LANGUAGE-BASED STRATEGIES

FOR MATH CLASSES:

HOW DO WE GET THE STUDENTS TO TALK MORE THAN WE DO?

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As teachers, we are all challenged with generating worthwhile DISCUSSION everyday. At a language-based school in particular, we want to remediate oral/expressive skills at every opportunity. Sometimes this is easier in certain classes than in others....

Math presents a particular challenge because of the traditional way it is taught and learned. You, as math teachers, are often in a position of directly offering and/or verifying "correct" answers and processes. How then, do we get the students to generate more of their own "lecturing" and discussion? How do we get THEM to voice the problem solving process more than we do???

In most cases, we simply want to be more aware of the OPPORTUNITIES FOR ORAL REHEARSAL in class each day. We can try:

1. ACTIVATING BACKGROUND KNOWLEDGE (How? When?)

2. TEACHING "SELF-TALK;" HAVING STUDENTS REVEAL THEIR OWN THOUGHT PROCESSES

3. TALKING (OR WRITING!) ABOUT THE PROBLEMS IN THE BOOK, OR HAVING STUDENTS CREATE THEIR OWN PROBLEMS!

4. TEACHING PREDICTION

5. USING COOPERATIVE LEARNING

1. ACTIVATING BACKGROUND KNOWLEDGE

Thoroughly investigating what students already know about a topic/concept is very important in any subject. Thorough discussion before "delving" into this exercise improves comprehension and later performance on the skill. Although this takes some extra time at the beginning, it will save time later on because of the benefits it reaps. How do we do this?

a. Relate any new concept to something they have learned in the Past. Ask them to take guesses at the new skill (what is it? how will we tackle it?; how does this skill relate to the past ones they have learned?; are they building upon something already known?). DISCUSS. Be aware that many students are NOT risk takers and, in fact, may RESIST guessing at something they have not been specifically taught. However, with time and encouragement, students usually get better at this.

b. Ask students to guess at real-world applications. How could they use this skill? Can they try to solve any of the problems WITHOUT a formal introduction by you, the teacher?

2. TEACHING "SELF-TALK" STRATEGIES

"Self-talk" strategies are simply techniques that help a student to verbalize his/her thought process more effectively. Revealing thoughts out loud not only helps the student to "hear" their own reasoning (and usually clarify it for them!), but it also helps you, the teacher, to see how they are drawing their conclusions. This is an "out-loud" skill that promotes discussion and independence on the part of the students.

However, students need to BE TAUGHT a basic repertoire of questions in order to LEARN and APPLY information:

WHILE LEARNING:

"When can I use this new skill?"

"How is this related to info I already know?"

"What skills are similar (or different) from one another?" "Have I done this before?" "What have I learned that could be useful in this situation?"

TO APPLY INFORMATION:

"In this new situation, can I use skills I already know?"

"Why is the teacher requiring that I do this?" "Is what I'm doing making sense?"

"Have I addressed this assignment correctly?" "Have I answered the question asked?"

"Would I advise someone else to do this?" "Would someone else advise me to do this?"

Methods

a. Make question-asking an integral part of everything you do, before and after.

b. For tests/quizzes, ask students FIRST what they think will be on it; ask them for a "plan of attack" for studying.

1. Also, during tests/quizzes, require that student report their self-questioning strategies: How did they answer the test items? How did they study? Are there questions that they are still pondering? etc.

c. Make this self-questioning just as important as the actual answer to the problem!

d. Keep "typical" question-asking strategies listed on a poster in the room, or in their notebooks for quick reference.

e. MODEL, MODEL, MODEL!! Research tells us that the most effective way to teach this questioning skill is to model it ourselves. Whenever possible, Verbalize YOUR OWN THOUGHT PROCESS in front of the student. Tell them, for example, how YOU might solve the problem!

f. Have students ask the above questions to each other. They can/should discuss them among themselves, as well as with you .

3. TALKING (OR WRITING!) ABOUT MATH PROBLEMS

   a. Regularly have students "evaluate" or give opinions on the problems they have been assigned. Were these good examples, or bad ones? What would they have done?

   b. Can the students paraphrase what the question is asking? Can they say it in their own words--either to you, or to each other? (This is a very important comprehension check...)

   c. Can they make up their OWN problems to submit to you, or to the class as a whole? This would give you an indication of their comprehension and carry-over of skills.

   d. Have students get together and make up a test/homework assignment on their own! Then, if appropriate, use the actual items on a real assignment.

4. TEACHING PREDICTION

Prediction is the first step toward anticipating problems, and knowing when to employ the problem-solving process. It also requires that the student Process information at a deeper, more critical level.

Methods:

   a. Before beginning any activity, ask the students "How do you think you'll have to do this? What problems might we encounter?" etc.

   b. During the task, continually ask them what they think will happen next...

   c. Afterward, ask if their predictions came true, and how prediction helped the problem solving process...

Even for a regular lesson/lecture, ask the students what they think you will have them do next (in light of what you have just taught): "what is the next logical step?"

5. USING COOPERATIVE LEARNING GROUPS

Cooperative learning is a STRUCTURED group learning situation in which ROLES are assigned to ensure the equal distribution of work. Almost ANY activity can be designed as a cooperative one, including solving/writing math problems and studying for tests.

Groups can be 2-6 students, depending on the task and your goal for the exercise.

SUGGESTED ROLE ASSIGNMENTS:

- scribe (person who writes for the group)

- coordinator (group leader to organizes people and tasks so that the project can be completed)

- spokesperson (this is the ONLY person who can speak to you, the teacher; having a spokesperson requires that the students speak to EACH OTHER, rather than just to you!)

- idea person (this is a good role for an "oral processor" someone who likes to talk about everything, rather than put pencil to paper; this person could discuss analysis of the problem, give suggestions and answers, but not actually write out the final answer)

- proofreader, checker? (this person could have a calculator, or answer sheet, etc.?)

- oral presenter (in some cases, you may want to require that a student represent the group by explaining their problem to the class)

- ETC., ETC.!! You can come up with your own roles, too!

Methods:

a. Assign HETEROGENEOUS groups; this makes abilities/talents more complimentary, and enhances the skills of all involved.

b. Assign ROLES. Be specific about what each student needs to do.

c. Rotate jobs/roles every week, so each student has a chance to do a few of them. Do not change so often, however, that students never get used to one role...

d. Assign grades to both the individual AND the group each day. The group grade will be motivating for all students (i.e., nobody wants to be known as the "slacker" who pulled down everyone else's grade); the individual grade is motivating because it rewards those kids who have worked hard, and likewise penalize those who haven't.

e. Give DAILY FEEDBACK on everyone's performance. Remember that our students do not necessarily know how to behave in groups; they must be TAUGHT.

f. Try to give POSITIVE FEEDBACK whenever possible (as opposed to negative)...this builds confidence and pride, and reinforces good work.

g. Assign PUBLIC COMPETENCES; praise students in front of others; this increases esteem/confidence within the group and provides high motivation...

h. Set TIME LIMITS for tasks, so that problem solving or other projects don't get exceedingly long!

Suggestions for Cooperative Activities in Math

- vocabulary definitions
- problem solving--either from book or from examples generated on their own
- studying for tests/quizzes
- making up tests/quizzes
- oral presentations
- note taking assignments