

# Grade 3 Mathematics

Level Map for parents

Personalized through the coach. **From foundation to Olympiad.**

Your 1:1 coach - the same one in every session - maps your child’s level and personalizes every step toward your family’s goal, at your child’s pace.

When your child solves something new and looks up - wanting more - the coach is ready. The five learning elements run your child’s plan. Each such moment compounds, week by week, until your child is solving problems that would have looked impossible at the start of Grade 3.

## The five learning elements

- 1

**1:1 live coaching.** Every class is live and one to one, on a shared writing canvas: the coach sees every stroke as your child works, and help lands at the exact moment of a stall.
- 2

**Practice between classes.** Topic by topic, your child watches each idea tick off as they own it.
- 3

**Room above every lesson.** Each lesson carries an above-grade layer your child can climb into the day they want more.
- 4

**Pen on paper.** Practice after class happens on paper, because writing by hand makes learning stick.
- 5

**Learning that stays.** What your child learns comes back at the right moments, spaced and mixed, until it stays.

**Five elements. Eleven chapters.** Every chapter shows two things - where its math lives in the real world, and how far beyond grade level it climbs in the Challenge Arena.

Each Challenge Arena is the Grade-3 form of a competition problem-type - the same shapes that appear in **Math Kangaroo**, building toward **Math Olympiad for Elementary**, **AMC 8** and **MATHCOUNTS**. How far along that path your child climbs is your family’s call.

## The 11 chapters

| #  | Chapter                | Entry → Depth<br><i>Understanding</i>                       | Math in the Real World<br><i>Application</i>                                                         | Challenge Arena<br><i>Olympiad reasoning</i>                                                                                                                                                                                             |
|----|------------------------|-------------------------------------------------------------|------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 01 | Number System          | Skip counting → place value → <b>4-digit numbers</b>        | Two town signs: Springfield 3,472 people, Riverside 2,891. Which is bigger, and by roughly how much? | How many times does the digit 7 appear from 1 to 100?                                                                                                                                                                                    |
| 02 | Addition & Subtraction | Regrouping → <b>mental math</b> → word problems             | Class party budget: \$100. Balloons \$12, snacks \$38. How much is left?                             | Replace each ★ with a <b>different</b> digit (1–9) so that ★★ + ★★ = ★★★. Find every solution. Prove you have them all.                                                                                                                  |
| 03 | Multiplication         | Arrays → <b>distributive property</b> → multiplying by tens | The hall has 5 rows of 8 chairs, and 45 children are coming. Enough chairs?                          | In a multiplication pyramid, each cell is the product of the two cells just below it. The top is 64; the row above the base reads 2, ?, 2; the base corners are 1. Which two numbers sit just below 64? <i>Worked through on Card 3.</i> |
| 04 | Division               | Equal sharing → division facts → <b>remainders</b>          | 24 strawberries, 5 lunchboxes. How many in each box, and how many are left over?                     | A farmer has 50 apples in bags of 8. Bags sell for \$7, loose apples for \$1. What are the total earnings? Would bags of 6 earn more?                                                                                                    |

Grade 3 Level Map (continued)

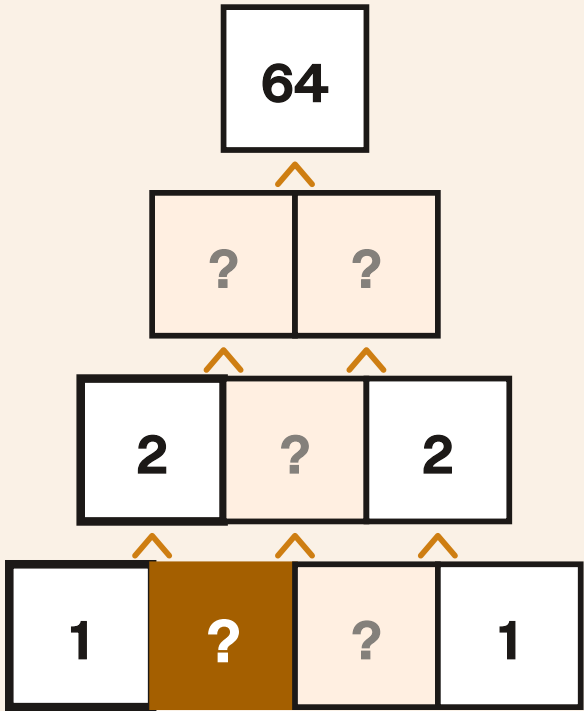
| #  | Chapter          | Entry → Depth<br><i>Understanding</i>                            | Math in the Real World<br><i>Application</i>                                                              | Challenge Arena<br><i>Olympiad reasoning</i>                                                                                                                                                               |
|----|------------------|------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 05 | Fractions        | Unit fractions →<br>number line →<br><b>equivalent fractions</b> | The show is a $\frac{1}{4}$ -hour long. How many minutes is that, and how many such shows fit in an hour? | Three friends share a pizza. One piece is $\frac{1}{2}$ . Find every combination for the other two using denominators up to 12.                                                                            |
| 06 | Geometry         | 2D shapes → <b>types of quadrilaterals</b> →<br>symmetry         | Fold a paper square corner to corner: what shape do you get, and why is it exactly half the square?       | Mira has four jigsaw pieces. Which two can she put together to form a complete square? <i>Worked through on Card 4.</i>                                                                                    |
| 07 | Mass             | Grams & kg →<br>benchmarks →<br><b>comparison</b>                | Flour 250 g, sugar 150 g, butter 100 g. Does the bowl hit half a kilo?                                    | You have eight identical-looking coins, but one is heavier. Find it using a balance scale only twice.                                                                                                      |
| 08 | Capacity         | Liters → estimation →<br><b>comparison</b>                       | The medicine cup says 5 mL and the bottle holds 100 mL. How many doses?                                   | You have a 5-liter jug and a 3-liter jug with no markings. Measure exactly 4 liters.                                                                                                                       |
| 09 | Time             | Telling time →<br>AM/PM → <b>elapsed time</b>                    | Buses run every 15 minutes, and one just left at 3:45. When are the next two?                             | Riya reads from 3:40 PM for 15 minutes, takes a 10-minute break, then reads for twice as long. When does she finish?                                                                                       |
| 10 | Area & Perimeter | Unit squares → area → <b>relating area &amp; perimeter</b>       | The rug is 3 m by 2 m. The reading corner is 8 m <sup>2</sup> . Does the rug leave floor to spare?        | Flynn walks around a square park in 12 minutes. A plaza has four times the area of the park. Walking at the same pace, how long does Flynn take to walk around the plaza? <i>Worked through on Card 5.</i> |
| 11 | Data Handling    | Picture graphs → bar graphs → <b>line plots</b>                  | Goals this season: Ben 2, Adam 0, Chris 3. On the bar graph, what does Adam’s bar look like?              | In a class of 37, twice as many like Math as Science. Five more like Art than Science. How many like each? Write it as equations.                                                                          |

Three of these Challenge Arenas are worked through on Cards 3, 4, and 5.

# 03 Multiplication

A Challenge Arena problem, worked through.

In a multiplication pyramid, each cell is the product of the two cells just below it. The top is 64; the row above the base reads 2, ?, 2; the base corners are 1. Which two numbers sit just below 64?



$1 \times ? = 2 \rightarrow$  the cell is 2  
the base fills: 1, 2, 2, 1  
 $2 \times 2 = 4 \quad 2 \times 4 = 8$

**Below 64: 8 and 8**

The pyramid as given; the solve climbs from the base.

## Multiplication, read backward

The bottom row is short two cells, so there is nothing to multiply upward yet, and here the child pauses. The coach asks one question:

“What do you notice about a 2 and the 1 beneath it?”

Your child reads it backward: 1 times what gives 2? The cell is 2, and the bottom row fills to 1, 2, 2, 1. From there they multiply up:  $2 \times 2 = 4$ , then  $2 \times 4 = 8$ . Both cells just below 64 hold 8, and the top checks out:  $8 \times 8 = 64$ .

**A product read backward gave the missing factor.**

### THE MOVE

Every multiplication fact runs both ways: forward it gives the product, backward it gives the missing factor.

Finding a missing factor by reading multiplication backward is the seed of solving for the unknown later on.

### ONE RUNG HIGHER

In the same pyramid, the bottom row now reads 1, ?, ?, 1, and both missing numbers are the same. The top cell is now 729. What are the missing numbers?

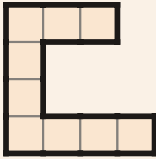
The next Challenge Arena waits in Geometry.

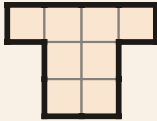
# 06 Geometry

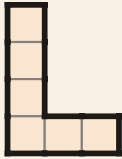
A Challenge Arena problem, worked through.

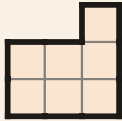
Mira has these four jigsaw pieces. Which two can she put together to form this square?

The four pieces









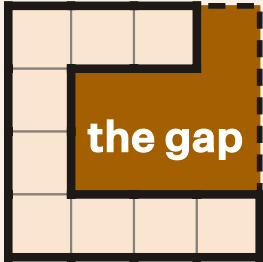
1

2

3

4

the square, imagined



The gap is the shape of piece 4

1 + 4 make the square.

Piece 1 inside the imagined square; the gap is piece 4.

## Two pieces, one square

Four odd-shaped pieces, and most children start jamming pairs together to see what sticks. Trial and error runs long, and here the child stalls. The coach asks one question:

“What would complete this piece into a square?”

Your child holds piece 1 in their head, pictures the square around it, and looks at the gap. The gap has a shape of its own, and that shape is piece 4. Pair them: the square is built. The check runs the other pieces: the gaps of 2 and 3 match none of the remaining pieces.

Imagine what is missing, then go find it.

THE MOVE

Turning a search for pairs into a search for the missing shape cuts the puzzle down to one look.

Holding a missing shape in the mind is the seed of construction and proof diagrams ahead.

ONE RUNG HIGHER

How many squares of any size hide in a 3×3 grid? What pattern do you notice?

One more climb: Area and Perimeter.

**The walk follows the side, and the side only doubled.**