INTRODUCTION

What is the *FOCUS* series?

FOCUS is a mathematics-strategy practice series. Each student book in the series provides brief instruction and concentrated practice for students in one targeted Mathematics Strategy. *FOCUS* also allows students the opportunity for self-assessment of their performance. It allows teachers the opportunity to identify and assess a student's level of mastery.

Six Mathematics Strategies featured in the *FOCUS* series:

- Building Number Sense
- Using Estimation
- Using Algebra
- Using Geometry
- Determining Probability and Averages
- Interpreting Graphs and Charts

The *FOCUS* series spans eight year levels, from year one to year eight. The introductory passages in each lesson are written at or below year level, allowing students to focus on the mathematics without struggling with the reading.

Book	Reading Level
Book A	at or below year one readability
Book B	at or below year two readability
Book C	at or below year three readability
Book D	at or below year four readability
Book E	at or below year five readability
Book F	at or below year six readability
Book G	at or below year seven readability
Book H	at or below year eight readability

What is Building Number Sense, the Mathematics Strategy featured in this *FOCUS* book?

Number sense is an understanding of numbers and the relationships between them. As students build number sense, they become familiar with a variety of representations for whole numbers and parts of whole numbers.

Students learn to express numbers in a variety of forms. Three common ways to express numbers are in standard form, in word form and in expanded form. Students in the upper years learn to use exponents, in addition to the other common forms, to express numbers.

Students in years one to three develop counting skills and become familiar with ordinal numbers. They practise counting to identify numbers that come before or after another number. They also learn to use ordinal numbers to identify an item's position in a row or a list.

Students in years four to eight learn several ways to represent the parts of a whole. Students in year four are introduced to fractions. They learn to understand the parts of a fraction and to recognise the quantity represented by a fraction. Students in the upper years examine the relationship between fractions, decimals and percentages. They also learn to perform mathematical operations with fractions and decimals.

Students in year eight are introduced to prime and composite numbers, and they learn to determine a number's prime factorisation. They also practise following the order of operations when solving problems with parentheses, exponents or square roots.

How should I use the *FOCUS* series in the classroom?

The *FOCUS* series can be used effectively in the classroom in several ways. Here is a suggestion for using the program in **whole class, large group, small group, paired** and **individual formats.**

To the Student
(inside front cover of the student book)

Read and discuss this with the whole class or large group to make sure students understand what they are to do in the book.

Learn About
(pages 2–3 of the student book)

Read the two pages of instruction in the Mathematics Strategy to the whole class or large group. Model using the Mathematics Strategy. Use information from the Mathematics Strategy Tips for the Teacher on pages 12–13 of this teacher guide to prompt additional in-depth discussion of the Mathematics Strategy, as appropriate. Make sure all students understand the features of the Mathematics Strategy and how to apply the Mathematics Strategy before they go on. The Learn About requires approximately 45 minutes.

Lesson Preview
(pages 4–5 of the student book)

Read the boxed directions to the whole class or large group. Emphasise what students should watch for as they read the problem. Have students read the problem individually. Guide the whole class or large group in answering the two selected-response questions. Then discuss why each answer choice is correct or not correct. Make sure all students understand how to answer the Mathematics Strategy questions before they go on. The Lesson Preview requires approximately 45 minutes.

Lessons
(pages 6–45 of the student book)

For each lesson, have students read the directions and the passage individually, in pairs or in small groups. Have students answer the selected-response questions and the constructed-response question individually, in pairs or in small groups.

Have students use the Tracking Chart on page 47 of the student book to note the date that they have finished each lesson. When the questions in all five lessons in a group have been corrected, have students note the number of correct responses for each lesson and then the number of correct responses for the whole group of lessons.

Each lesson, plus tracking, requires approximately 45 minutes. Allow students 30 minutes to read the passage and answer the questions, and allow 15 minutes to discuss the responses. Discuss the answers to the questions with the whole class or large group, or with pairs, small groups or individuals. (See **What is the correction procedure?** on page 4 of this teacher guide.)

Self-Assessment: When students have finished each group of five lessons, have them complete the appropriate Self-Assessment. When students have finished all twenty lessons, have them complete Self-Assessment 5. Each Self-Assessment requires approximately 20 minutes.

Discussion: When students have finished each group of five lessons, discuss their performance individually or in small groups. When students have finished all twenty lessons, discuss their performance individually or in small groups. Each discussion requires approximately 25 minutes.

Learn About
Using Algebra: Number Sentences

A **number sentence** has numbers and symbols. It has a $+$, $-$, $\times$ or $\div$ sign and an $=$, $<$ or $>$. Example: $6 + 5 = 11$

Some number sentences have a missing number. A box or letter can stand for the missing number. Example: $6 + n = 11$

You can use addition or subtraction to find the missing number.

$$6 + 5 = 11 \quad \text{OR} \quad 11 - 5 = 6$$

You can write a number sentence to solve a problem. Read the problem. Then read how to solve the problem.

Joe is reading a book that has 80 pages. Joe has read 48 pages. How many more pages does Joey have left to read?

Question:	Answer:
What numbers do you know?	I know there are 80 pages. I know that 48 pages have been read.
What number do you need to find?	I need to find the number of pages remaining.
What operation should you use?	I can use addition or subtraction.
Use the numbers in the problem to write a number sentence. Use a letter for the number you need to find.	$48 + p = 80$ OR $80 - p = 48$
Find the number that replaces the letter.	$48 + 32 = 80$ and $80 - 32 = 48$ So, $p = 32$.

Remember:

A **number sentence** is a sentence with numbers and symbols. It has a $+$, $-$, $\times$ or $\div$ sign and an $=$, $<$ or $>$. Some number sentences have a missing number. A box or letter can stand for the missing number.

Have students use the numbers 1 to 20 to review counting in order from least to greatest. State a number, and ask students to count forward the next few numbers. Then ask volunteers to identify the number that comes just before and just after the stated number. After the review, have students practise counting with three- and four-digit numbers.

Write the numbers 1 to 20 on cards, and place the cards in a box. Have a student pick two cards without looking into the box. Then have the student count from the lower to the higher number that he or she picked. Repeat the activity several times, and then use greater numbers according to students' ability levels. Select a range of about 20 two- or three-digit numbers, such as 521 to 540.

Write the ordinal words *first* to *tenth* on separate index cards. Mix up the cards, and assign one card to each of ten students. Have the students organise themselves in order and hold up their cards for others to read. Then ask the class to read the ordinal words aloud, noting whether the group has placed themselves in the correct order. Continue with other groups of students, increasing the number of ordinal words used according to the abilities of the students.

A calendar can be used to reinforce students' understanding of ordinal numbers. Ask students to point out specific days on the calendar, such as *the first Friday, the fourth Thursday* or *the second Monday.*

Draw students' attention to the number chart in the middle of the Learn About page. Write a numeral on the board, and ask students to say the number word and ordinal number that correspond to that numeral. Then make three sets of cards to show the numerals 1 to 10, the word form of the numbers one to ten, and the ordinal numbers *first* to *tenth*. Have students work together to match each numeral with its word form and corresponding ordinal number.

RESEARCH SUMMARY

The following is a summary of the research upon which the *FOCUS on Mathematics* series is based.

Overview

The *FOCUS on Mathematics* series is a targeted maths-strategy practice program geared towards both on-level and off-level maths students. The research summary is based on a literature review of academic monographs, journals and reports by content-area researchers and education experts.

The summary covers the following topics in support of the series *FOCUS on Mathematics*:
- Introduction to the Series
- What Is the Need for *FOCUS on Mathematics*?
- How Is *FOCUS on Mathematics* Supported by Research?
- How Does Research Support the Assessments Found in *FOCUS on Mathematics*?
- Quick-Reference Chart: From Research to Application: Strategies
  and Features in *FOCUS on Mathematics*

Introduction to the Series

FOCUS on Mathematics is a series designed for on-level and struggling maths students who need repeated practice. *FOCUS on Mathematics* centres on brief instruction and concentrated practice with targeted maths concepts and strategies in the context of word problems.

The *FOCUS on Mathematics* series covers:

Building Number Sense	Using Geometry
Using Estimation	Determining Probability and Averages
Using Algebra	Interpreting Graphs and Charts

What Is the Need for *FOCUS on Mathematics*?

There is a current drive in mathematics education to meet 21st-century skills so that today's students will be competitive in tomorrow's workforce. Several expert panels and mathematical organisations have sounded the alarm bell for improving students' mathematical understanding (e.g. NCTM, 2006; NMAP, 2008), as recent tests also show that students' mathematical progress is slowing (e.g. NCES, 2007).

In answer to these concerns about students' lacklustre mathematical performance, maths experts and researchers have joined forces to combat the slowing of mathematics progress.

The release of several major reports has named algebra as a "gateway to higher mathematics", which then leads to greater successes in both the academic and working lives of students (NCTM, 2006; NMAP, 2008). In response to this joint effort, these experts have also laid a pathway for students to follow in order to develop the mathematical skills and knowledge to master algebra. The *FOCUS on Mathematics* series may be an effective tool to help students along this pathway of proficiency to algebra.

The *FOCUS on Mathematics* series provides students with explicit instruction of key mathematical concepts and strategies combined with targeted practice in the context of word problems.

ANSWER KEY

FOCUS on Building Number Sense, Book C

Lesson 1 *(page 6)*

1. B   2. C   3. D   4. C

5. Solution: The number 2435 written in expanded form is 2000 + 400 + 30 + 5.

Sample Explanation: *First, I multiplied each digit by its corresponding place value.*

$$2 \times 1000 = 2000$$
$$4 \times 100 = 400$$
$$3 \times 10 = 30$$
$$5 \times 1 = 5$$

Then I wrote 2435 in expanded form.

$$2000 + 400 + 30 + 5$$

Lesson 2 *(page 8)*

1. C   2. B   3. D   4. A

5. Solution: The number 67 written in expanded form is 60 + 7.

Sample Explanation: *First, I multiplied each digit by its corresponding place value.*

$$6 \times 10 = 60$$
$$7 \times 1 = 7$$

Then I wrote 67 in expanded form.

$$60 + 7$$

Lesson 3 *(page 10)*

1. B   2. C   3. A   4. C

5. Solution: The number that comes just after three hundred and fifty-three and just before three hundred and fifty-five is three hundred and fifty-four.

Sample Explanation: *I counted on from 353 to 355.*

Lesson 4 *(page 12)*

1. A   2. B   3. D   4. D

5. Solution: The number 253 written in expanded form is 200 + 50 + 3.

Sample Explanation: *First, I multiplied each digit by its corresponding place value.*

$$2 \times 100 = 200$$
$$5 \times 10 = 50$$
$$3 \times 1 = 3$$

Then I wrote 253 in expanded form.

$$200 + 50 + 3$$

Lesson 5 *(page 14)*

1. D   2. D   3. B   4. C

5. Solution: The number 37 comes just after 36 and just before 38.

Sample Explanation: *I counted on from 36 to 38.*

Lesson 6 *(page 16)*

1. B   2. B   3. B   4. D

5. Solution: The number 1324 written in expanded form is 1000 + 300 + 20 + 4.

Sample Explanation: *First, I multiplied each digit by its corresponding place value.*

$$1 \times 1000 = 1000$$
$$3 \times 100 = 300$$
$$2 \times 10 = 20$$
$$4 \times 1 = 4$$

Then I wrote 1324 in expanded form.

$$1000 + 300 + 20 + 4$$

Lesson 7 *(page 18)*

1. C   2. C   3. B   4. B

5. Solution: The number 300 is an even number.

Sample Explanation: *The digit in the ones place is 0. Therefore, the number 300 is even.*