

INSTRUCTIONAL GUIDANCE: ADDITION & SUBTRACTION

Teaching guidance and background

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ENSSA assesses Year 1 students' developing accuracy and fluency with addition and subtraction number facts. These tasks draw on students' understanding of part-part-whole relationships, counting strategies, efficient derived-fact strategies and, over time, automatic recall.

This guidance is linked to the Year 1 Number Facts Addition and Number Facts Subtraction subtests. Foundation teachers should use the Decomposition guidance as the main recommendation for early number operations, but may draw on this guidance when students are ready for addition and subtraction facts.

What it looks like

Students are developing arithmetic when they can solve, explain, and increasingly recall addition and subtraction facts using number relationships rather than relying only on counting-by-ones.

This may look like:

Increasingly fluent recall of number facts, including part-part-whole facts and doubles within 20

- ▶ “___ and ___ make ___.
- ▶ “___ plus/add ___ is equal to ___.
- ▶ “___ take away/minus/subtract ___ is equal to ___.
- ▶ “The difference between ___ and ___ is ___.
- ▶ “___ is ___ more than ___.
- ▶ “Double ___ is ___.

Using number fact strategies to solve more difficult two-digit problems more efficiently

- ▶ “I broke ___ apart into ___ and ___ to solve the problem.
- ▶ “I used the double ___ + ___ = ___ to help me solve ___ + ___.
- ▶ “I used ___ to help me solve ___.
- ▶ “I know ___, so I can work out ___.

Explaining how they solved an addition or subtraction problem

- ▶ “First I ___, then I ___.
- ▶ “I know the answer is ___ because ___.
- ▶ “The parts are ___ and ___. The whole is ___.
- ▶ “I used the strategy ___ because ___.

Why does it matter?

- Early arithmetic skills are strong predictors of later mathematics achievement throughout primary school and beyond. Persistent difficulties with basic addition and subtraction are a hallmark of students with long-term mathematics challenges.
- Explicit teaching of part-part-whole relationships and place-value understanding supports arithmetic development.
- Students benefit from moving beyond counting-by-ones towards more efficient strategies and automatic recall of basic number facts, which is why fluency-based computation tasks are widely used for screening and progress monitoring for both early numeracy and later mathematics.

- Arithmetic understanding supports development of more complex mathematics skills, including word problems, advanced calculations and algebra.

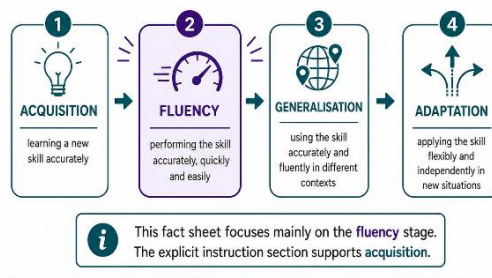
Goal of instruction

The goal of instruction is to move students from early counting strategies towards accurate, efficient and increasingly automatic addition and subtraction strategies. Students should develop strong number understanding, part-part-whole knowledge, place-value understanding, and a growing bank of known facts that can be used flexibly.

Students need to build both **accuracy** and **fluency** with number combinations so that they are able to **generalise** this knowledge to solving problems effectively. This advice focuses on the acquisition and fluency stages of learning, with a heavier focus on fluency because acquisition instruction is often well covered in core curriculum teaching. The explicit instruction section supports acquisition; the review and practice section focuses mainly on fluency once students are accurate.

INSTRUCTIONAL HIERARCHY

Learning moves through four connected stages.



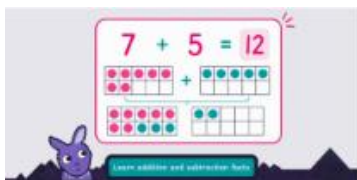
Adapted from Haring, N. G., Lovitt, T. C., Eaton, M. D., & Hensen, C. L. (1978). *The fourth R: Research in the classroom*. Columbus, OH: Charles E. Merrill.

Building accuracy (the acquisition stage)

At the acquisition stage, students are learning how and when to execute strategies accurately.

Effective addition and subtraction instruction at the acquisition stage:

- Relies on secure counting procedures and principles
- Requires skill in recognising and writing numbers and mathematical symbols (numerals, +, -, =)
- Involves explicitly teaching number relationships and efficient strategies
- Teaches strategies beginning with concrete materials or representations, e.g. teaching addition by counting using blocks or lines
- Involves high levels of teacher modelling and feedback after each trial
- Cover-Copy-Compare can be used after a fact or strategy has been introduced, when students still need a correct model, accurate rehearsal, self-checking, and immediate correction.



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Explicit instruction

Explicit instruction involving deliberate teacher modelling, and the gradual release of responsibility to students is an excellent teaching strategy for the acquisition stage. Check the “Explicit Instruction Routine Examples” for examples of how these can be presented to maximise both support for and the active involvement of students.

Teachers **explicitly model** addition and subtraction strategies using a **Teacher Modelling / Guided Practice / Supporting Independent Practice** approach. Instruction should include modelling efficient strategies such as counting-on, doubles, near doubles, part-part-whole reasoning, making tens, and using tens and ones to solve problems mentally.

Concrete and visual materials such as counters, ten-frames, number tracks, number paths, hundreds charts, and Base-10 materials should be used to develop conceptual understanding of the process of addition and subtraction before gradually reducing reliance on materials as students develop fluency and automaticity.

Guided practice should include multiple **opportunities to respond**, **immediate feedback**, and regular **checks for understanding** to ensure students are using efficient strategies rather than relying primarily on counting-by-ones.

Independent practice and **review** activities should provide repeated practice solving addition, subtraction, and mental computation tasks across increasing number ranges.

Students move repeatedly between acquisition and fluency as new fact sets and strategies are introduced. A fact set should not be practised for speed until students can solve it accurately. If students are fast but inaccurate, return to explicit modelling, guided practice, immediate feedback and a smaller fact set.

Building fluency (the proficiency stage)

Once students can perform a skill accurately and independently, they need opportunities to build fluency. Instruction should progressively support students to retrieve a growing bank of number facts automatically, because many flexible strategies depend on facts students already know.

Effective addition and subtraction instruction at the fluency stage includes:

- Frequent practice with small, taught fact sets
- Many opportunities to respond, e.g. choral responses, whiteboard work, practice pages
- Timed practice, attempting personal best scores rather than comparison with peers

Students move repeatedly through acquisition and fluency/proficiency stages with larger numbers and increasingly complex calculations. Gradually increase difficulty through:

- addition and subtraction within 10
- bridging through 10
- two-digit calculations
- problems requiring place-value understanding

Effective approaches to build fluency work with small sets of facts practised to mastery, with many opportunities to respond. If fluency in arithmetic facts is an area of need at the class level, structured practice programs may be considered such as:

- MIND: Facts on Fire by Dr Brian Poncy and Dr Gary Duhon (free – see Resources for link)
- Numbots by MathsCircle (subscription)

Effective instruction supports students to move beyond counting-by-ones towards more efficient mental strategies and increasing fluency.