

# 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 Interpreting Graphs and Charts, the Mathematics Strategy featured in this *FOCUS* book?

Graphs and charts are used to organise and represent information. There are various types of graphs and charts. Each type is uniquely suited to represent a specific form of information. Students learn to read and interpret increasingly complex types of charts and graphs as they progress through the year levels.

Some graphs and charts are used to represent and compare amounts. Pictographs, which appear primarily in the early years, use pictures and symbols to represent amounts. Bar graphs use bars and numbers to represent amounts, and charts use words and numbers. Circle graphs show how the individual amounts in a group relate to the whole.

Graphs can be used to identify the location of places or items. Coordinate grids have a horizontal  $x$ -axis and a vertical  $y$ -axis. Numbers on the axes, called coordinates, are used to identify locations on coordinate grids. Maps represent locations and distances. Many maps include a scale, which shows how the distances on a map relate to actual distances.

Graphs can represent changes in amounts over time. Line graphs are commonly used for this purpose. Lines connect the points on a line graph. The lines represent change over time. In the later years, coordinate grids are used to show change over time. These are similar to line graphs, but the points are not connected with a line.

Students learn to interpret and apply the information displayed in graphs and charts. They answer questions that assess their ability to understand and analyse the information.

## What is in each student book?

There are 48 student books in the *FOCUS* series. There is one student book for each of the six Mathematics Strategies, at each of the eight mathematics levels. Each student book contains:

- *To the Student*  
This introduces the program and should be read and discussed with students to make sure they understand what they are to do in the book.
- *Table of Contents*
- *Learn About (Modelled Practice)*  
These two pages provide basic instruction and modelling in the understanding and application of the Mathematics Strategy. The Learn About should be read and discussed with students to make sure they understand the Mathematics Strategy. Additional tips for helping students understand and use the Mathematics Strategy are included in the Mathematics Strategy Tips for the Teacher on pages 12–13 of this teacher guide.
- *Lesson Preview (Guided Practice)*  
These two pages include a sample problem and two selected-response questions with explanations of why each of the eight answer choices is correct or not correct. The Lesson Preview should be read, worked through and discussed with students to make sure they understand how to answer strategy-based questions.
- *20 Lessons (Independent Practice)*  
Each two-page lesson contains one passage, four strategy-based selected-response questions and one strategy-based constructed-response writing question.

**Selected-response questions:** In each lesson, students apply the Mathematics Strategy and then choose the correct answers for four selected-response (multiple-choice) strategy-based questions. You should model how to answer these kinds of questions using information on the Lesson Preview pages.

**Constructed-response writing questions:** In each lesson, students apply the Mathematics Strategy to solve a strategy-based question. You should model how to answer these kinds of questions by using one of the sample answers provided in the Answer Key.

- *Tracking Chart*  
Students use this chart for noting their completion of and performance in each lesson.
- *Self-Assessments*  
These five forms allow students the opportunity for self-assessment of their performance.
- *Answer Form*  
Students may use this form to record their answers to the eighty selected-response questions and to indicate that they have answered each of the twenty constructed-response writing questions.

## What is in each teacher guide?

There are 48 teacher guides in the *FOCUS* series, one for each student book. Each teacher guide contains:

- suggested instructions for using the *FOCUS* series effectively in the classroom
- Mathematics Strategy Tips for the Teacher, a facsimile of the Learn About on pages 2–3 of the student book, with tips for additional discussion related to understanding and using the Mathematics Strategy
- four reproducibles: three Teacher Assessments to be used for individual student assessment in the Mathematics Strategy and one Class or Group Performance Graph to be used for class or group assessment in the Mathematics Strategy
- summary of research that supports the *FOCUS* series
- a completed Answer Form for the eighty selected-response questions in the student book
- an Answer Key for the eighty selected-response questions, plus sample answers for the twenty constructed-response writing questions in the student book

## How should I use the Mathematics Strategy Tips for the Teacher?

These pages contain a facsimile of the Learn About on pages 2–3 of the student book, along with extended information about the Mathematics Strategy, which you can use as a basis for in-depth discussion to make sure students understand the strategy and how to use it.

## Where do students record their answers?

Students should fill in their answers to the selected-response questions on the Answer Form on page 53 of the student book. If students use the Answer Form, they may detach it from the book. Alternatively, students may fill in the correct answers directly on the student book page.

Students should write their answers to the constructed-response questions directly on the lines provided in the student book. Students who use the Answer Form for the selected-response questions should fill in the circle on the Answer Form to show that they have answered the constructed-response question, which is the fifth question in each lesson.

# MATHEMATICS STRATEGY TIPS FOR THE TEACHER

Charts and graphs are used to represent and compare information.

There are many types of charts and graphs. Some graphs use pictures to represent amounts. Other graphs use bars to represent amounts. A tally chart uses tally marks to count items in a group by ones and fives.

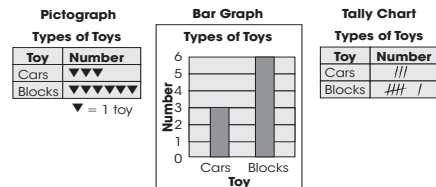
Pictographs are used to compare the number of items in a set of groups. Students count the symbols displayed in a pictograph to compare the number of items in the groups. The group with the most symbols is the largest. Pictographs include a key to specify the number of items that each symbol represents. Introduce pictographs that use a value of one for each symbol or picture. Then explore how the amounts displayed in the graph change if each symbol represents two items. Show how to count by twos to determine amounts.

Bar graphs provide a clear visual comparison of data. The bar that is the tallest or longest shows the greatest amount. The numbers on the left of a vertical bar graph label the value of each horizontal line. The numbers on the bottom of a horizontal bar graph label the value of each vertical line. On a bar graph, a bar that begins at 0 and ends at the line labelled *three* represents a quantity or value of three. Begin a study of bar graphs using a scale of one. When students are comfortable reading and interpreting these graphs, introduce bar graphs with scales of two.

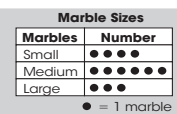
## Learn About

### Interpreting Graphs and Charts: Pictographs, Bar Graphs and Tally Charts

Some graphs and charts are used to show how many items are in a group. A **pictograph** uses pictures to show how many. A **bar graph** uses numbers and bars to show how many. **Tally charts** use lines called tally marks to show how many. Groups of 5 tally marks are shown like this *||||*. Each of the charts and graphs below show that there are 3 cars and 6 blocks.



Jeremy has a marble collection. His marbles are 3 different sizes. The number of marbles of each size is shown in the pictograph. How many medium-size marbles does Jeremy have?



Each dot equals 1 marble.  
There are 6 dots in the row for medium-size marbles.  
Jeremy has 6 medium-size marbles.



**Pictographs** use pictures to show how many. **Bar graphs** use numbers and bars to show how many. **Tally charts** use lines called tally marks to show how many.

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Use the graphs and charts displayed on the Learn About page or have students create their own graphs to compare the same data represented in a pictograph, a bar graph and a tally chart. Review the information that is represented by each graph, how the labels and keys help, and how to compare the number of items in each group. Encourage students to analyse the information in the graphs and make their own statements about the graphs shown.

# Learn About

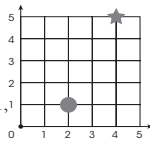
## Interpreting Graphs and Charts: Calendars and Grids

A **calendar** shows the days, weeks and months in a year. The days of the week and the dates for a month are listed in rows and columns on a calendar. This calendar shows that the first day in May is a Wednesday. Also, the second Friday of the month is 10 May.

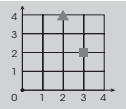
May						
Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	

A **grid** shows the locations of items. Grids have numbers. Some numbers go left and right. Other numbers go up and down. The numbers are used to find items on the grid.

This grid shows that the circle is over 2 and up 1, and the star is over 4 and up 5.



Danny drew this grid in maths class. Where is the square?



First count over. Then count up. The square is **over 3 and up 2**.



A **calendar** shows the days, weeks and months in a year.  
A **grid** shows the locations of places and items.

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A calendar can be used to show patterns. For example, if the first Thursday of the month occurs on May 2, the next Thursday will occur seven days later, on May 9. The pattern is plus seven, or  $2 + 7 = 9$ .

The standard use of a grid always involves first moving left or right, and then moving up or down. At this level, students use grids that require moving to the right and then moving up. It may be beneficial for some students to place a grid on a wall to reinforce the concept of *up* as a tangible direction rather than as the less concrete concept of *up* as towards the top of the page.

A calendar represents time by days, weeks and months. A standard calendar shows the name of the month at the top and the days of the week at the top of each column, starting with Sunday and ending with Saturday.

A common error when using grids is to move up first and then left or right. Have students think of *left* and *right* as moving *over*. Then practise saying the phrase *over and up*. Compare this to other common phrases that use *over*, such as *over and out* or *over and above*. In each phrase, and in using grids, the word *over* comes first. Another way to remember this is that *o* comes before *u* in the alphabet.

A calendar shows that there are seven days in each week and a little more than four weeks in each month. Use a one-year calendar to count the number of whole weeks in each month. Most months will show three whole weeks plus two partial weeks. Discuss with students how the partial weeks can be combined to make another group of seven days, with some days left over.