**Number facts**

Automatic recall of number facts is an essential aspect of efficient mental computation. Other aspects include flexible place value understanding, partitioning and operational sense. Having instant recall of number facts enables children to concentrate on the steps within computation methods.

Using and applying several key thinking strategies flexibly will help children recall number facts efficiently. Many children who are not able to recall key number facts often treat each fact as a new calculation. As a result, students may revert to using inefficient strategies, including extended counting.

Once students have flexible mastery of several key thinking strategies, they will develop secure knowledge of some key number facts and appreciate that from the answer to one problem, other answers can be derived. Strategies for recalling addition number facts and the related subtraction facts need to be efficient and meaningful.

Students who have an understanding of the Commutative principle for addition
(8+4 = 4+8) and Identity principle (adding and subtracting zero) can greatly reduce the total number of facts that need to be learned.

**Strategies for addition facts and related subtraction facts**

Curriculum into the Classroom identifies the following thinking strategies for recalling addition number facts, and the related subtraction number facts:

* Use counting
* Use doubles
* Use five
* Use ten
* Use a rule
* Think addition (for subtraction)

**Use counting**

* Addition: 4+1, 1+6, 9+2, 2+7
* Subtraction: 7-1, 9-2
* Other applications: 5+=7, 8-6=

Counting on or counting back from one number is an early trusted strategy for children. It builds on children’s initial counting experiences.

Students will generally ‘use counting’ to solve single digit addition or subtraction when they have no other, more efficient strategy. As a result, students may become over-reliant on counting as a strategy.

The ‘use counting’ strategy should be used for adding and subtracting 1 and 2. For all other addition and subtraction number facts, more efficient thinking strategies can be applied.

**Use doubles**

* Addition: 4+4, 6+6, 3+4, 8+7, 5+7
* Subtraction: 8-4, 12-6, 7-3, 17-8
* Other applications: 4+=8, 13-=7

Students’ knowledge of doubles develops through experience with structured materials, including ten frames. Often, doubles facts are reinforced with the use of visual images, e.g. 4+4 as legs of a spider, 6+6 as eggs in an egg carton.

As students become fluent with doubles facts, they can derive strategies for recalling the facts near to the doubles.

**Use five**

* Addition: 3+2, 1+4, 3+4
* Subtraction 5-4, 7-2

Before students recognise the significance of ten, children will often identify and use five as a benchmark number. Children can often subitise collections of five, and see five in parts, e.g. 2 and 3 or 4 and 1. For these reasons, ‘using five’ often develops as a natural strategy for young students.

The ‘use five’ strategy will often be replaced by other strategies as students develop fluency with other thinking strategies.

**Use ten**

* Addition: 6+4, 3+7, 8+4, 7+9
* Subtraction 10-4, 11-7
* Other applications: 2+=10, 10-=7

The ‘use ten’ strategy typically develops from the “use five’ strategy and builds on students’ ability to flexibly partition ten and seeing the parts that make ten. Students with well-developed part-part-whole thinking will see that ten and numbers near to ten can be split in different ways, and these partitions assist in recalling basic facts.

Recognising patterns, particularly partition pairs for ten (including 1 and 9, 2 and 8, 3 and 7, 4 and 6, 5 and 5) is an important initial phase of the strategy. Students then typically derive a strategy of building up to the ten, e.g. with 8+4, students may partition 4 as 2 and 2, build up the 8 to ten and add the remaining 2. In subtraction, e.g. 11-7, students may partition 11 as 10 and 1, and solve as 10-7 plus 1.

A critical place value extension to the ‘use ten’ strategy is for students to have instant recall of ’10 plus’ facts, e.g. 10+5. These can be represented with structured materials, including twenty frames and place value beads.

**Use a rule**

* Addition: 5+0, 0+9
* Subtraction: 7-0, 4-4

This is not a strategy in the same sense as those presented earlier. Students’ early number study needs to include a focus on operations involving zero (Identity principle for addition and subtraction).

Through experience with interpreting, acting out and representing addition and subtraction stories involving zero, students will derive the following ‘rules’:

* When zero is added to any number, the answer is always the other number
* When zero is subtracted from any number, the answer is always the other number
* When all of a collection is taken away, the answer is zero.

Naturally, these simple rules apply to numbers beyond single digits and as a result are critical for later mental computational fluency.

**Think addition**

* Subtraction: 9-4 (Think 4+=9), 13-7 (Think 7+=13)

The ‘think addition’ strategy for subtraction relies on students’ awareness of the inverse relationship between addition and subtraction and their ready recall of related facts.

Related facts are often represented with structured materials, including basic fact grids, fact family triangles and part-part-whole models. See below.

   

   