

Analysis of Teaching Event 1

For my first lesson in the high school math classroom, I taught a Geometry Honors class with primarily tenth grade students. The concept of the lesson was Angle Relationships and the goal was for the students to learn about the Linear Pair Conjecture and the Vertical Angles Conjecture. The three main learning objectives I had for this lesson were that the students would be able to discover relationships between different pairs of angles, practice measurement skills using a protractor, and develop inductive and deductive reasoning skills as well as practice cooperative behavior.

For my student artifacts I was able to collect ten different student homework assignments and the recording of my lesson. After looking through the different questions and answers, I believe that the first five questions were an easy review for most of the students. They have seen similar diagrams before and they were able to apply their new conjectures to find the measures of the angles. I feel that question number six was a key question to show the level of understanding of the lesson on linear pair of angles. It asked, what's wrong with the picture where points A, B, and C are collinear but the two angles only add to be 170° . This question requires students to know that a linear pair of angles must sum to be 180° and although looking at the picture it appears that the two angles combine to equal 180° the students must not assume, and instead add the two angle measures together. Seven of the ten students wrote down an acceptable answer expressing that the two angles should sum to be 180° , but the two angles in the picture did not (see Jacob, Kayla or Darby's homework). I also feel that number nine from the homework assignment is an important question in showing the students' level of understanding of linear pairs and what a converse and counterexample are. The question is, you discovered that if a pair of angles is a linear pair, then the angles are supplementary. Does that mean that all

supplementary angles form a linear pair of angles? Is the converse true? If not, sketch a counterexample. This multi-question format seemed to be too much for the students because looking at their answers it seems that they answered one part or the other of the question. Some students were correct in the parts of the question they did answer though; many students drew a counterexample showing two nonadjacent angles that sum to 180° . This way the angles do not form a linear pair, but are supplementary. This type of solution can be seen in Jacob's, Kayla's, Kennie's, Sienna's, and Darby's papers. However, Natasha wrote that the converse is true, and she did not draw a picture. If she would have drawn out pictures maybe she would have seen what the question was asking. Kodiak left a question mark for question nine. He possibly didn't understand what the question was asking or didn't know how to begin answering the question. If I were the classroom teacher I would go over this question as a class the following day because I feel that this is a question that covers many aspects of the lesson.

Since the class has seen different examples of vertical angles and supplementary angles before, this lesson was somewhat of a review for them, however, the new aspects were the formal conjectures. Being able to state what the Linear Pair Conjecture is and to understand its similarities and differences to supplementary angles, as well as formally stating the Vertical Angles Conjecture. I feel that these subtle, but important new details were understood among the class. I was excited when we would have a whole class discussion and the students would participate, such as twenty-two minutes into the recording, when the students provided different real-world examples of linear pair of angles. This told me that they knew what was going on enough to think of everyday objects that represented the same idea. Just after twenty-eight minutes into the lesson you can hear some of the students' discussions when asked to talk with their partner about what they believed to be the angles on their wax paper. As I walked around I

could hear comments such as, I agree with you because you labeled the larger, obtuse angle a higher number than the smaller angle. Jacob actually compared his guessed angle measures to what his protractor showed and saw that the two angle measures didn't add up to 180° . On the video you can hear him questioning why this is, because he knew that they should sum to 180° . This made me happy to hear that he was confident enough to question what the protractor was telling him (again at twenty-eight minutes in).

In completing my analysis of the level of students' understanding from the lesson, I modeled many of Carpenter and Lehrer's (1999) points in developing understanding. I believe that I had the students articulating what they knew in the warm-up with writing down their own descriptions and pictures related to the vocabulary terms. In having the students write a description and then draw a picture or give an example, it provided them with multiple representations for the same term, providing further connections. I feel that the lesson extended and applied mathematical knowledge when we discussed as a class the similarities and differences between supplementary angles and linear pairs, as well as deriving how the vertical angles conjecture is true by using what we knew about linear pairs. Finally, the students were able to make the mathematical knowledge their own when they developed real-world examples of the mathematics. I believe that making these connections is the most important part. Bridging the gap between what is learned in school and what happens in the real-world is crucial and the closer we can bring those two systems together the more meaningful the mathematics can be. It's one thing for the teacher to list a whole bunch of real-world examples, but I feel that when students come up with their own connections the content can then be understood. Some students' examples may be a little strange, as in a student's example of a chair as an example of a linear pair of angles (at twenty-two minutes into the recording.) In forming a list of examples to

share with the class I would have never thought of a chair leg coming off of the base of the chair, but for that student, the idea works and that's what will help them remember linear pairs of angles. I also feel that the students were able to reflect on what they knew when they had to decide on their angle measure on their wax paper, then switch with a partner and discuss whether or not they agreed with the chosen angle measures. This required the students to use what they knew to decide the reasonableness of the angle measures.

Looking back at the lesson as a whole, I feel that it was a valid first attempt; however, there are many aspects that could be improved upon. In revising this lesson I would build in more time to answer questions and for class discussion about what is going on with the different activities. I felt that the lesson was a mile wide but only an inch deep. Although it only covered two topics, I wanted to present linear pair of angles and vertical angles in multiple ways, which I feel I did by providing multiple real-world examples and applications to everyday objects, however, under the pressure of time I felt that I was not able to give enough time to respond to each student's question. Many times I would ask for an answer and call on a student who would share their answer aloud but I would never validate whether their answer was correct, incorrect, or partially correct and how it could be better. Instead, since it wasn't the exact answer I had on my key I called on another student hoping to hear the 'perfect' answer (See six minutes in). In watching the recording of my lesson I noticed that I would ask a question, get an answer that wasn't exactly right and would simply move on telling the class what I, the teacher, had. This was not good. This would instill in students that the only 'correct' or 'acceptable' answer was the answer the teacher has. Another revision I would make is in classroom management, I feel that if it were my 'real' class and I saw these students on a daily basis that I could lay down my set of expectations for classroom behavior. I didn't appreciate students getting out of their seat

without permission. In the future, I will not attempt to talk over the class. I will wait until it is quiet and I have their attention before speaking. I also noticed that I tried giving directions while passing out materials (See twenty-three minutes in). In doing so my sentences were broken into parts because I would become distracted. There were no students listening to my directions and if there were they probably would have been confused because they were not clear and direct. Then, once I was done passing out materials, I had to announce the directions again. If I would have simply passed out the materials without trying to multitask things would have been better. My questioning has room for improvement as well, I feel that I asked a variety of different types of questions, from lower to higher order questioning, but forgetting my wait time and the way in which I phrased the questions was crucial. Numerous times I found myself asking, “Does anybody want to describe...” as well as “Does that make sense?” in reality these are yes/no questions and won’t tell me anything about what the student knows. I also should try to avoid asking a question and leading to the answer, or even answering it myself. In the recording I said, “Both are valid, right? Of course the class will simply agree with the teacher, anything to move on and be done with the lesson. If I were to teach this lesson again I would have an example of a shower that I would want them to draw. Initially I didn’t want to provide them with a picture because I wanted each person to be creative and not copy what was on the overhead; however, there was some confusion as to what to draw and what should have only taken a minute required five minutes. Thus in the future I would put an example up so that they could have something to reference. In the vertical angles part of the lesson, when I asked the class to switch their wax paper with a partner and then to discuss whether they agree or disagree with the angle measure their partner put, the students simple told each other “agree” or “disagree”. In revising this lesson I would be sure that the student have a dialogue and talk about the reasons why they agree

or disagree with their partner's decisions. I feel that the talking in the classroom should be mainly students, on-task talking about the mathematics, not necessarily the teacher's voice. With this said, there were times when I would make a comment, for example, "So you know all the way around is 360° ." When I could have instead asked the class what they knew about what they saw. In having the students drive the conversation you are not restricting what is said and therefore are more likely to see and hear what the students know. The last thing I would want to correct in teaching this lesson is that I would have more time to go over the student worksheet. I ran out of time in the end and had to quickly go through the answers for the four questions. I feel that if the before mentioned changes are made then more time would be available in the end to discuss student answers for the worksheet.

I thoroughly enjoyed teaching the lesson and feel that students did learn about angle relationships and gained an understanding of the material. I am glad to have had the opportunity to teach the lesson and learn for myself what is required to implement a successful lesson.