

Strategy 1: Quiz and Re-Quiz

At the beginning of class, distribute a quiz to all students. The quiz should have about 5 select-response questions (multiple-choice, T/F, etc.) that may be *a little too difficult* (just within the Zone of Proximal Development). This quiz *does* count for a grade; it is not a warm-up.

As students complete the quiz, collect them and try to score them immediately. When all the quizzes have been collected, announce and distribute a second copy of the quiz.

For the second quiz, students are encouraged to use calculators, book, notes, and especially each other. As a part of required participation points, students must now discuss how to do the quiz problems with classmates, and keep working on them until the entire class comes to a consensus about the correct answers. Students are not permitted to work on this quiz alone. This second quiz will also be recorded as a grade, but everyone should get 100 the second time.

As soon as the first set of quizzes is scored, walk around and listen to the discussions. Give limited assistance as needed. If a student or group of students is finished, send them out as consultants to other groups.

I suggest doing this activity *at least* once per week.

Why it works:

- Working in students' ZPD
- Gives teacher immediate feedback on what students know and can do
- It creates a situation where student-to-student discourse is valued
- Multiple-choice questions with good distractors make for good discussions
- ELLs are free to use home language and draw on resources to explain their thinking
- Maps well to ALL 8 CCSS-M practice standards:
 - Make sense of problems and persevere in solving them.
 - Reason abstractly and quantitatively.
 - Construct viable arguments and critique the reasoning of others.
 - Model with mathematics
 - Use appropriate tools strategically.
 - Attend to precision.
 - Look for and make use of structure.
 - Look for and express regularity in repeated reasoning
- Creates a setting where the classroom is a community of learners
- Is engaging for all students

Math Speeches

In an ELA class, students are sometimes asked to develop, organize, and then deliver a speech. As mathematics instructors, we also carry some responsibility in teaching listening, reading, speaking, and writing as outlined in the CCSS-ELA; particularly for our ELLs and struggling students. Instead of randomly calling on a student to come to the board and explain how to do a problem, ask students to prepare a speech as homework. This could be done at the end of a unit or as a formative assessment to check for student understanding.

Distribute a page of mathematics problems to students, telling them that they will be preparing a speech about one of them. Students may choose to work alone or in pairs, and must let the teacher know which problem they would like to do. English learners are encouraged to work in pairs to reduce anxiety and to get help with grammar, pronunciation, etc. from a classmate.

In large classes, speeches may need to be staggered over time until every student or pair has completed the task.

The speech must contain a list of components. Here's what I have used:

- Introduction: Describe what kind of problem this is.
- State and write the properties, book sections, or other information you need to solve the problem (e.g., the laws of exponents, the distributive property, etc.)
- Solve the problem, both aloud and in writing.
- Conclusion: Explain how you know your answer is correct.

Here is a rubric you could adapt to score the speech:

Criterion	Rating Excellent	Rating Good	Rating Satisfactory	Rating Needs Improvement	Score
	Points 5	Points 4-3	Points 2	Points 1-0	
Introduction	Clearly identifies topic	Adequately identifies topic	Identifies topic inaccurately	Does not identify topic	
Properties and tools used	Comprehensively identifies properties and mathematics needed	Identifies some of the properties and mathematics needed	Mentions properties incompletely or inaccurately	No mention of properties or mathematics used	
Body	Explains the steps accurately and succinctly while solving the problem. Uses appropriate academic language	Explanation is somewhat clear, with minor inaccuracies or non-academic language	Explanation is not clear or correct, though effort is made.	Problem was not explained orally	
Conclusion	Accurately explains how to evaluate the mathematics done.	Explains, but without sufficient detail, how to evaluate the mathematics done.	Explains how to check the problem inaccurately	Does not explain how to do the problem	
Written demonstration	Written mathematics is legible, comprehensive, and accurate	Minor problems with written mathematics	Significant problems with written mathematics	Does not show steps required to do the problem	
Clarity	Speaks clearly and distinctly all the time with no mispronounced words	Speaks clearly and distinctly nearly all the time with no more than one mispronounced word	Usually speaks clearly and distinctly with no more than two mispronounced words	Often mumbles or cannot be understood with more than three mispronounced words	

Why it works:

- Students are able to produce better academic language when they are given a speech structure and time to design a response to a mathematics problem.
- Working in pairs and being given the opportunity to choose their own problem greatly reduces anxiety.
- Opportunity to use home language, everyday language, and academic language
- Incorporates the principles of Universal Design
- Engages students in *language learning* in mathematics

Dictation

Students can work in groups of 4-5 or as a whole class. Distribute a page of mathematics problems to each student. These could be from a textbook, worksheets, an exam, or any other resource you might have. In particular, choose pages that have mathematics you think your students might have difficulty reading *aloud*. Each student should have a unique page, and they should not share that page with their classmates.

Next, every student in the class should have 5-6 pieces of scrap paper, depending on how many students are going to dictate a mathematics problem today.

A student is selected to begin the dictation. She is instructed to choose any problem on her page, and read it aloud to her group (or the whole class). The students are to listen carefully and write what they hear her say on a piece of scrap paper. They do not need to write their name on the paper. When students are finished, they should all give her their papers, and she is instructed to grade them. This should take less than one minute. Then she should report out how many were correct and how many were incorrect.

Another student is selected to dictate a problem from his page in the same manner as before. This will continue until all group members have had a turn or as time allows.

Why it works:

- It is likely that a student who cannot say a mathematics exercise aloud is not able to fully comprehend the mathematics when reading and hearing it. Practice is important!
- Provides instant and personalized feedback to students
- Increases academic language proficiency, in particular with mathematics symbols.
- Just hearing a teacher say mathematical exercises does not produce the kind of retention from active engagement with student listening, speaking, reading, and writing mathematics
- English learners get lots of feedback as both a listener and a reader in a short time, without humiliation
- Can be done frequently as it does not take up much class time or resources to conduct.
- Engages all students
- Universally designed based on choices available to students.

What didn't work:

Knowing that incorporating and legitimizing *home language* is important, I had a standing offer of 100 extra credit points for any student who could come to the front of the class and do a mathematics problem in any language other than English. (At first, the offer was for 10 points, but I raised the value when I had no takers).

When students asked for opportunities for bonus points, I always reminded them of my offer. Students were free to choose any problem they had been presented with in class (tests, quizzes, homework, in-class exercises).

I suggested that students could work on this at home with a parent.

When I asked students why they were not able or willing to try it, they were not able to tell me a "good" reason; not even the graduated students who still contact me today more than ten years later. Some would remind me that I would not be able to understand as a mono-lingual English speaker.

All of my students for three years had a non-English native language.