VIDEO NOTES: *8th Grade Math Lesson on Classifying Equations*

Video Links: 8th Grade Math Lesson on Classifying Equations
Common Core State Standard: partial alignment to Expressions and Equations (CCSS.8.EE.C.7a)
Compass Component and Rating: Questioning and using discussion techniques (3b), *Effective Proficient*
Lesson Objective: Come to consensus about how to sort a set of equations.

Common Core State Standard(s)
Expressions and Equations (CCSS.8.EE.C.7a): Give examples of linear equations in one variable with one solution, infinitely many solutions, or no solutions. Show which of these possibilities is the case by successively transforming the given equation into simpler forms, until an equivalent equation of the form x = a, a = a, or a = b results (where a and b are different numbers).

Compass Component 3b: Using Questioning and Discussion Techniques (Rating: *Effective Proficient*)		
Indicators	**Evidence**	**Common Core Connection**
Teacher uses open-ended questions, inviting students to think and/or have multiple possible answers.	• Teacher asks questions such as, *"Please convince us that that equation is never true"* (2:03) and *"Did any teams have a different way of proving that this equation is never true?"* (2:56). These allow students to share individual responses and explain different ways to show why the equation is never true.	Students work toward CCSS.Math.Practice.MP1 as they use higher order thinking skills to make sense of problems and persevere in solving them.
Discussions enable students to talk to one another, without ongoing mediation by the teacher.	• Teacher gives students an opportunity to solve and discuss the equations in small groups (1:06), preparing their arguments together before the whole-class discussion. This allows students to revise their thinking in small groups first, improving their argument before presenting it to the class, thus increasing the quality of the whole-class discussion.	This lesson is only partially aligned to standard CCSS.8.EE.C.7a due to the teacher's use of mathematical terminology. The teacher does not make a direct link between the classification of the equation and the number of solutions. "Identities" will have an infinite number of solutions, but the teacher only makes a connection to the fact that identities

		will always be true. Similarly, the teacher uses the term “absurdities” instead of the more widely accepted “contradiction” and fails to connect this group of equations with no, or zero, possible solutions. She simply states that absurdities will never be true. Students construct arguments regarding the validity of the equations (CCSS.Math.Practice.MP3).
The teacher calls on most students, even those who don’t initially volunteer.	• Teacher calls on students who have their hands raised, as well as those who do not, through the use of equity sticks.	
Many students actively engage in the discussion.	• During the class discussion, numerous students explain how they arrived at their answers. Students share out thoughtful responses to questions and listen to the responses of others.	

WHAT COULD THIS TEACHER DO TO IMPROVE?

What did the teacher do in this lesson?	*Highly Effective* Indicators	What could the teacher do to move to *Highly Effective*? (example actions)	How could this lesson be improved for students to meet Common Core standards?
The questioning and discussion is led by the teacher, with some responses explained by the teacher herself instead of the students.	Students initiate higher-order questions.	In order to shift the discussion to be student-led instead of teacher-led, redirect student questions back to the whole class. Additionally, ask students what questions they would ask someone to determine if a given equation were true, sometimes true, or always true. Lastly, count to 5 after asking a question to give students sufficient think time before they respond.	In order to fully meet the expectations of CCSS.8.EE.C.7a, the teacher must make the connections between the types of equations (identity and contradiction) and the number of solutions. Lessons which follow this introduction should be focused on linear equations in one variable. The use of quadratic equations should be extremely limited because there are no expectations for students to understand solving quadratic equations in Grade 8.