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**HAWKER BROWNLOW**  
**E D U C A T I O N**

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## ★ TO THE TEACHER ★

One of the most important aspects of teaching Mathematics is communication. Writing, speaking, explaining or drawing can help your students internalise what they have learned and clarify their own thinking. Communication can also act as a powerful tool for you to assess the thinking of your students.

Your students should be encouraged to use strategies that foster communication. We have incorporated the following strategies for your students in ***Maths the Write Way***.

- ★ Write your own problems
- ★ Communicate orally
- ★ Identify key words and explain their importance
- ★ Create your own game, puzzle, picture, poem or rap
- ★ Summarise your work
- ★ Investigate to find other ways to solve a problem
- ★ Make predictions and draw conclusions
- ★ Work with a group to share ideas and solve problems

***Maths the Write Way*** contains seven lessons. Each lesson includes four Investigations and two Extensions to the Investigations. Hints are included to provide clues to the solutions. Each lesson also has four Assessments, two with open-ended responses and two with a multiple-choice format. Vocabulary activities, following Lesson 3 and Lesson 7, emphasise the importance of mathematical language. Finally, two mini reviews and a Final Review will help you assess the work of your students.

In ***Maths the Write Way***, we have provided a forum for you to instruct as well as assess. We encourage students to look for a variety of ways to solve problems. The process—not just the solution—must be emphasised. Working and sharing ideas in cooperative groups will enhance understanding and communication.

The Teacher Guide includes:

- ★ Listing of lesson objectives and necessary materials
- ★ Key vocabulary and concepts for the lesson
- ★ Suggestions for discussing key mathematical concepts
- ★ Sample solutions to all Investigations, Extensions and Assessments
- ★ Suggested strategies for solving problems
- ★ Reproducible pages for use with selected activities

We are sure you will find ***Maths the Write Way*** a valuable resource for supplementing and enhancing your mathematics instructional program.

Brian E. Enright  
Robert Gyles  
Maxine Leonescu  
Fred I. Remer

## Pages 2–5

**Objectives**

- ★ To round numbers to the nearest hundred and to the nearest thousand
- ★ To compare fractions using pictures, numbers and written statements
- ★ To reinforce understanding of basic multiplication and division facts through number-fact families

**Materials**

- ★ map of North and South America and the Caribbean Sea

**Vocabulary**

Before beginning the lesson, you may wish to review the following maths terms: *balance, chart, denominator, round, rule, territories*.

Understanding how to round numbers is an important skill for building number sense. Rounding helps students understand what reasonable estimates of numbers are. Writing rules for rounding will help students clarify their thinking and see that one number can represent an entire set of numbers. Allow students to work in groups so that they can investigate the thinking of others. Using real data can strengthen understanding of the importance of rounding as a way to estimate.

As an introduction for Investigations 1 and 2, you may wish to have students locate the various islands and countries on a map.

In Part B, students are exposed to additional concepts that build number sense. Comparing fractions in concrete and abstract ways leads to the notion that whole objects and numbers can be divided into parts of varying sizes. Basic fact families show how operations with numbers affect the number size.

Answers to Investigations, Extensions and Assessments will vary. Sample solutions are provided.

**Part A**

## Pages 2–3

**Investigation 1**

When rounding any number to the nearest hundred, look at the digit to the right of the hundreds place (tens place). If the digit is 5 or more, round up. The hundreds-place digit becomes one greater and is followed by zeroes in the tens and ones places. If the digit in the tens place is less than 5, round down. The hundreds-place digit stays the same and is followed by zeroes in the tens and ones places. For example:  $578 = 600$  to the nearest hundred, and  $523 = 500$  to the nearest hundred.

**Investigation 2**

When rounding any number to the nearest thousand, look at the digit to the right of the thousands place (hundreds place). If this digit is 5 or more, round up. The thousands-place digit becomes one greater and is followed by zeroes in the hundreds, tens and ones places. If the digit in the hundreds place is less than 5, round down. The thousands-place digit stays the same and is followed by zeroes in the hundreds, tens, and ones places. For example:  $2,643 = 3,000$  to the nearest thousand, and  $5,251 = 5,000$  to the nearest thousand.

**Extension**

The range of numbers that equal 5,400 when rounded to the nearest hundred is 5,350–5,449. First find the lowest number in this range. The lowest number that rounds up to 400 (to the nearest hundred) is 350. So 5,350 is the lowest number that rounds to 5,400. Since 449 is the highest whole number that rounds down to 400 when rounding to the nearest hundred, 5,449 is the greatest number that rounds to 5,400.

**Assessment 1**

D

**Assessment 2**

Mr Taylor's whole number weight could range from 150 to 249 kilos. When rounding to the nearest hundred, 150 is the lowest number that rounds up to 200, and 249 is the greatest number that rounds down to 200.

**Part B**  
**Pages 4–5**

**Investigation 3**

The shaded part of each square gets smaller in each figure moving from left to right. In the fractions, all the numerators are the same, and all the denominators are different. If you compare the denominators and the pictures, you see that the larger the denominator is, the smaller the shaded part of the picture is. Therefore the largest fraction is  $\frac{1}{2}$ , then  $\frac{1}{3}$ ,  $\frac{1}{4}$  and  $\frac{1}{8}$ .

**Investigation 4**

- A.  $7 \times 8 = 56$
- B.  $8 \times 7 = 56$
- C.  $56 \div 7 = 8$
- D.  $56 \div 8 = 7$

In item B, the choices are  $\times$  or  $\div$ . First try  $8 \times 7 = 56$ , which works. Then check by trying  $8 \div 7 = 56$ , which doesn't work. So  $8 \times 7 = 56$  is correct. Do the same for item C. First try  $56 \times 7 = 8$ , which doesn't work. Then try  $56 \div 7 = 8$ , which works. So the correct answer is  $56 \div 7 = 8$ .

**Extension**

- A.  $2 \times 3$  (I found 2 numbers whose product was 6).
- B.  $2 \times 5$  (I found 2 numbers whose product was 10).
- C.  $24 \div 2$  (I found 2 numbers whose quotient was 12).

**Assessment 1**

B

**Assessment 2**

$\frac{1}{10}, \frac{1}{8}, \frac{1}{5}, \frac{1}{3}$

Students might draw a picture for each of the fractions and then compare them. Students might also compare denominators to order the fractions.

**LESSON 2**

*Data Analysis*

**Pages 6–9**

**Objectives**

- ★ To collect and record real data
- ★ To determine reasonable estimates for quantities
- ★ To understand the importance of developing strategies for solving problems
- ★ To select an appropriate graph for presenting a set of data
- ★ To explore the concept of arrangements

**Materials**

- ★ raisins (two different-sized boxes for each group of students)
- ★ Reproducible 1: *Line Graph*
- ★ Reproducible 2: *Arrangements*

**Vocabulary**

Before beginning the lesson, you may wish to review the following maths terms: *arrangement*, *average* (of a group of numbers), *data*, *estimate*, *graph*, *pictograph*, *symbols*.

Adults often take for granted a child's ability to estimate. Estimation skills can be developed by giving students many opportunities to find the most reasonable answer. Students often think of some very clever and sensible methods. When students explain their estimation techniques orally and in writing, the teacher gets a solid idea of their understanding and has a base to build upon.

Interpreting data is crucial as a life skill. Charts, tables and graphs appear in all kinds of print and visual media. Although being able to read information from a chart or a graph is important, understanding the implications of data fosters higher-level thinking skills. Children practice these crucial skills when they make predictions and draw conclusions.

One sure way of having children understand data is by allowing them to gather their own information.

If the data is related to their own lives, the activity becomes meaningful. There are many ways that children can collect data that they find interesting. The following are a few suggestions:

- ★ surveys that deal with preferences (favourite foods, entertainers, sports, pets) or statistics (number of family members, how long it takes to travel to school)
- ★ library research
- ★ electronic research (on-line computer services)
- ★ interviewing

For Investigation 2 and Extension in Part A, distribute copies of Reproducible 1. For Investigation 4, distribute copies of Reproducible 2.

Answers to Investigations, Extensions, and Assessments will vary. Sample solutions are provided.

## Part A

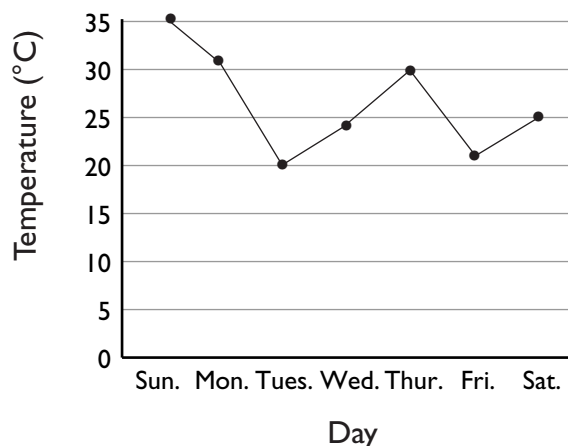
### Pages 6–7

#### Investigation 1

Students may count a handful of raisins and then estimate how many handfuls are in the small box. The estimate for the number of the raisins in the small box can be used to estimate the number of raisins in the large box. Students might estimate how many times greater the large box of raisins is than the small box or how much more the large box weighs.

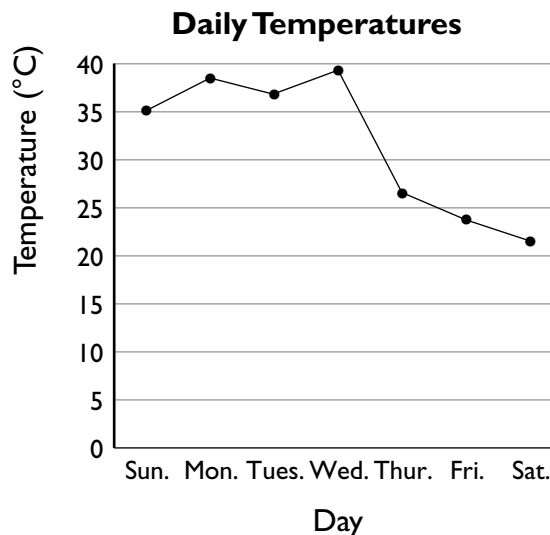
#### Investigation 2

##### Daily High Temperatures



The temperature was the highest at the beginning of the week. The temperature continued to fall through Tuesday. Temperatures rose again from Tuesday through Thursday and then were lower by Friday and rose slightly by Saturday.

#### Extension



Dear Kyle,

The temperature this week dropped from a high of 40°C on Wednesday to a low of 22°C on Saturday. If this trend continues I predict that next week's weather will be cold and dry.

Sincerely,  
Joseph

#### Assessment 1

##### B

#### Assessment 2

The length of the desk is about 60 centimetres. Two books fit along the length of the desk, and there is some extra space. The books are close to 30 centimetres in length, so a reasonable estimate for the length of the desk is about 60 centimetres.

## Part B

### Pages 8–9

#### Investigation 3

The number of books read by Phil (5) is equal to  $\frac{1}{5}$  of the books read by Selena (25) and  $\frac{1}{4}$  of the books read by Chi (20).

If Mona read 12 books and Phil read 8 books, it would be hard to use a key in which one symbol equals 5 books. The numbers 12 and 8 do not divide evenly by 5. The key could be changed to show that one symbol equals 2 books. For the data in Step 1, the 25 books that Selena read could be shown by  $12\frac{1}{2}$  symbols. The number of symbols for the other readers would be 5 for Mona, 10 for Chi, 5 for Lucinda, and  $2\frac{1}{2}$  for Phil.

#### Investigation 4

If one flavour is placed in the first place in the dish, there are two different ways to arrange the other two flavours. If you put each flavour in the first place, there are  $3 \times 2$ , or 6 possible arrangements.

C = chocolate, V = vanilla, S = strawberry

1. C V S
2. C S V
3. V S C
4. V C S
5. S C V
6. S V C

#### Extension

Add the flavour banana (B). If you place one flavour on the first place in the dish, there are 6 possible arrangements:

1. C V S B
2. C V B S
3. C S B V
4. C S V B
5. C B V S
6. C B S V

If a different flavour was placed in the first spot, there should be the same number of arrangements. It is reasonable to estimate that there are  $4 \times 6$ , or 24, possible arrangements.

#### Assessment 1

D

#### Assessment 2

Make an organised list to find all possible two-digit numbers.

Tens	Ones
3	4
3	5
4	3
4	5
5	3
5	4

There are 6 different two-digit numbers using the digits 3, 4, and 5.

## LESSON 3 *Operations*

### Pages 10–13

#### Objectives

- ★ To develop strategies for using mental maths
- ★ To add and subtract with regrouping, using real data
- ★ To write problems demonstrating understanding of addition and subtraction
- ★ To use aspects of the distributive property to reinforce understanding of multiplication
- ★ To investigate division strategies

#### Materials

- ★ counters and cups

#### Vocabulary

Before beginning the lesson, you may wish to review the following maths terms: *combine*, *factor*, *mental maths*, *strategy*.

Developing mental maths strategies can help students improve arithmetic skills and increase confidence. The first investigation explores rounding numbers to multiples of ten. Showing how to make numbers more ‘friendly’ for students will help to increase their ability with mental calculation.