

Calculation Procedures

Principles that underpin this document:

- Mental fluency is an essential complement to efficient written methods.
- Pupils need to develop a range of efficient strategies for calculation, and need to know which to use in a given situation.
- At all stages of learning, pupils should be given opportunities to *understand* the methods they encounter.
- Pupils should learn a progression of strategies in each of the four operations, leading eventually to the most efficient methods. The complementary nature and inverse of addition and subtraction, and of multiplication and division, should be emphasised at every opportunity.

These are all sensible principles. However, problems can arise if....

- We attempt to teach a method in isolation, without reference to those which precede and those which follow.
- Pupils are exposed to too many methods and end up confused.
- We are too rigid in our approach, and only teach a particular method at a particular time, instead of teaching something when pupils are ready.

Mental or written?

A lot of everyday maths is performed mentally, so pupils should be encouraged to use mental skills when they are confident so that they can do so accurately. However, pupils can be over-confident about their mental abilities, or perhaps would just prefer to write less, and so may opt for a mental method when they should not. If a written method is being taught, it is perfectly reasonable to insist that it is used during tasks designed to practise it. However, in individual problem solving situations, part of the process of tackling the problem will involve deciding what kind of calculation method to use, and whether this should be mental or written. Each and every time a child looks at a problem involving calculation they should go through these questions:

- Can I tackle this calculation mentally?
- If not, which is the most efficient written method I know to solve it?
- Do I have a rough idea of what the answer will be?

This is the area where we need to step back and allow some independence. In this type of situation we cannot be the judge for each and every child as to what is the most suitable method. They must choose for themselves. However, progression in the teaching of calculation methods should lead pupils as far as possible down the road towards the most efficient method, i.e. one which is quick and accurate (accuracy being more important than speed).

These procedures give examples of the progression of skills and suitable activities in the lower levels, and guidance on the progression of written methods in the four operations from 10 onwards. Levels 1-3 are not subject specific but are included in the document for reference. It is designed to work alongside the mental methods taught in each level, as pupils should use mental methods efficiently to help them find their answers, for example knowing their multiplication tables when finding the answer to a division question by subtracting groups of numbers (chunking). If someone were to look through a pupil's book halfway through the academic year, they should be able to see their journey through their progression in their use of written methods in the four operations.

Key vocabulary is noted throughout the document, as well as guidance on methods, such as when we count up on a number line the jumps are above the number line, when counting back, jumps are recorded below the number line.

At Ravenswood, when pupils are doing written calculations, they must always record the methods they used.

When problem-solving, all pupils need to follow the RUCSAC method (appendix at end of Calculation Procedures).