 cm 50 cm = 10 cm
 Each stick would be 10 cm shorter.
- 2. 2 poles + 4 rods → 78 cm 4 poles + 2 rods → 84 cm 6 poles + 6 rods → 78 + 84 = 162 cm 1 pole + 1 rod → 162 ÷ 6 = 27 cm 4 poles + 4 rods → 27 × 4 = 108 cm 2 poles → 108 - 78 = 30 cm 1 pole → 30 ÷ 2 = 15 cm
 - 1 pole is 15 cm long.

3.

CHAPTER 10: MASS

Measuring Mass (pp. 53-56)

Thinking Platform

Egg B is heavier. The scales on the weighing machines are different.

The value represented by each small interval depends on the number of gaps between each numbered interval.

Attaining Mastery

1.	340 g	2.	180 g	3.	170 g
4.	120 g	5.	260 g	6.	380 g
7.	40 a	8.	180 g		

Comparing Mass (pp. 57-66)

Thinking Platform

- Box B is heavier.
- Box B is heavier than Box A. Box C is heavier than Box B. So, Box C is the heaviest.

Attaining Mastery

1.	(a)	less than	(b)	more than
	(c)	С	(d)	A
	(e)	A	(f)	С
2.	(a)	Bag A	(b)	heavier
	(c)	heavier		
3.	(a)	В	(b)	С
	(c)	С		
4.	(a)	heavier	(b)	heavier
	(c)	lighter	(d)	Box A
	(e)	Box C		
5.	75			
6.	90			
7.	(a)	60	(b)	180
	(c)	25	(d)	75
8.	20	÷ 2 = 10		
	He	r sister's mass is 10 k	g.	
9.	27	÷ 3 = 9		
	9>	c 2 = 18		
	Cir	ndy's mass is 18 kg.		
10.	12	× 2 = 24		
	Cir	ndy's mass is 24 kg.		
11.	50	0 + 500 + 300 = 130	0	
	The	e total mass of the p	apaya and v	watermelon is 1300 g.
12.	50	0 + 500 + 500 + 500	= 2000	
	Th	e total mass of the p	apaya and s	watermelon is 2000 g.
13.	14	- 2 = 12		

- $12 \div 2 = 6$
- 6 + 2 = 8
- The mass of the box of watermelons is 8 kg.
- 14. 220 + 220 + 50 = 490 Their total mass is 490 g.
- 15. 150 + 150 + 150 + 150 = 600 Their total mass is 600 g.
- 16. $20 \div 2 = 10$ 4 x 10 = 40 Their total mass is 40 g.
- 17. Box B is the heaviest. Box C is the lightest.
- 18. Matthew, Darren, Owen, Pat

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Think Out Of The Box!

1. Victor \rightarrow 38 kg Father \rightarrow 38 kg \times 3 = 114 kg Difference \rightarrow 114 kg - 38 kg = 76 kg Victor is 76 kg lighter than his father.

2.	Orange	27	0 g
	Pear	120 g	
	Mango	120 g	120 g

270 g - 120 g - 120 g = 30 g Mango \rightarrow 30 g + 120 g + 30 g + 120 g = 300 g The mango weighs 300 g.

 Box + 5 pencils → 470 g Box + 5 pens → 820 g 5 pens → 110 g × 5 → 550 g Box → 820 g - 550 g = 270 g 5 pencils → 470 g - 270 g = 200 g 1 pencil → 200 g ÷ 5 = 40 g A pencil weighs 40 g.

CHAPTER 11: VOLUME

Comparing Volume (pp. 71-74)

Thinking Platform

- We are not able to tell which container has more as A and B have different shapes and sizes.
- Not able to tell
- Container D
- Container F
- C and D, E and F. Containers C and D have the same shape and size. So do Containers E and F.

Attaining Mastery

1.	(a)	D, E, F	(b)	Z, Y, X
	(c)	D, B, A, C, E		

Measuring In Litres (pp. 75-79)

Thinking Platform

- We are not able to tell which container has more as A and B are of different sizes.
- We can use a container marked in litres to measure the volume of water in Containers A and B.

Attaining Mastery





Finding The Volume (pp. 80-84)

Thinking Platform

12 mugs

Attaining Mastery

1.	4 bottles can hold 2 l of water.	
	12 bottles can hold 2 $\ell \times 3 = 6 \ell$ of water.	
	The tub can hold 12 bottles of water.	
	Thus, the tub can hold 6 ℓ of water.	
2.	3 bottles can hold 5 ℓ of water.	
	6 bottles can hold 5 $\ell \times 2 = 10 \ell$ of water.	
	2 tubs can hold 12 bottles of water.	
	1 tub can hold 12 \div 2 = 6 bottles of water.	
	Thus, one tub can hold 10 ℓ of water.	
3	(a) 4 (b) 5	(c

3.	(a)	4	(b)	5	(c)	20
4.	(a)	8	(b)	3	(c)	12
5.	(a)	6	(b)	30	(c)	10

Word Problems Involving The Four Operations (pp. 85–88)

Thinking Platform

- 9; use division
- 32 ℓ; use subtraction
- 40 ℓ; use addition

Attaining Mastery







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The difference between the amount of water in the 2 containers is 21 $\ell.$

15 ℓ 1

8. $\bigcirc \rightarrow 6 \ \ell \div 3 = 2 \ \ell$

 $22 \ell - 2 \ell = 20 \ell$ $20 \ell \div 2 = 10 \ell$

A wooden tub can hold 10 ℓ of water.

9. $14 \ell + 2 \ell = 16 \ell$

10.

16 ℓ ÷ 2 = 8 ℓ

14 ℓ – 8 ℓ = 6 ℓ 6 ℓ of water should be poured from Beaker B to Beaker A.

Pail 3 ℓ

 $15 \ \ell + 3 \ \ell = 18 \ \ell$ $18 \times 2 = 36 \ \ell$

There is 36 ℓ of water in the pail at first.

Think Out Of The Box!

1. 4 bowls \rightarrow 3 × 4 = 12 glasses 12 ÷ 4 glasses \rightarrow 3 jugs 5 jugs \rightarrow 5 × 4 = 20 glasses 20 ÷ 5 = 4 bottles <u>3</u>; <u>4</u>

2. Flask D, Flask B, Flask C, Flask A greatest least



CHAPTER 12: TIME

The Minute Hand (pp. 94-96)

Thinking Platform

- See answer on p. 95.
- See answer on p. 95.
- In Clock A, the minute hand is pointing at 5. In Clock B, the minute hand is pointing at 8.

Attaining Mastery

1.	30	2.	55	3.	35
4.	45	5.	50	6.	60
7.	7	8.	9	9.	10
10.	11				

Reading And Writing Time To 5 Minutes (pp. 97-104)

Thinking Platform

• A

- Clock A 8.50, eight fifty
- Clock B 9.10, nine ten
- B, because the hour hand is between 3 and 4.
- The hour hand moves in between 3 and 4 from 3.00 to 4.00. The minute hand makes a complete round from 3.00 to 4.00.

Attaining Mastery







Use Of a.m. And p.m. (pp. 105-106)

Thinking Platform

- 12 hours
- See Notes on p. 105.
- See Notes on p. 105.

Attaining Mastery

1.	(a)	9.00 a.m.	(b)	9.00 p.m.
2.	(a)	8.00 a.m.	(b)	8.00 p.m.
3.	(a)	8.00 a.m.	(b)	4.00 p.m.
4.	(a)	6.00 p.m.	(b)	6.00 a.m.
5.	(a)	3.00 p.m.	(b)	11.00 a.m.
6.	(a)	4.00 a.m.	(b)	10.00 p.m.

Time Taken In Hours And Minutes (pp. 107-109)

Thinking Platform

See Notes on p. 107.

Attaining Mastery

1.	(a)	3.00 p.m.	(b)	2.00 p.m.
2.	(a)	4.45 p.m.	(b)	3.45 p.m.
3.	(a)	6.20 p.m.	(b)	5.20 p.m.
4	(a)	12.10 p.m.	(b)	10.10 a.m.

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Time difference is 1 hour, 45 minutes.

CHAPTER 13: GRAPHS

Reading And Making Picture Graphs With Scales (pp. 113–127)

Thinking Platform

- No, it is not easy to count each type of fruit as the fruits are not arranged in an organised manner.
- It is easier to gather information from the table as it is organised.
- We can identify the fruit Daniel ate the most by the tallest column.
 We can identify the fruit Daniel ate the least by the shortest column.
- We can identify the fruit Daniel ate the most by the longest row.
 We can identify the fruit Daniel ate the least by the shortest row.
- For Graph A, 6 should be drawn for Orange.
 For Graph B, 3 should be drawn for Orange.
- Both graphs represent the same set of information.
- · Each graph uses a different scale to represent the information.
- See Notes on p. 116.

Attaining Mastery

1	(a)	7	(b)	9	(c)	Tuesday: Friday
24	(d)	4	(e)	18	141	recoudy, mady
2.	(a)	7	(b)	5	(c)	11
	(d)	3B; 3E	(e)	28		
3.	(a)	14	(b)	2	(c)	2
	(d)	20	(e)	56		
4.	(a)	12	(b)	9	(c)	24
	(d)	6	(e)	63		
5.	(a)	25	(b)	55	(c)	10 a.m.; 11 a.m.
	(d)	10	(e)	155		
6.	(a)	16	(b)	36	(c)	12
	(d)	A: C	(e)	96		

7. (a) 3 (b)

Types of fish sold in a shop

*****	\$\$ \$\$ \$\$	*****	***	****
100		AA	1	
Goldfish	Angelfish	Guppy	Clownfish	Swordtai





Summative Test

- 1. (4) $5 \times 3 = 15$ tomatoes $5 \times 6 = 30$ tomatoes
 - 30 tomatoes were sold on Saturday.
- 2. (3) 15 + 10 + 20 + 5 = 50 tomatoes
- 3. (4) 20 + 25 = 45
- 4. (2) 12 + 8 + 16 + 4 + 12 = 52
- 5. Mavis
- 6. Lynette
 7. 12 ÷ 3 = 4

```
Each () stands for 4 stickers.
```

```
Anna \rightarrow 4 × 4 = 16
Lynette \rightarrow 3 × 4 = 12
16 + 12 = 28 stickers
```

Anna and Lynette received 28 stickers altogether.

8. Siti → 12 stickers

9

- Anna → 16 stickers
- 16 + 4 = 2020 - 12 = 8 stickers
- 20 12 <u>0</u> SIICKEIS
- Number of girls who like to wear certain type of clothes



Think Out Of The Box!



Number of fish eaten



CHAPTER 14: SHAPES AND PATTERNS

Shapes And Two-Dimensional Figures (pp. 132-143)

Thinking Platform

- A circle; B semicircle; C quarter circle
- Circle wheel, gauge, coin, Singapore flyer
- Semicircle protractor
- Quarter circle a quarter of a cake
- See Notes on p. 133; semicircles, circles, quarter circles, rectangles, squares, triangles.

Attaining Mastery

- 1. (a) 8 rectangles, 1 triangle, 6 circles, 3 semicircles, 2 quarter circles
 - (b) 7 rectangles, 1 triangle, 5 circles, 4 semicircles, 1 quarter circle
 - (c) 11 rectangles, 4 triangles, 8 circles, 5 semicircles, 2 quarter circles
- Accept any possible answers that make use of all the shapes given.
 - Figure 1 and Figure 2 should be significantly different.









- 4. (a) triangle; circle (b) rectangle; square (c) semicircle; triangle (d) quarter circle; rectangle
- 5. Ensure that the figures are copied onto the dot grid accurately.
- 6. Ensure that the figures are copied onto the square grid accurately.

Three-Dimensional Figures (pp. 144-146)

Thinking Platform

- Cube die, ice cube
- Cuboid domino, shoe box
- Cone ice cream cone, traffic cone, party hat
- Cylinder bottle, mug

Attaining Mastery

- 1. 4 cubes, 1 cuboid, 3 cones, 3 cylinders
- 2. 2 cubes, 2 cuboids, 3 cones, 6 cylinders
- 3. 5 cubes, 1 cuboid, 2 cones, 3 cylinders

Summative Test

- 1. (2)
- 4. (4)
- 6. 7 squares; 8 circles; 1 triangle; 0 rectangle

2. (3)

5. (3)

3. (2)

- 7. 1; 4
- 8.
- 9. Ensure that the figure is copied onto the dot grid accurately.



Think Out Of The Box!



Accept any possible answers that make use of only squares and triangles that form a pattern by orientation and colour.

VISIBLE THINKING IN MATHEMATICS challenges the child to contemplate and comprehend mathematical concepts. In this series:

- Thinking Platform provides an avenue for reflection on the reasoning behind the concepts and skills, and underscores the importance of the thinking involved in problem solving. Emphasis on thinking is extended to the answers through detailed solutions.
- Notes present opportunities for parents and teachers to clarify misconceptions, simplify a concept
 or provide support in areas of difficulty for the child. Teaching tips and textbook links enhance and
 supplement learning.
- Attaining Mastery provides parallel questions that highlight differences between similar problems
 and allow the child to focus on the correct application of concepts and strategies.
 - (a) There were 265 adults and 120 children at a funfair. How many people were there altogether? (Answer: 265 + 120 = 385 people)
 - (b) There were 265 adults and 120 more children than adults at a funfair. How many people were there altogether? (Answer: 265 + 265 + 120 = 650 people)
 - (c) There were 265 adults and 120 fewer children than adults at a funfair. How many people were there altogether? (*Answer: 265 120 = 145 children; 265 + 145 = 410 people*)
- Summative Test consolidates learning for every chapter.
- Think Out Of The Box! includes challenging word problems to stretch the child's application of concepts learnt.

About the Author

Ammiel Wan is a familiar name among teachers and parents in Singapore. He has spearheaded a team in redesigning the thinking curriculum with the belief that 'Every child can think'. Ammiel has presented at international conferences, including the 'International Conference on Thinking' where his paper on 'Thinking through the Conceptual Approach' was selected for publication in an international journal. He has received accolades such as the 'Fellow of Teachers' Network' and has been featured in local papers for his innovative approach in teaching mathematics. Being a strong advocate of teaching and continuous learning, he conducts regular workshops for teachers, parents and pupils in Singapore.



