Key things to consider

- Short, low-stakes tests or 'quizzes' in various formats can be a cheap, easy-to-implement way of recapping material that might strengthen pupils' long-term ability to remember key concepts or information.
- Planning test difficulty is particularly important—pupils should be able to retrieve at least some of the content they are tested on.
- Quizzing or low-stakes testing may also reveal misconceptions. How will you ensure that where these emerge pupils are supported to overcome them?

What is the theory?

Retrieval practice describes the process of recalling information from memory with little or minimal prompting. Low stakes tests (such as individual questions or quizzes) are often used as methods of retrieval practice as these require pupils to think hard about what information they have retained and can recall. When used in this way, tests can be a strategy *for* learning in addition to being an assessment *of* learning. The retrieval practice evidence base (both basic and applied) suggests that testing learning is often a better strategy *for learning* than restudying or recapping the same information.

Cognitive science informs us that memory has a 'strength', referring both to how easily something can be recalled and how deeply information is embedded. When content is studied and recalled, both types of memory strength increase, meaning that information is more easily accessible and that this accessibility is more durable.

It is thought that by testing for knowledge of previously learnt content, retrieval practice encourages pupils to strengthen their memory on key concepts or information. Also, the testing process makes pupils aware of weaknesses in their memory and gaps in their understanding, thereby supporting self-monitoring of learning that can lead to the development of strategies for improvement.

How do teachers use retrieval practice in the classroom?

The most common application of retrieval practice in the classroom is using low-stakes quizzes to encourage learners to retrieve information from their long-term memory. Retrieval practice is often contrasted with recapping material—where the teacher reminds pupils of previous learning rather than asking learners to recall it themselves.

The low-stakes quizzing can take many forms including:

- multiple choice questions;
- short-answer fact questions;
- short problem-solving;
- true/false questions;
- labelling diagrams;
- image recognition;
- recitation of quotes or definitions; and
- list creation.

Retrieval practice might be combined with other approaches—for example, providing targeted feedback on the outcomes of the low-stakes quizzes.

An example approach

At the beginning of German class, Mrs Key asks the class to think back to their learning from the previous week and to list as many of the German words for animals as they can on a sheet in front of them.

What has been researched?

The research summarised here examines any activity that requires students to recall information from memory rather than recapping, revising, or restudying the information. This can include partial recall of information supported by hints, cues, scaffolds, or other contextual information. A common way of achieving this in a classroom is through low-stakes quizzes, questions, and tests.

What does the evidence say?

When compared to no recap activity at all, the evidence for using quizzes is moderate and generally positive.

Most studies that compare quizzing to forms of re-study or recap have a positive impact—though there are high levels of variation in the evidence and some negative results.

One of the weaknesses of the evidence is that many of the approaches are designed and delivered by researchers rather than classroom teachers. There are examples of teacher-delivered quizzing having a positive impact but given the lack of studies, a firm conclusion is not possible. There are also questions about whether retrieval practice is as effective for more complex or subtle learning beyond rote factual recall.

Despite these limitations, the positive impact of the retrieval studies, the good theoretical grounding of the practice, and the low cost of implementing low-stakes testing and quizzing generally mean that it is a promising approach that teachers should consider.

Implementation

Teachers have identified numerous ways that retrieval practice can be implemented and very few barriers to implementation were identified. Practices identified by teachers included:

- use of knowledge organisers to rehearse learning points;
- retrieval grids;
- labelling diagrams with gradual reduction of information; and
- true or false, multiple choice, cloze procedure, and finish the sentence.

At present, the evidence is uncertain about which activity formats are most effective and whether retrieval practice can help students learn 'higher-order' or more subtle learning content beyond factual recall. There are, however, a number of factors that teachers should consider when implementing retrieval practice—particularly around whether additional support is required for pupils that struggle. When one provides a test to a group of students, they will—to varying proportions:

- successfully retrieve some answers;
- be unable to retrieve others; and
- erroneously retrieve some answers (for example, misconceptions).

A key consideration when implementing retrieval approaches should be how to determine optimal task difficulty. If pupils are unable to retrieve information successfully then this is unlikely to increase memory strength, however, the evidence is currently uncertain about optimal level of challenge. It should be noted that quizzing has other potential benefits beyond encouraging pupils to retrieve information. For example, testing might identify gaps in knowledge and where pupils erroneously retrieve wrong answers, feedback might be used to support learning and help pupils overcome misconceptions.

An interesting challenge is how to combine retrieval practice with spaced learning. Spacing lessons might make pupils less able to retrieve information. If teachers are implementing both approaches together, they could carefully monitor whether the approaches are additive and check that spacing does not reduce the ability of pupils to retrieve information successfully. Spaced retrieval can also potentially answer questions about which learning content to prioritise in a crowded curriculum. Moreover, revisiting previously-taught content as part of retrieval practice—while it is likely to be preferable to restudying or reteaching (assuming that the material was successfully learnt)—may also encroach on the time available to teach new material.

What is the evidence based on?

The review found 21 studies that compared retrieval practice to restudy.

- The studies spanned students from early years to older pupils aged 16–17. There was a good spread across primary and secondary pupils
- Studies looked at a wide range of subjects including language, history, maths, science, and English.
- Only one of the 21 studies was delivered by regular class teachers. Others were delivered by researchers (in keeping with the aim of this review, all studies did take place in school rather than lab settings).