



Retrieval and recall of learned knowledge in maths and English

All progress and attainment builds on prior learning, so retrieval and recall of core knowledge is essential to prevent having to reteach content repeatedly. Retrieval and recall practice needs to be systematically built into the curriculum to give pupils the best chance to maintain high levels of performance.

Retrieval and recall in maths

This can be grouped under three headings:

1. The maintenance of **fluency**, *e.g. number bonds and multiplication tables*.
2. The maintenance of learned **methods and processes**, *e.g. column addition or long multiplication*.
3. The retention of **conceptual knowledge and understanding**, *e.g. the properties of shapes*.

The methods used for retrieval and recall will vary according to the group in focus.

1. Fluency of number bonds and multiplication tables.

This is best learned and recalled through FAST Maths (document available by email from David) which was specifically designed to ensure the accurate learning of the content, combined with efficient and rapid recall.


Online resources enable pupils to practise their number knowledge, but rarely help them improve it as they are essentially 'testing' pupils in each interaction. If the pupil does not know an answer they have little opportunity to correct themselves. FAST Maths resolves this by ensuring that pupils record, and therefore learn, only correct answers. Fluency needs to be practised frequently (3-4 times a week) until it is secured. After this the frequency can be reduced significantly.

2. The maintenance of learned **methods and processes**.

Methods such as column addition, subtraction, multiplication and division, together with calculations involving measures and fractions need periodic practice to be maintained. Usually these can be set and completed by pupils in independent working sessions. The critical factor is that errors are identified immediately and resolved through class discussion or revisiting in the next session. If this is not done then pupils are at risk of repeating their mistakes, unintentionally reinforcing their misconceptions.

3. The retention of **conceptual knowledge and understanding**.

This often depends on the use of mathematical language in reasoning and explanation to demonstrate knowledge and understanding. For example, in most age groups we might show pupils a square and ask them to list all the properties they know about it. These types of explanations are best secured in partner or small group talk so that pupils share



knowledge and reinforce each other. This might be recorded, and is then best shared verbally across the class so that all pupils benefit from the collective knowledge generated. This approach can also be used in problem solving. Pupils do not necessarily *need to solve* the problem, but need to show that they can *explain how they would do so*.

Programming retrieval and recall in maths

Retrieval coverage cannot be randomly implemented in classes, as this is likely to lead to gaps and inconsistencies. On the other hand some flexibility is needed by teachers to respond to emerging assessment information.

Fluency needs **regular and frequent practice** until secured. At the building stage this may mean 3-4 times a week to secure number bonds and tables for 10-15 minutes each session. This investment of time will 'pay back' in efficiency and time saved when pupils apply fluency in other maths calculations.

Calculation methods and processes need **regular, but not necessarily frequent practice**. Once a week usually suffices with a few worked examples that are explored and confirmed verbally as a class. This coverage focuses on skills learned in previous years and earlier in the same year to maintain competency.

Conceptual knowledge and understanding needs **periodic practice** depending on when it was last covered. Maths leaders will need to look at the pattern of curriculum coverage and plan in when specific content needs retrieval practice. This will often mean revisiting knowledge taught in previous years.

Calculation methods and conceptual knowledge coverage can be planned into the curriculum on a half termly basis. This gives class teachers capacity to cover it, and allows ongoing flexibility to respond to needs identified from assessment of current work.

Weaker practices

These sometimes include:

- Infrequent or erratic practice of fluency.
- Fluency testing and marking with no opportunity for pupils to understand why some answers are incorrect.
- Tests with multiple formats of fluency, calculation and problem solving where there is no exploratory follow up and errors are 'buried' in the wide range of questions.
- Repeated individual practice, removing the opportunities for pupils to learn from each other and therefore limiting their knowledge gain.



Retrieval and recall in writing

This can be grouped under two headings:

1. The maintenance of **word knowledge**, *e.g. spellings, vocabulary and word use.*
2. The maintenance of **sentence knowledge**, *e.g. the application of vocabulary, spelling, punctuation and grammar combined with composition.*

Word knowledge strategies


Strategy	Practice focus	Notes
Look, cover, write, check (LCWC)	Spelling and handwriting	LCWC is an individual activity. Spellings can be differentiated to individual needs. It is essential that the pupil looks at the correct spelling, covers it then writes it, then repeats the process across the page. Teachers need to scan the output to ensure that spellings have been recorded correctly and that handwriting meets expectations.
Paired or trio spelling practice	Listening and Spelling	One pupil reads a spelling from a card then covers it. Both pupils write the spelling and compare their answers, checking them against the card. They then change roles. As this self-corrects little or no teacher scanning is usually needed.
Synonyms and antonyms	Vocabulary recall and spelling	Pupils are given one word in pairs or trios and asked to list vocabulary with similar or opposite meanings. By talking together they generate and compare more ideas. They also record them collaboratively, checking each other's spelling.
Missing words	Vocabulary	Pupils are given a sentence with one or more words missing. They copy the sentence and fill in their choice of missing word. They could write more than one option. These choices can be compared and discussed across the class. The challenge level can be raised for older cohorts with the complexity of the sentence and choice of missing words.



Sentence level strategies

The strategies below are in approximate increasing difficulty, but are applicable to most cohorts if the stimulus sentence is accessible to pupils.

Strategy	Practice focus	Notes
Copy Cat	Transcription Handwriting resilience	Pupils are given a sentence. They copy this into their books accurately giving them handwriting stamina and resilience. Note – <i>this is not a taught handwriting activity but provides practice</i> . They then rewrite it, changing one feature as directed. Specific elements to be recalled are built into the sentence to remind pupils and can be identified / discussed afterwards.
Observational sentences	Observation Composition	Pupils are given a pictorial stimulus and are asked to write 1-3 sentences about what they can see, deduce or infer. Ideas are shared and compared.
Editing sentences	SPAG Composition	Pupils are given one or more sentences and are asked to edit them. This may include inserting punctuation or improving the sentence by changing vocabulary. In older cohorts they may be asked to add clauses. There is good opportunity for class discussion to compare answers and ideas.
Building sentences from key words	Composition	Pupils are given 1, 2 or 3 key words and have to build a sentence that incorporates all of the words provided. The level of difficulty is easily varied by changing the words provided. Words can be used in any order in the sentence. Teachers may allow adjectives to be turned into adverbs and the tense of verbs to be changed. There are lots of opportunities for comparing the outcomes.
Punctuating sentences	SPAG	Sentences with no punctuation can be simple (inserting capital letters and full stops) or very complex (sentences with clauses and direct speech). It is essential that the correct answer is explored verbally together and ideally modelled on the board and that pupils correct their own work at the same time. Teacher scanning is desirable to see how pupils manged and what was corrected (in coloured pen).



Finishing sentences	Composition	Pupils are provided with the beginning of a sentence, copy it, and complete it in any way they wish. Ideas are shared and compared.
Beginning sentences	Composition	Pupils are given the end of a sentence and write a beginning that links to it. This is more challenging than writing an ending. Ideas are shared and compared.
Re-ordering sentences	Reading Composition	Pupils are given a sentence. They copy it, then reorder the content with minor adaptations of wording, retaining the core meaning. For example: <i>The cat sat on the rug by the fire on the cold day.</i> <i>On the cold day the cat sat on the rug by the fire.</i> <i>In front of the fire the cat was sitting on the rug because it was a cold day.</i>
Correcting sentences	SPAG Editing	Pupils are given a sentence with errors in it – SPAG, spellings or vocabulary that does not make sense. They re-write the sentence ensuring that it is correct. It is essential that the errors are identified through class discussion to ensure pupils recognise them.
Jumbled sentences	Composition	The words in one sentence are jumbled. Pupils have to reorder to make sense. All words must be used unchanged. As the complexity of the sentence increases this can be a very challenging activity. It might be completed in pairs to facilitate discussion and debate. There may only be one correct answer, or more than one to explore. Alternatives can be shared and validated.
Writing the next sentence	Reading Composition SPAG	Pupils are given one sentence and are asked to write the next sentence that might follow on. They might be instructed to include specific SPAG elements. Ideas are shared and compared.

These strategies can be differentiated for cohorts through the complexity of the language and SPAG used. They will not all be used in short periods but are likely to last a full year. The choice and repetition of strategies will probably need to be chosen by teachers to meet the assessed writing needs of the class.