

Review - "You should already know this."

Helping students maintain mathematic or arithmetic skills is the responsibility of all secondary math teachers. Often you'll hear a math teacher say, "You should have learned that in your last class. That's the job of the teacher of the class before this. I covered that topic. Now I can move on." In reality, it doesn't work that way.

Expecting students to master a topic well enough to recall it and use it months later, even though it was taught only once, shows complete disregard for learning theory. Some teachers may operate under the theory that one exposure to a topic is all that is needed. In such classes, final exams and chapter tests frequently reveal that long-term learning did not take place; recall was difficult. Ineffective reprimands for poor student success include, "But I already taught you that. You should know that! You learned it last year. You learned that in Algebra I. Why don't you know it?"

To retain mathematical skills, students must use them over and over again and see links to previously learned concepts. Students forget skills that are not frequently used. Just think – if math teachers were asked a few simple questions from pre-calculus, calculus, or another higher class than they currently teach, would they have difficulty answering them? Would they have to stop and think about solving them? Or, for example, would they have difficulty answering questions from another subject, such as history or science? When we don't use it, we lose it. The same is true of secondary students. At one time they could have solved a percentage problem, but because they don't practice percentage problems periodically, they forget how to do them. Teachers need to provide frequent practice in basic arithmetic skills and their applications and linkage at the middle school and high school levels. It is not a matter of *if*, but *when* students forget it.

Many successful teachers make it a point to teach or cover everything their students should know in the class. That does not mean that they have to re-teach every topic or skill, but review should be included or embedded in daily instruction, class discussions, note-taking sessions, skills practice, long-term memory review, and quizzes. Teachers have made the following suggestions. Start the class with a quick review. Incorporate review into daily lessons on a regular basis. Include review exercises in homework assignments. From time to time, even give assignments that are exclusively review work. Emphasize to students the value of self review. Require that students take notes and keep a notebook, in order. Include review concepts in assessments and exams. Just because students have completed the assignment on an objective, does not mean that they are through with it forever.

Another suggestion is to set aside a few minutes each week in each course for practice in one of the important skills and its related applications. Be careful, however. Often teachers will address this concern with worksheets or puzzles; some teachers even become a worksheet mill. Games and puzzles become just that. Students solve the puzzles, but don't learn much math. Sometimes they learn to guess and solve the puzzle without doing any of the math. It is important to make the object clear before handing out the puzzle worksheets. After the worksheet is completed, remind them of the purpose or ask students to identify and explain the math involved. Review should not become busywork for students where not much learning takes place.

When searching for review problems, don't limit them to problems from the previous unit; consider the previous year as well. In algebra, use geometry problems that reinforce algebra skills. For example, using measurements, finding slopes, solving for angles, finding elapsed time, solving using integers and decimals or fractions, identifying functions, and graphing on the coordinate plane are concepts that probably have been learned, but must be reviewed periodically.

It is a teacher's responsibility not only to teach skills, but also to maintain them. The *Components of an Effective Mathematics Lesson* include expectations for daily review and long term memory review. **DAILY REVIEWS** provide review for short-term memory over recently taught material. When correcting homework provide immediate and meaningful feedback and hold students accountable. Keep reviews and homework checks brief. **LONG-TERM MEMORY REVIEWS** maintain skills, address deficiencies, and stress important ideas for the year.

Note: The RPDP website, www.rpd.net, contains practice tests and tests for unit resources that include spiraled review for previous skills and concepts. The website also contains long-term memory review practice sets on numerous topics.

