Oxford International Primary

6

Maths

Student Book

Second edition

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Student Book

Tony Cotton
Caroline Clissold
Linda Glithro
Cherri Moseley
Janet Rees

Language consultants:
John McMahon
Liz McMahon

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Contents

How to use this book

The Student Book for *Oxford International Primary Maths* forms part of your mathematics lessons for this year. Your teacher will introduce the ideas through whole-class activities, then you will explore them in more depth using this book, before all coming back together to discuss what you have learned. Find out more at: www.oxfordprimary.com/international-maths

Structure of the book

This book is divided into 11 units. Each unit covers a different strand of mathematics.

What you will find in each unit

There are five types of lessons:

Engage introduces the unit's mathematical ideas.
It tells you what you will learn in the unit and includes the big question.

Discover introduces mathematical skills and concepts.

In **Explore** you practise the skills you learned in Discover.

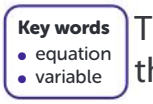
Connect helps you make links between the different areas of mathematics in the unit.

In **Review** you show your teacher what you have learned in the unit.

What you will find in the lessons

Although each lesson is unique, they have common features:

Discover / **Explore** The lesson type tells you whether you are discovering new mathematical concepts or exploring concepts you have already been introduced to.



This box gives the key words for the lesson.

This challenges you to take your learning further.


In the speech bubbles, you will find useful hints, examples of how to complete a question, or extra questions to get you thinking about the mathematics you are doing.

Additional features


This shows you where you can practise the key vocabulary, either by writing the words or through a discussion.


This shows you where you can practise your mental maths skills such as your multiplication tables or other key number facts.


This shows you where you need to record your work in a notebook.

Key words are listed in a picture glossary at the end of the book. You can write your own definition for each word.

Teacher's Guide

The Teacher's Guide that accompanies this book provides lesson notes for each page.

Practice Book

At the bottom of each page in this book, there is a link to the Practice Book, where you can find extra practice to do in your lesson or at home.

1A Place value

Discover

Place-value game

0	1	2	3	4
5	6	7	8	9

1 Pick a card from a set of digit cards 0–9.

- Write the digit in any column in the top row of the place-value grid.
- Replace the card and repeat six more times. Now you will have a 7-digit number in the top row.

Repeat until all the rows are full.

Millions	Hundred thousands	Ten thousands	Thousands	Hundreds	Tens	Ones

Key words

- hundred thousand
- million
- ten million

Now complete these sentences about the numbers in the table.

2 The largest number is ____.

The largest number possible using the digits from this number is ____.

3 The smallest number is ____.

The smallest number possible using the digits from this number is ____.

4 The number nearest to 5 000 000 is ____.

The number nearest to 5 000 000 using the digits from this number is ____.

Stretch zone

What is the number nearest to 1 000 000 using the digits from **question 4**? Explain how you know.

■ For more practice, go to Practice Book 6, page 15.

1A Place value

Explore

Multiply by 10, 100 and 1000

Use a calculator for this activity.

1 Enter any 4-digit number into your calculator.

- Write the number in the first row of the place-value grid below.

Follow these instructions.

- Multiply the number by 10.
- Write the new number in the next row of the place-value grid.
- Multiply this new number by 10 two more times. Complete the next two rows of the table.

2 Repeat with a different 4-digit number.

Key words

- place-value grid
- power of 10
- multiple of 10

What calculation is the same as multiplying by 10 twice?

	Millions	Hundred thousands	Ten thousands	Thousands	Hundreds	Tens	Ones
× 10							
× 10							
× 10							
× 10							
× 10							
× 10							

3 Now complete these sentences:

When you multiply by 10, the digits move ☐ place to the _____.

When you multiply by 100, _____

When you multiply by 1000, _____

Stretch zone

Can you write a general rule for multiplying a number by any power of 10?

■ For more practice, go to Practice Book 6, page 16.

1B Rounding

Discover

Round to the nearest 10, 100 and 1000

Pick four cards from a set of digit cards 0–9.

- Make ten different 4-digit numbers using these digits.
- Order the numbers from smallest to largest.
- Write the numbers in the first column of the table.
- Complete the other columns by rounding your numbers.

Worked example

Number	Round to the nearest 10	Round to the nearest 100	Round to the nearest 1000
5379	5380	5400	5000
7359	7360	7400	7000
9753	9750	9800	10 000

Number	Round to the nearest 10	Round to the nearest 100	Round to the nearest 1000

Key words

- round to the nearest
- 4-digit number

I picked these digits.

3	5	7	9

I can make 5379, 7359, 9753 and lots more.

I rounded each number to the nearest 10, 100 and 1000.

Remember: look at the digit to the right of the one you are rounding. If the digit is 5 or more, round up. If it is less than 5, round down.

Stretch zone

I am thinking of a number. I round my number to 6000 to the nearest thousand. What is the smallest possible number I could be thinking of? What is the largest possible number?

■ For more practice, go to Practice Book 6, page 17.

1B Rounding

Explore

Round and order numbers

Key words
- round to the nearest
- 4-digit number

0	1	2	3	4
5	6	7	8	9

1 Pick four cards from a set of digit cards 0–9.

My four digits: ☐ ☐ ☐ ☐

2 Use these digits to make as many different 4-digit numbers as you can. Write your numbers in the first box below.

3 Round all the numbers to the nearest 10. Write the rounded numbers in the second box.

All the possible numbers:

The numbers rounded to the nearest 10:

4 Use your rounded numbers to make correct number sentences.

☐ < ☐ < ☐ < ☐

☐ > ☐ > ☐ > ☐

☐ < ☐ < ☐ < ☐

☐ > ☐ > ☐ > ☐

☐ < ☐ < ☐ < ☐

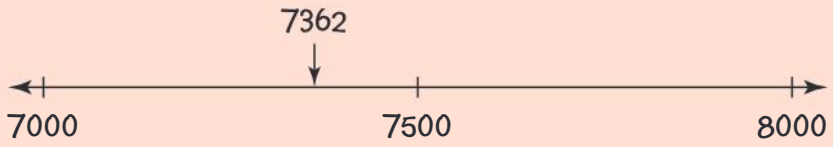
☐ > ☐ > ☐ > ☐

Explore (continued)

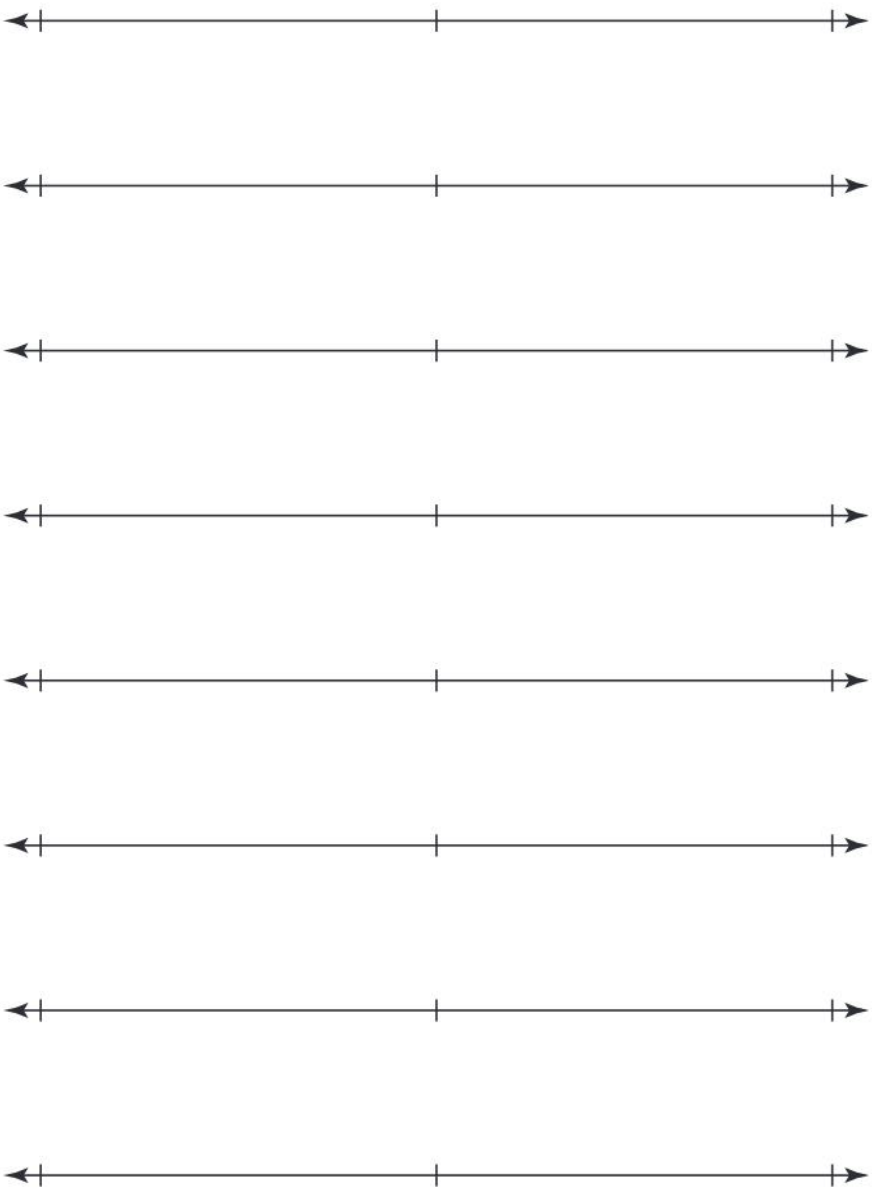
5 Choose eight of your original numbers from **question 2**.

- Label the ends of a number line with the correct thousands.
- Write the number in the correct place on the number line.

Worked example



I chose 7362. I labelled the number line with 7000 and 8000. I also labelled the halfway point to help me find the correct position.



1B Rounding

Explore (continued)

6 The table below shows supporter attendance numbers at seven English Premier League football clubs.

- Complete the table by rounding each number to the nearest thousand. The first one is done for you.

Football club	Average attendance	To the nearest thousand
Manchester United 	74 528	75 000
Arsenal 	59 079	
West Ham 	58 336	
Tottenham Hotspur 	54 130	
Manchester City 	54 017	
Liverpool 	52 731	
Newcastle United 	51 515	

7 Calculate the following using the rounded numbers.

a The total attendance for these seven clubs

b The difference in attendance between Manchester United and Manchester City

c The difference in attendance between Liverpool and West Ham

d The difference in attendance between Arsenal and Tottenham Hotspur

Stretch zone

Find out about the attendance numbers at some sports clubs in your own country. Round the attendances to the nearest 100 or 1000 and order the clubs from largest attendance to smallest.

■ For more practice, go to Practice Book 6, page 18.

1C Using negative numbers

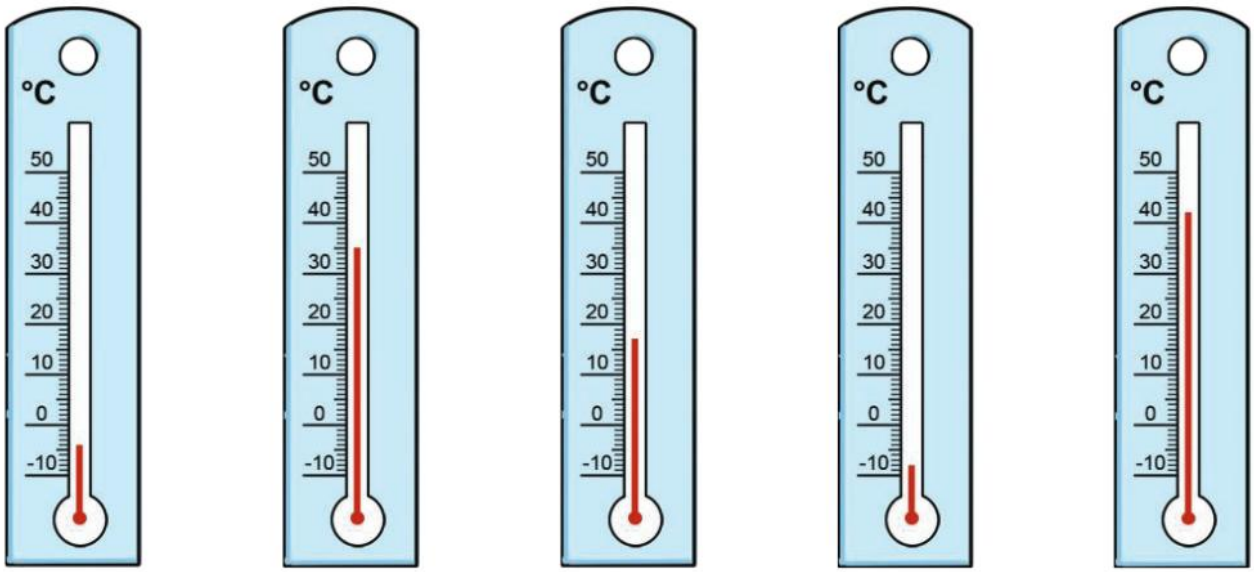
Discover

Positive and negative temperatures

Key words
- temperature
- below freezing
- negative number

1 Draw lines to match the temperatures to the thermometers.

London 17 °C Moscow −4 °C Oslo −8 °C Bangkok 35 °C Dubai 42 °C



2 Look at the temperatures in the cities in **question 1**.

- If you travel between the cities below, does the temperature rise or fall?
- What is the change in temperature?

a Bangkok to London Rise / Fall

Change in temperature: ☐ °C

b Bangkok to Dubai Rise / Fall

Change in temperature: ☐ °C

c Moscow to London Rise / Fall

Change in temperature: ☐ °C

d Moscow to Oslo Rise / Fall

Change in temperature: ☐ °C

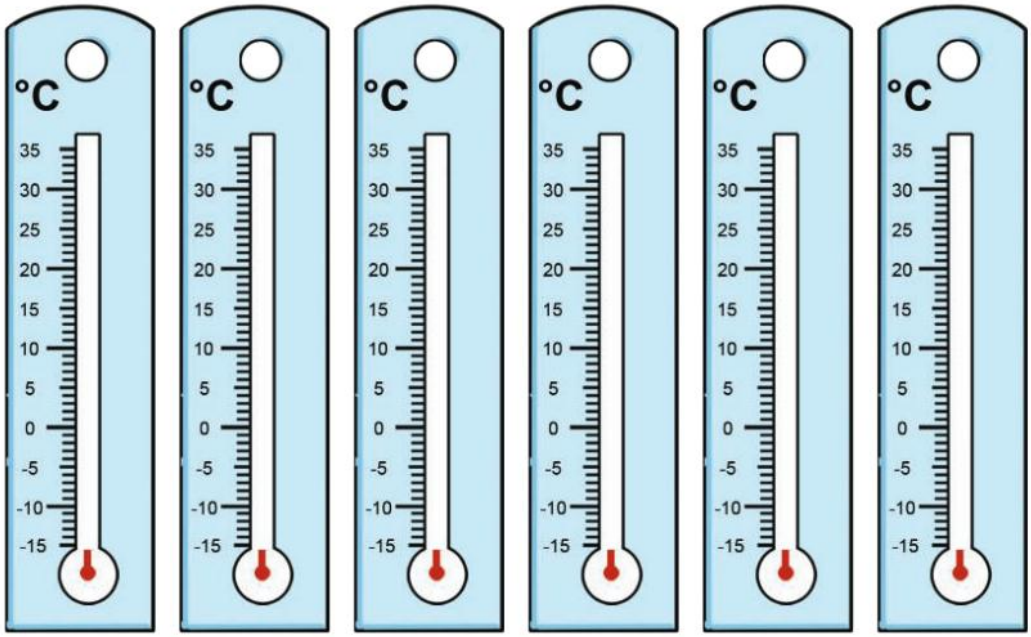
1C Using negative numbers

Discover (continued)

Try to find three positive temperatures and three temperatures below zero.

3 Choose six cities around the world. Use the internet to find the average temperature for each city in December.

- Draw the temperatures on the thermometers below.



Stretch zone

Look at this table of temperatures in some cities around the world.

City	Temperature on 1st January	City	Temperature on 1st January
Anchorage		Sydney	28 °C
London	−2 °C	Harbin	
Oymyakon	−45 °C	Cairo	
Rio de Janeiro		Bangkok	

Use the following clues to complete the table.

- Cairo is 59 degrees warmer than Oymyakon.
- Rio de Janeiro is 38 degrees warmer than London.
- Harbin is 47 degrees colder than Sydney.
- Anchorage is 26 degrees colder than Cairo.
- Bangkok is 50 degrees warmer than Anchorage.

■ For more practice, go to Practice Book 6, page 19.

1C Using negative numbers

Explore

Negative number statements

Is each statement 'Always true', 'Sometimes true' or 'Never true'? Circle the correct answer.

Key words

- negative number
- positive number

1

If you add two negative numbers, the answer is negative.

$^{-}3 + {}^{-}2$

Always true / Sometimes true / Never true

2

If you subtract a positive number from a negative number, the answer is positive.

$^{-}7 - 9$

Always true / Sometimes true / Never true

3

If you subtract a positive number from a positive number, the answer is negative.

$8 - 15$

Always true / Sometimes true / Never true

4

If you add a negative number and a positive number, the answer is positive.

$^{-}3 + 6$

Always true / Sometimes true / Never true

5

If you subtract a negative number from a negative number, the answer is negative.

$^{-}4 - {}^{-}6$

Always true / Sometimes true / Never true

6

If you subtract a negative number from a positive number, the answer is positive.

$8 - {}^{-}6$

Always true / Sometimes true / Never true

First do the calculation given for each statement. Then do at least two more calculations to see if you get the same results.

I did these calculations for the first statement:

$^{-}3 + {}^{-}2 = {}^{-}5$

$^{-}10 + {}^{-}7 = {}^{-}17$

$^{-}4 + {}^{-}8 = {}^{-}12$

All the answers are negative, so I think this statement is always true.

Stretch zone

Write calculations with these answers: 0, $^{-}13$ and 66. In each calculation, use any of the numbers $^{-}22$, $^{-}3$, 14, 39 and 88 and any combination of adding and subtracting.

■ For more practice, go to Practice Book 6, page 20.

1D Comparing numbers

Discover

Compare large numbers and negative numbers

Key words
- 7-digit number
- million
- hundred thousand
- negative number

1 Pick seven cards from a set of digit cards 0–9.

- Replace your card each time so it is possible to pick the same digit twice.
- Make nine different 7-digit numbers using your digits.

My numbers are:

I picked 1, 1, 2, 3, 5, 5, 6. The first two numbers I made were 1 561 235 and 5 235 611.

2 Write your numbers in the table, in order smallest to largest.

- Then write your numbers in words.

Number	Number in words

3 Use the same digits to make five 2-digit negative numbers.

- Write them in order, from smallest to largest.

Stretch zone

What is the difference between your smallest and largest negative numbers? Write some negative number calculations for a partner to solve.

■ For more practice, go to Practice Book 6, page 21.

1D Comparing numbers

Explore

Compare populations and temperatures

Key words
- 7-digit number
- million
- hundred thousand
- negative number

1 Write the populations of these countries in order, starting with the smallest.

Iceland 356 991

Slovenia 2 078 938

Barbados 285 000

Uruguay 3 473 730

Bahrain 1 234 571

Brunei 393 162

Botswana 2 373 622

Tonga 103 036

2 Write the highest and lowest populations in words.

Highest: _____

_____

Lowest: _____

_____

3 These are the temperatures at which some substances solidify.

- Write the temperatures in order, starting with the lowest temperature.

Mercury $^{-}39\,^{\circ}C$ Ethanol $^{-}114\,^{\circ}C$ Water $0\,^{\circ}C$ Carbon dioxide $^{-}78\,^{\circ}C$

Glycerol $18\,^{\circ}C$ Lead $327\,^{\circ}C$ Nitric acid $^{-}42\,^{\circ}C$ Sodium $98\,^{\circ}C$

4 Write the highest and lowest solidifying temperatures in words.

Highest: _____

Lowest: _____

Stretch zone

Use the internet to find five substances with very low solidifying temperatures. Can you put these five temperatures in order?

■ For more practice, go to Practice Book 6, page 22.

1E Using place-value facts

Discover

Number pairs for 100, 10 and 1

Follow these steps five times and complete the table.

- Choose two cards from a set of digit cards 0–9.
- Make a 2-digit number. Use this number to make number pairs to 100, 10 and 1.
- Reverse the digits. Use this new number to make pairs to 100, 10 and 1.

Number	pair to 100	pair to 10	pair to 1

Key words

- number pairs
- known facts
- derive

I picked 5 and 6 and made 56. Here are my pairs:

56 + 44 = 100
5.6 + 4.4 = 10
0.56 + 0.44 = 1

I reversed the digits to make 65.

65 + 35 = 100
6.5 + 3.5 = 10
0.65 + 0.35 = 1

Stretch zone

How does knowing pairs to 10 help you find pairs to 10 000?

Write some examples.

■ For more practice, go to Practice Book 6, page 23.

1E Using place-value facts

Explore

Write number pair facts

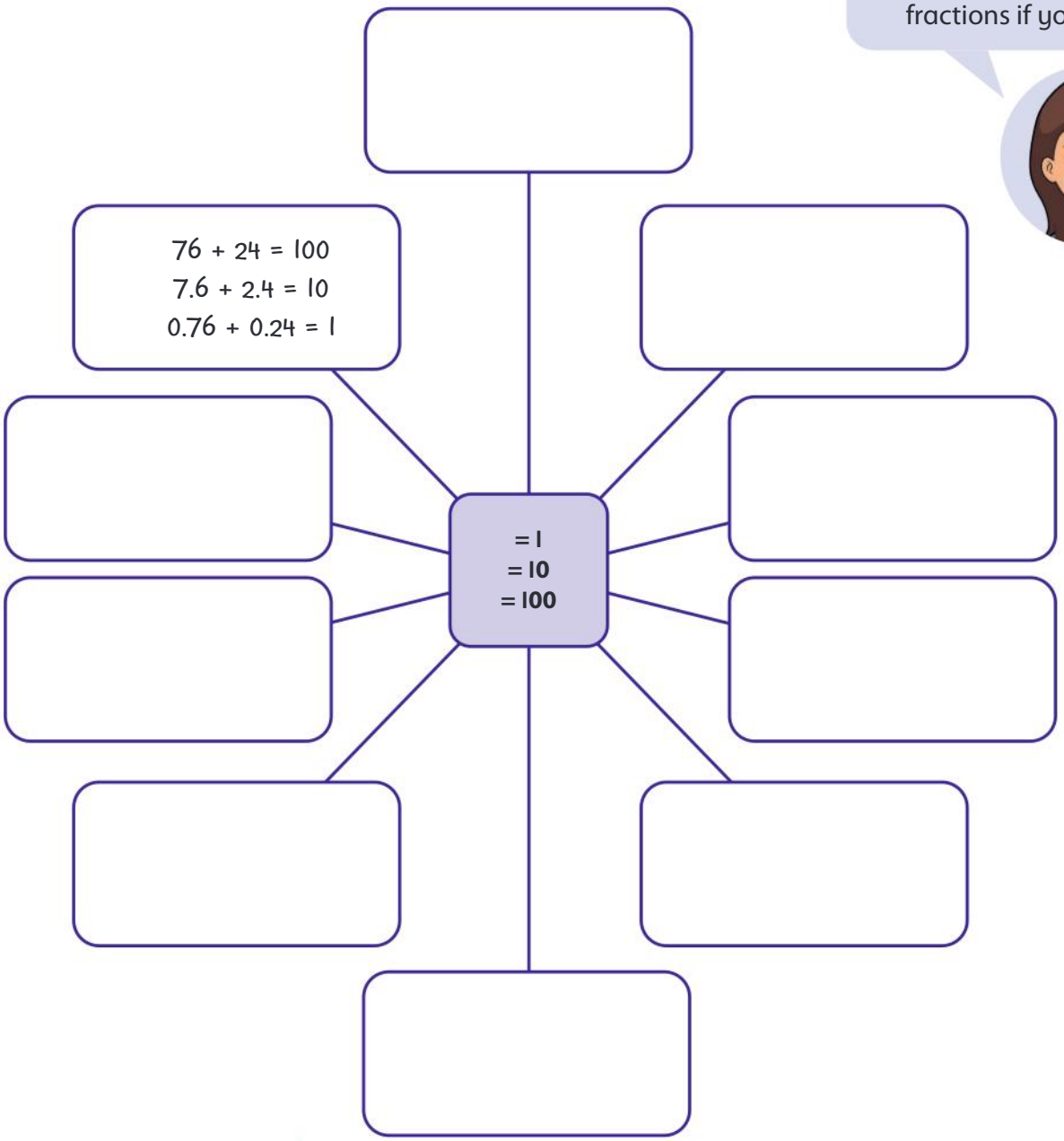
Use your knowledge of place value to complete this diagram.

- Write some pairs to 100, 10 and 1. One is done for you.
- Use your knowledge of number bonds to 10 to help you.

Key words

- number pairs
- known facts
- derive

Use both decimals and fractions if you can.



Stretch zone

Use one of your pairs to write pairs to 1000, 10 000 and 100 000.

■ For more practice, go to Practice Book 6, page 24.

1 Number and place value

I can use place value to understand large numbers. I can order large numbers and negative numbers based on the value of each digit. I can round numbers when an approximate number is needed.

Connect

Chessboard and rice problem

In 1256, the Islamic scholar Ibn Khallikan wrote the following maths problem. A king wanted to reward a wise man for inventing the game of chess. He asked the man what reward he would like. The wise man replied:

I only want one small gift. Tomorrow, place one grain of rice on the first square of your chessboard. I will take this home for my family. On the second day place two grains on the next square for me. On the third day double the number of grains again, placing four grains for me to take home. Each day double the number of grains you give me until you have placed rice on every square of the chessboard. That will be sufficient reward for me.

1 How many squares do you think it will take to reach one million grains of rice on the chessboard?

a Estimate the answer. ☐ squares

b Now calculate the answer. ☐ squares

2 How far can you get calculating mentally? ☐ squares

☐ grains of rice

3 Now use a calculator to do the calculations.

When does your calculator run out of digits? ☐ squares

☐ grains of rice

Stretch zone

Calculate the answer to **question 1** using rounding. When your answer is above 10 round to the nearest 10; when it is above 100 round to the nearest 100; when it is above 1000 round to the nearest 1000 and so on. Does this make the problem easier to solve? Explain your answer.