Belmont Model Lesson Series

Presented by Julie Van Winkle (CCSS Math facilitator, ISIC) and Nury Arrivillaga (Title 3 Coach)
February 2, 3, and 5, 2015

GOAL: For teachers to see Common Core math instruction in action – teachers will observe inquiry-based math instruction that focuses on CCSS and reinforces collaboration among students, as well as writing and speaking skills.

Notes about the classroom set-up:

The students in the model lesson are sitting in groups of 3, but depending on your classroom furniture, groups of 3 or 4 would work. Each table labeled with a letter, and each place at the table has a number. This allows the teacher to use "equity sticks" to randomly call on students. The same set of sticks can be used in all classes, so that teachers don't have hundreds of sticks with each individual kid's name written down! Teachers can also assign specific roles within each group (for example, the number 1 student at each group is responsible for getting supplies for each activity).

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Day One: Simplifying Monomial Expressions

Get the Goof: Exponents: This activity is similar to a "warm-up", however, instead of asking students to solve a problem, the students must identify the error made by another student. This relates directly with Math Practice 3, constructing viable arguments and critiquing the work of others. The students must not simply find the mistake, but explain *how* the mistake was probably made. It is important that students give specific explanations: for example, they can't simply say "the exponent is wrong" – they need to explain *why* the exponent is wrong (e.g., "the student added the exponents together to get -7, but they should have gotten $2x^2$ over $3x^5$, which simplifies to 2 over $3x^3$.") In my classroom, I provide students with a Get the Goof sheet at the beginning of each week. The sheet has a space for each day of the week, where the students explain the error in complete sentences. At the end of the week, I collect their Get the Goof sheets and check their work for a grade.

Group review sheet, mathematically speaking: This activity provides an example of the teacher allowing for student choice. Each group can choose which problems they do, as long as they do at least 3, and as long as all the problems are not from the same section. This allows for multiple points of entry – groups that are struggling may choose to answer 2 simpler problems, while more confident groups may choose to tackle the more challenging problems. All groups must at least attempt one more difficult problem. As the students work collaboratively to solve the problems, one student must keep track of the math vocabulary used, to reinforce using academic language.

Card Sort: Finding equivalent expressions This activity challenges students to use the rules of exponents to make connections among equivalent monomials containing negative exponents, fractions, and decimals. If you do a card sort activity, you can have students cut the cards out, or pre-cut them. We color-coded the cards so that different groups do not get their cards mixed up (especially since depending on your class furniture and the size of you class, you may have more than one group working at the same table). I did NOT tell the students how to organize the expressions – they must determine the order themselves. Different groups will make progress on different monomials, and in the end, they must compare and contrast their own work with the work of other groups to determine whose groupings are the "best." During the discussion, groups must defend their rationale and question other groups' decisions.

Exit Ticket: Polls Everywhere Exit tickets are data that teachers can collect to see whether students understand certain concepts. The advantage of using an online platform is that you can see the results instantly, without having to collect and correct hundreds of papers! Also, students have an opportunity to use their phones for something academic!

Day Two: Patterns, Tables, Graphs, and Equations

Get the Goof: Analyzing a table: This activity is similar to a "warm-up", however, instead of asking students to solve a problem, the students must identify the error made by another student. This relates directly with Math Practice 3, constructing viable arguments and critiquing the work of others. The students must not simply find the mistake, but explain *how* the mistake was probably made. It is important that students give specific explanations: for example, they can't simply say "they wrote the equation wrong" – they need to explain *why* the equation is wrong (e.g., "the student interposed the slope (m-value) with the y-intercept (b-value)."). In my classroom, I provide students with a Get the Goof sheet at the beginning of each week. The sheet has a space for each day of the week, where the students explain the error in complete sentences. At the end of the week, I collect their Get the Goof sheets and check their work for a grade.

Analyzing patterns: Each group receives a different pattern set. This is a great opportunity to differentiate to the individual needs of your students! Some patterns contain powers, and others are linear. Some patterns have two colors, others only one. Think strategically about which pattern you give to which group. Depending on the skill level of your class, you can show the whole class how to model growth by shading in the "added pieces", or you can circulate and help groups individually as needed. This helps demonstrate the growth factor, that can later be related to slope.

Making a poster: Avoid giving groups a long amount of time to make a poster without assigning specific roles. For classes that are more difficult to manage, give each individual a specific task (making the table, writing the explanation, etc.). I recommend giving each group member a specific color marker, so that you can see how much/little each group member has contributed. Be sure to set intermittent time-goals along the way (e.g., "you should be finished with your table in five minutes."). Use songs or timers to make sure that "5 minutes" really MEANS 5 minutes!

Gallery Walk: The importance of this activity is for students to critique the work of others. For students who struggle with English, it is helpful to provide sentence starters. No matter the level of your students, gallery walks go more smoothly when students have specific instructions about what they should be looking for.

Wrap-up: Today;s Meet This online platform allows for open-ended responses. Teachers can use this to "take the temperature" of their classes. It is similar to an online discussion board. Depending on the maturity level of your class, you may consider projecting the live page during a lesson so that the class can read any comments/questions comments as they are added. For ELD 3 and above, this can be a powerful way to practice reading and writing skills.