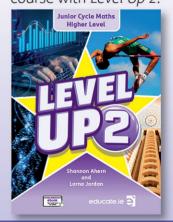


- ✓ Packed with differentiated exercises for students of all levels and abilities.
- ✓ Concepts and worked examples explained with accessible language to facilitate all learners.
- ✓ Exam Link sections contain exam-style questions based on insights from three years of SEC final exams and marking schemes.
- ✓ Written by experienced teachers who have examined for Junior Cycle
 Maths and frequently provide webinars and workshops for Maths
 teachers.
- ✓ Published after the release of the Early Enactment Review of the Junior Cycle Maths specification and addresses issues that it raised.

Level Up 1 covers the complete Ordinary Level Junior Cycle Maths course and is also the perfect starting book for eventual Higher Level students.

COMING IN 2026 Higher Level students can

complete their Higher Level course with *Level Up 2*.





The Complete Package

Based on issues raised in the Early Enactment Review of the Junior Cycle Maths specification, *Level Up 1* includes:

- comprehensive planning material to ensure all examinable content is covered
- easy-to-navigate algebra chapters to support students
- Let's Discuss pair-work activities that allow students to work collaboratively on maths problems that are relevant to their lives
- units of learning based on Learning Outcomes from across the strands.

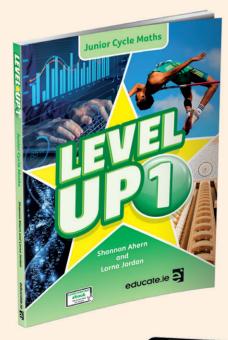
Level Up 1 covers the entire Ordinary Level Junior Cycle Maths course. It is intended that all students start with Level Up 1 in First Year. Higher Level students will then move on to Level Up 2 in Second Year after completing part of Level Up 1.

Level Up 2 will contain all the Higher Level-only material from the specification while also reminding Higher Level students of the core skills and concepts that they covered in Level Up 1.

Students of all levels and abilities will be using *Level Up 1* in First Year, and the exercises have been designed with this in mind. This differentiated approach means that students of all abilities are catered for and challenged appropriate to their needs.

For the Student

- Textbook with complimentary ebook
- Digital resources including construction animations and extra exercises

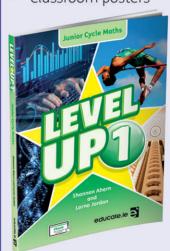




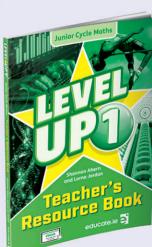


For the Teacher

- Textbook with **complimentary** ebook
- Teacher's Resource Book with full solutions
- Digital resources including editable planning documents
- PowerPoints with worked examples and solutions
- Classroom posters







COMPLIMENTARY

ebook



Take a Look Inside

Chapters open with clear learning intentions to let students know what they will learn in the chapter.

Entry Level

activities introduce students to the chapter topic.

Content is presented using simple language, accurate diagrams and a well-paced structure.



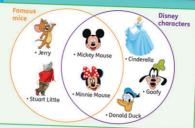
- identify a set as a well-defined collection of elements
- define sets by listing their elements and generating rules that define them
- * use and understand set notation
- use and understand set including
 represent sets on Venn diagrams
 use the union and intersection of sets to solve problem

Null set
Venn diagram
Equivalent set
Subset

Universal set

ENTRY LEVEL

In pairs, read this diagram and reflect on what you think it means. Use your knowledge from cartoons and movies to help you.



1.1 Introduction to sets

A set is a collection of well-defined and distinct objects. Symbol: any capital letter (e.g. A)

A set can be made up of anything (numbers, images, words, letters, etc.) but they must follow a well-defined rule.

must rollow a well-defined rule.

This means that there can be no confusion over what is included in the set. For example, a collection of fruits beginning with P. (peach, pineapple, pear, prune)

In sets, all objects must be be distinct, meaning there should be no repetition of elements. For example, a set cannot contain: (peach, pineapple, pear, prune, peach) because peach appears more than once.

Sets are used in the collumption.

Sets are used in the real world for a wide range of reasons, for example organising living things into kingdoms in biology, grouping artefacts in history and categorising rocks in geology.



terms are defined as needed.

Chapters are split

Clear worked examples show students how to solve maths problems.

The **Learning**

Outcomes addressed

in each chapter are

listed at the start of

each chapter to aid

teacher planning.

Key terms are listed

at the start of the chapter and are clearly highlighted and defined in the text.

Other unfamiliar

- 2. Place the correct sign () or () between each pair of numbers
- (c) -104 ___ -101 (d) -2·5 ___ -3
- (e) -1 050 ___ -1 230 (f) -99 -98

Place these 16 digits in the table below so that each row and column are in ascending order. There is more than one

-6, 3, 20, 2, 10, -8, -1, -10, 7, 30, -5, 0, -15, -2, 4, -12

3.2 Place value

Even though the same digits are used in the numbers be others. What do you notice? What do you wonder?

The place value of a digit is the value of the digit depending on its position in the number.

umber two million, six hundred and seventy-two thousand, eight hundred and ninety-five is wn in the place value grid below

	Million	Hundred thousand	Ten thousand	Thousand	Hundred	Ten	One
Digit	2	6	7	2	8	9	5
Value	2 × 1 000 000 =	6 × 100 000 =	7 × 10 000 =	2 × 1 000 = 2 000	8 × 100 = 800	9 × 10 = 90	5 × 1 =

Written as a number this is: 2 672 895.

Note that the digit 2 is repeated in the number, but has a different value depending on its position

Decide which is greater, 51 954 or five hundred thousand.

	Million	Hundred thousand	Ten thousand	Thousand	Hundred	Ten	One
51 954			5	1	9	5	4
Five hundred thousand		5	0	0	0	0	0

Because 5 hundred thousands are far larger than 5 ten thousands, 500 000 > 51 954

into easy-to-navigate sections.

(a) List the first six multiples of 4.

(b) List the first six multiples of 6.

(a) 4, 8, 12, 16, 20, 24

(b) 6, 12, 18, 24, 30, 36

Let's take a closer look at the above example

Multiples of 4 = {4, 8, 12, 16, 20, 24} • Multiples of 6 = {6, 12, 18, 24, 30, 36}

12 and 24 are multiples of both 4 and 6; this makes them common multiples.

As 12 is the smaller common multiple, we call this the lowest common multiple of 4 and 6.

The **lowest common multiple (LCM)** is the smallest natural number that is a multiple of two or more numbers.

Example 2.2.4

Find the LCM of 6 and 9

List some multiples of 6: (6.12, 18, 24, 30, 3) List some multiples of 9: {9, 18, 27, 36, 45 ...} 18 is the LCM of 6 and 9



Example 2.2.5

Watson the dog barks every 9 seconds.

Cole the dog barks every 12 seconds.

They both start barking at the same time. After how many seconds will they next bark at the same time?

We are trying to find the next **common** time that the dogs will bark. We need to find the LCM of 9 and 12.

List some times Watson will bark: {9, 18, 27, 36, 54 ...} List some times Cole will bark: {12, 24, 36, 48, 60 ...}

By comparing the times we can see that they will next bark at the same time in 36 seconds.

- - (a) 5 is a _
- (c) 1 is a __ of 7.
- (d) 3 is a
- of 10. (f) 2 is a_
- 2. Decide whether the following statements ar true or false.
- (a) 6 is a multiple of 5.
- (b) 20 is a factor of 10
- (c) 4 is a multiple of 2.
- (d) 10 is a multiple of 30.
- (e) 7 is a factor of 14. (f) 1 is a factor of 9.
- (g) 13 is a factor of 13.
- (h) 20 is a multiple of 5.



Let's Discuss activities allow students to discuss maths ideas and concepts that are relevant to their lives.

1. Below a student has written some numbers in scientific notation to 3 significant figures that are not quite right. Fix them so that they fit the criteria for scientific notation.

(a) 81.2×10^4 (c) 12.45×10^1 (e) 74.5×10^3 (b) 54.2×10^3 (d) 1.536×10^4 (f) 0.124×10^6

2. Arrange the list of numbers from smallest to biggest. $4\cdot3\times10^5$ $1\cdot21\times10^{15}$ $12\cdot1\times10^{75}$ $13\cdot9$

LEVEL 3 **

 $\textbf{1.} \ \ \textbf{State whether each of the following statements are true or false}.$

(a) $3.4 \times 10^5 > 3.4 \times 10^3$ (d) $5.6 \times 10^3 > 2.1 \times 10^3$ (e) $8.3 \times 10^4 < 6.1 \times 10^4$ (g) 8·2 × 10⁴ < 9·1 × 10³ (b) $1.2 \times 10^2 > 1.2 \times 10^6$ (h) $4.81 \times 10^6 > 2.95 \times 10^4$ (c) $7.9 \times 10^4 < 7.9 \times 10^6$ (f) $3.7 \times 10^7 > 3.2 \times 10^7$ (i) 9·12 × 10⁴ < 9·1 × 10⁴

2. Write each of the following in scientific notation to 3 significant figures. (a) The mass of Jupiter: 1 898 000 000 000 000 000 000 000 000 kilograms

(b) The distance from Earth to the Sun: 149 600 000 kilometres.
(c) The age of the universe: 13 800 000 000 years.
(d) The views on a popular YouTube video: 3 561 245 782.

(e) The world population: approximately 8 123 819 741 people.

BONUS LEVEL

Using the skills you have learned so far, write each of the following using scientific notation and evaluate,

(a) How many times bigger is Jupiter than planet Earth? Volume of Jupiter: 1 431 281 810 739 360 000 cubic kilometres Volume of Earth: 1 083 210 000 000 cubic kilometres

(b) How many times faster is the speed of light than the speed of sound? Speed of light: 299 792 458 m/s

Speed of sound: 343 m/s

(c) What percentage of the body is taken up by bacterial cells if: Number of bacterial cells in the human body: 38 000 000 000 000 cells Number of human cells in the human body: 37 200 000 000 000 cells



Archimedes developed a method known as the 'Sand Reckoner' to estimate the number of grains of sand that could fit in the universe. This method used a method very similar to the scientific notation we use today, However, as scientific notation was not yet invented, instead of using powers of 10 Archimedes used the words 'myriad' to represent 10 000. This allowed him to work out the number of grains of sand to be:

Can you write this in scientific notation? Hint: You just need six symbols!

Sections end with graded Level 1, Level 2 and Level 3 exercises that allow students to level up their maths skills and track their progress.

Bonus Level exercises give students a chance to really test themselves and shoot for the stars.

Chapters close with **Level Complete** activities to show students how far they have progressed from the start of the chapter.

Revision Blaster

sections contain graded exercises that students can practise their skills on as they blast their way to exam success.

Exam Link sections throughout the book contain examstyle questions that link different topics together.

*



Revision Blaster

Match the following expressions to their algebra tile representations.

Expressions			Algebra tiles
1	2 <i>x</i>	А	
2	x + 2	В	
3	χ²	С	
4	<u>x</u>	D	

- 2. Evaluate where a = 5.
 - (c) 3a + 2(d) a - 4(b) 3a

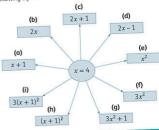
(f) 2a - 4

- 3. Evaluate where b = 1, c = 2. (a) 2b + cy
- (e) 6bc (b) 3b + 6c(f) $b^2 + c$ (c) -2b - 4c
- Simplify each of the following expressions.
- (a) -5z + 4 2z + 9(b) 3 7z 11 8z(c) 6w + 9 - 2w - 1.8
- (d) a + 3b + 6a 2b(e) x + 2y - 7x + 8y
- (f) -2c + 3d d + 5c

1. Fill in the blanks in the table below. The first

In letters	In words
3 <i>x</i>	Multiply x by 3
x-2	
	Add 4 to x
6x	
	Divide x by 7
	Subtract 5 from x

2. Solve each of the following equations.



The textbook also contains a CBA advice **chapter** and **answers** to all the exercises.



Exam Link 1: Chapters 1-6

Now that you have mastered the skills in Chapters 1-6, it is time to challenge yourself with some Now any you nave missered the skills in Chapters 1-6, it is time to challenge yourself with some problem-solving questions. The questions below link different topics together in the same way topics can be linked together in real life and in questions in the final exam, Question 1

(a) Find the value of the following.

(i) 451 + 982 (ii) 1 078 - 325 (iii) 30 ÷ (2 + 3)

(b) The numbers 1, 2, 3 and 5 are written on four cards. The cards can be arranged to make a four-digit number as shown below.

2 5 3 1

(i) Rearrange the cards to make another odd number

(ii) Rearrange the cards to make an even number.

(iii) Rearrange the cards to make a number that is divisible by 5.

(c) Insert operators to make each calculation below true. Use the operators \oplus , \bigcirc and \otimes .

(iii) 1 ___ 5 ___ 2 = 11 (iv) 1 ___ 5 ___ 2 = 4

Hint: Remember the correct order of operati

Question 2

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 $A = \{2, 3, 6, 7, 9, 10\}$

 $B = \{1, 3, 5, 7, 9\}$ (a) (i) Write down a subset of A that contains three elements.

(ii) Write down a subset of A that contains only odd numbers.

(iii) Write down a subset of A that contains only prime numbers. (i) Use sets A and B to fill in this Venn diagram.

(ii) List the elements of A n B. (iii) List the elements of A u B.

Hint: When it comes to Venn diagrams always start by filling in the intersection. This makes sure we don't double up on any elements.



(c) Decide if the following statements are true or fal (i) #A < #B (ii) $\#(A \cap B) > \#(A \cup B)$ (iii) $\#B > \#(A \cap B)$

Question 3

(a) Match the glaebraic exp

1	3x	Α	Divide a number by 5
2	x + 4	В	Multiply a number by 3
3	9-x	С	Subtract a number from 9
4	5 <i>x</i>	D	Multiply a number by 5
5	x - 9	Е	Add 4 to a number
6	<u>x</u>	F	Subtract 9 from a number

(b) Find the value of each expression from part **(a)** when x = 4.

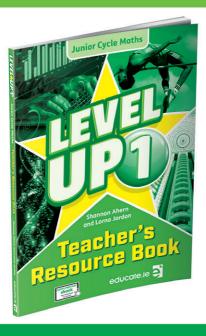




Teacher's Resource Book

The invaluable *Level Up 1* Teacher's Resource Book provides the ultimate support for planning, teaching and assessing Junior Cycle Maths. It includes:

- information on the Junior Cycle Maths specification
- guidelines on using Level Up 1 with your class group
- comprehensive schemes of work and departmental units of learning plans
- planning templates
- information on assessment
- worked solutions for all exercises
- information on retrieval practice and Junior Cycle Maths
- · teaching strategies and templates.



Digital Resources

- Ebook
- Editable planning documents
- PowerPoints with worked examples and solutions
- · Construction animations
- Extra exercises



About the Authors

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Lorna Jordan is a Maths teacher at Ballinrobe Community School, Co. Mayo with over a decade of teaching experience in Ireland and the UK. A graduate of the University of Oxford, Lorna completed her PGCE in Mathematics and a Masters in Education with a particular focus on mixed-ability teaching and formative feedback, areas that continue to inform her teaching and writing. Lorna has extensive experience as a state examiner for Junior Cycle Maths, GCSE and A-Levels, and has facilitated workshops for Maths teachers in Ireland and the UK.





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