Helping Your Child with Patterns & Algebra

Algebra · Foundation to Year 6 · Australian Curriculum Mathematics

Algebra is the study of patterns, relationships and unknowns in mathematics. It might sound complicated, but your child builds towards it gradually. They begin by noticing and copying **repeating patterns** (like red-blue-red-blue) in Foundation. By Year 3 they find unknown values in equations like **□ + 4 = 9**. By Year 6 they use brackets and understand the rules that connect numbers. These algebraic thinking skills help your child in all areas of maths.

Year level	What your child learns	What this looks like
Foundation	**Repeating patterns** Your child notices and copies **repeating patterns** using colours, shapes and sounds. **pattern** — something that follows a rule and repeats **repeating unit** — the part that repeats: 🔴🔵🔴🔵🔴🔵 **→ repeating unit is [red, blue]** **▲ ▲ ● ▲ ▲ ● ▲ ▲ ● → repeating unit is [▲ ▲ ●]** They ask: 'What comes next?'	Clap a pattern: clap, clap, tap, clap, clap, tap… **"What comes next? Can you copy it?"** Arrange coloured blocks in a pattern. **"What is the repeating part?"**
Year 1	**Skip-counting and number patterns** Your child creates patterns by **skip counting**: **by 2s: 0, 2, 4, 6, 8, 10…** **by 5s: 0, 5, 10, 15, 20…** **by 10s: 0, 10, 20, 30, 40…** They also identify the **repeating unit** in number, shape and symbol patterns: **1, 2, 3, 1, 2, 3, 1, 2, 3 → unit is [1, 2, 3]** They predict: 'What number comes at position 10?'	Count together by 5s to 100. **"What pattern do you notice?"** **'Write the next 5 numbers: 2, 4, 6, 8…'** **"What will the 10th number be?"**
Year 2	**Growing patterns and addition/subtraction facts** Your child creates patterns that **increase or decrease by a fixed amount**: **3, 6, 9, 12, 15… (goes up by 3)** **20, 17, 14, 11… (goes down by 3)** They identify **missing elements**: 3, 6, ___, 12 → missing is 9 They also memorise **addition facts to 20** and related subtraction facts: **8 + 7 = 15 → 15 − 7 = 8 → 15 − 8 = 7**	**'Count by 4s from 0. What is the 6th number?'** Find the missing number: 5, 10, ___, 20, 25 **"If 9 + 6 = 15, what is 15 − 6?"**
Year 3	**Inverse operations and unknown values** Your child learns that addition and subtraction **undo each other** — they are inverse operations. **8 + 5 = 13 → 13 − 5 = 8** They find unknown values in number sentences: **□ + 4 = 9 → □ = 5 (subtract 4 from 9)** **17 − □ = 9 → □ = 8** **unknown** — the missing number, shown as a □ or a letter like **n** They extend number facts to larger numbers: 18 + 7 = 25, so 180 + 70 = 250	**'□ + 6 = 14. What is □?'** **Think: 14 − 6 = □** **'23 − □ = 15. What is □?'** **"If 7 + 8 = 15, what is 70 + 80?"**
Year 4	**Unknowns in multiplication and division equations** Your child finds unknowns involving multiplication and division: **□ × 6 = 42 → □ = 7 (recall: 7 × 6 = 42)** **48 ÷ □ = 8 → □ = 6 (recall: 48 ÷ 6 = 8)** **5 × □ = 35 → □ = 7** They recall all **multiplication facts to 10 × 10** and use them to solve equations quickly. They use the **commutative property**: 6 × 7 = 7 × 6 (order doesn't change the product).	**'□ × 8 = 56. What is □?'** **(Think: 7 × 8 = 56)** **'63 ÷ □ = 9. What is □?'** Flash cards: multiplication facts to 10 × 10. **"Is 6 × 9 the same as 9 × 6? Why?"** ***Year 5 and 6 on next page***

	Year 5	**Inverse operations and families of facts** Your child deepens understanding of how multiplication and division are inverses: **Fact family: 6, 7, 42:** **6 × 7 = 42 7 × 6 = 42 42 ÷ 6 = 7 42 ÷ 7 = 6** They find unknowns in more complex equations: **n × 12 = 96 → n = 8 (96 ÷ 12 = 8)** **144 ÷ n = 12 → n = 12 (144 ÷ 12 = 12)** **factors** — numbers that divide exactly into another: factors of 12 are 1, 2, 3, 4, 6, 12 **multiples** — the results of multiplying: multiples of 4 are 4, 8, 12, 16…	Write the full fact family for 8 × 9 = 72. **'n × 7 = 63. What is n?'** List all factors of 24. **"What are the first 5 multiples of 6?"**
	Year 6	**Growing patterns, brackets and order of operations** Your child works with equations that include brackets: **(3 + 5) × 4 = 8 × 4 = 32 (brackets first!)** **3 + 5 × 4 = 3 + 20 = 23 (multiplication before addition)** **order of operations**: the rule for which operation to do first: **1st: Brackets 2nd: Multiply/Divide 3rd: Add/Subtract** They also work with growing number patterns: **Pattern: 3, 7, 11, 15… Rule: start at 3, add 4 each time** **They predict the 10th term: 3 + (4 × 9) = 39**	**'Calculate (8 + 4) × 3'** **(Add inside brackets first: 12 × 3 = 36)** **'Calculate 8 + 4 × 3'** **(Multiply first: 8 + 12 = 20)** Pattern: 5, 9, 13, 17… **"What is the rule? What is the 8th term?"**

★ How algebraic thinking grows from Foundation to Year 6

Foundation–Year 1 Patterns	Year 2–3 Missing numbers	Year 4–5 Unknowns in equations	Year 6 Order of operations
 Repeating pattern [red, blue] 2, 4, 6, 8, 10… Skip counting by 2s Rule: add 2 each time	5, 10, ___, 20, 25 Missing = 15 □ + 6 = 14 □ = 8 (subtract 6 from 14)	□ × 8 = 56 □ = 7 (7 × 8 = 56 ✓) n × 12 = 96 n = 8 (96 ÷ 12 = 8 ✓)	(3 + 5) × 4 = 8 × 4 = 32 3 + 5 × 4 = 3 + 20 = 23 (multiply first!)

The big idea: *algebra is about noticing patterns and rules. Every time your child says 'it goes up by 3 each time' or 'if I know 6 × 7 I also know 42 ÷ 6', they are thinking algebraically!*

Helping at Home — Patterns & Algebra

Worked examples and questions to ask · Foundation to Year 6

How it works — worked examples

Year 2 — Growing and shrinking patterns

Find the missing numbers: 4, 8, ___, 16, ___, 24

Find the rule	Each number goes up by 4. Rule: start at 4, add 4 each time.
Fill the gaps	**4, 8, 12, 16, 20, 24 ← missing numbers are 12 and 20**
Check	8 − 4 = 4 ✓ 12 − 8 = 4 ✓ Always the same difference!

Year 3–4 — Finding the unknown value

Solve: □ × 7 = 56

Think	□ × 7 = 56 means 'what number multiplied by 7 gives 56?'
Use inverse	Division undoes multiplication. So 56 ÷ 7 = □
Calculate	56 ÷ 7 = 8 (recall: 7 × 8 = 56)
Check	**8 × 7 = 56 ✓ □ = 8**

Year 6 — Order of operations with brackets

Compare: (2 + 6) × 3 and 2 + 6 × 3

	(2 + 6) × 3	2 + 6 × 3
Step 1	Brackets first: (2 + 6) = 8	Multiply first (before adding): 6 × 3 = 18
Step 2	Then multiply: 8 × 3 = 24	Then add: 2 + 18 = 20
Answer	**= 24**	**= 20 (different answer!)**

Key rule: *Brackets change the answer! Always work out what's inside brackets first.*

Questions to ask your child

You do not need to know the answer. Ask and let your child explain!

F Foundation

→ Clap a pattern: clap tap clap tap… What comes next?
→ Build a pattern with two colours. What is the repeating part?
→ Can you make a pattern that goes [A A B A A B]?

1 Year 1

→ Count by 5s to 50. What number comes after 35?
→ What comes next: 10, 8, 6, 4…?
→ Where will the 8th clap land if we clap by 3s?

2 Year 2

→ Find the missing number: 6, 12, ___, 24, 30.
→ If 8 + 9 = 17, what is 17 − 9?
→ Make a pattern that decreases by 4 from 40.

3 Year 3

→ Solve: □ + 8 = 15. How did you find the answer?
→ Solve: 20 − □ = 13.
→ If 6 + 7 = 13, what is 60 + 70?

4 Year 4

→ Solve: □ × 9 = 63.
→ Write the fact family for 7, 8 and 56.
→ Is 6 × 8 the same as 8 × 6? Why?

5 Year 5

→ Solve: n × 11 = 132.
→ List all factors of 36.
→ What are the first 6 multiples of 7?

6 Year 6

→ Calculate (4 + 3) × 5.
→ Calculate 4 + 3 × 5. Why is the answer different?
→ Pattern: 2, 5, 8, 11… What is the rule? What is the 10th term?

Things to try at home

Any age: Spot patterns everywhere — floor tiles, fabric, music, clapping games. 'What is the repeating part?'	**Year 1–2:** Count the stairs by 2s, or the fence posts by 3s. 'What will the next number be?'
Year 2–3: 'I'm thinking of a number. I add 7 and get 15. What was my number?' Take turns making these puzzles.	**Year 3–4:** Flash card drills for multiplication facts. 'If 8 × 7 = 56, what is 56 ÷ 8? And 56 ÷ 7?'
Year 5: 'List all the factors of 48. Which factors do 48 and 36 share?' (Common factors)	**Year 6:** Try: 10 × (3 + 7) vs 10 × 3 + 7. 'Do you get the same answer? Why not?'

Key words to learn together

pattern: something that follows a rule and repeats or grows in a predictable way	**repeating unit:** the section of a pattern that repeats over and over: e.g. [red, blue, red, blue…]
skip counting: counting by a number other than 1: by 2s, 5s, 10s, etc.	**rule:** the instruction that describes how a pattern works: 'add 3 each time'
unknown: the missing value in an equation, shown as □ or a letter like n	**number sentence:** a statement with numbers and symbols: 8 + □ = 15
inverse operations: operations that undo each other: addition ↔ subtraction; multiplication ↔ division	**commutative property:** the order of numbers doesn't change the answer: 6 × 7 = 7 × 6
factor: a whole number that divides exactly into another: factors of 12 are 1, 2, 3, 4, 6, 12	**multiple:** the result of multiplying a number by a whole number: multiples of 4 are 4, 8, 12, 16…
brackets: grouping symbols ( ) — always calculate what's inside brackets first	**order of operations:** the rule for which operation to do first: brackets → multiply/divide → add/subtract