Ways to Improve Student Memory

When students struggle to use what they've learned in the past it causes huge issues with both time and further learning.

1. Deeper Initial Learning… they why and what more than the how. Teach procedure as a natural consequence of the conceptual properties possessed by the topic at hand. A great example is factoring as the opposite of distributing. This connects topics for students and helps them understand more deeply, which improves recall. Another example is teaching why x =0 for y-intercepts, and why the equation of the y-axis is x=0. Or teaching that a graph is a picture of all answers. So when you're graphing, that's what you're doing. Show the how as little as possible.

2. Language and Structure: The way math is written, the spatial arrangement, contains meaning. That is very different than the way spoken languages are written.

If you can put something like (x -1)(x+3) = 0 on the board and the students immediately starting doing stuff, you have a big problem on your hands. Or, maybe more likely, the next teacher will have a huge problem.

Instead of reading instructions, written in English or mathematically, the students are performing steps based upon false ques. *When it looks like this, we do this …* Math is not a video game where you're successful if you hit up – left – down – down – down – triangle you win. The steps, the how, are contextually determined.

Focus on the language of math and the structure of how its written. An example is with exponents. Instead of teaching exponents as a list of "laws" or "rules" I suggest teaching exponents as repeated multiplication. All of the "laws" come from the fact that exponents are a short-hand way of writing repeated multiplication. In a future video I'll show how negative exponents can be discovered this way, too. The rules are a great summary tool, but they'll forget the rules. They'll likely remember the idea and thus can reconstruct the rules.

3. Vocalization: It is entirely possible that we cannot have memories without language. It's a fascinating topic, and whether that is the actual reality or not isn't important. But what is important is that memories are stories and stories are language. If a student can do a problem but cannot explain it, they don't know.

   Again, a student that says, "I know it, but don't know how to say it," will NOT retain that knowledge. The ability to vocalize and articulate thinking, without use of many pronouns, using rich mathematical language, is paramount to understanding and retention. And by just paying separate shipping and handling, there's a bonus gift. The ability to articulate will make them more critical thinkers and that will translate to all subjects and impact their daily lives.

4. Note Taking Habits: Having students write their observations and questions more than copying what's on the board. Also having students writing about what something is, and why things are, instead of how to do them, will promote retention by making them understand the subject more deeply. An example is logarithms, and another is square roots. A great way to think about both is that they're questions written mathematically. <expound on this in a document>

5. Assessments and Activities that Integrate Multiple Concepts

   By having students apply what they're learning in unexpected, untaught ways (they have to figure out), you'll promote retention because you'll for them to challenge what they know. Also, having them use "old" information without warning to answer a question promotes their fluency in and is a practice in recall. <Cambridge problem here>