Indicator 2 – develop and organize coherent and relevant units, lessons and learning tasks that build on students' prior knowledge skills and interests and to engage students in the work of the discipline.

How do I incorporate higher level learning so students think critically, creatively and solve problems?

How do I engage students in rigorous and relevant learning that promotes curiosity?

As a first year teacher, I look for as many resources to use in my classroom as possible. These resources have come from colleagues within my school, experiences from student teaching, published resources and I have even been able to use some material from my graduate studies. Most of the resources that I use in my class on a daily basis, however, have been created from scratch by me. For example, I design each lesson from the curriculum as Smartboard slides with direction from the text's examples. I try to include as many visuals and graphics as I can in my presentations in order to cater to the visual learners. Another resource that I implement on a daily basis is a warm-up that is individualized for each subject. My warm-ups relate to current and/or prior knowledge, depending on my purpose for the activity. If I want to reinforce how to find percents the day after the lesson, then the warm-up is intended to accomplish that. If I am trying to refresh my honors students' prior knowledge on Fractions operations, then I will include that for the day's activities.

Every weekend, I plan for the upcoming week. I review the curriculum and create typed lesson plans for each class so that I have a goal for the entire week. My goal may not always fit the timeline, so each day I reflect, modify and adjust when I need to. One benefit to my schedule is that I teach two of the same courses (Pre-Algebra) every day. This allows me to reflect on how the first lesson went and what I thought was effective versus what I would like to change. An example of this was during a lesson on unit rates. The students were working on an activity in their workbooks and they had to calculate wages per week, day and hour. The students were working in small groups and as I was walking around and observing, the students were coming up with answers that made no sense in the context of the problem. This activity was intended to demonstrate to students the concept of annual employment wages and how adults are able to figure out weekly wages in order to budget their funds. At the end of the activity, I also intended to teach them about taxes and how much they could expect to take home on a weekly basis. It turned out to be too difficult for my students and I decided to put the workbook activity aside for the next class. As I reflect back, I would modify the data given so that the annual salary was $52,000 (weeks in a year for easier computation) and I would also teach them first about the conversions for weeks in a year, days in a year and hours in a year, rather than have them figure that out on their own. Overall, I think that while my intentions were good, I planned on trying to fit too much into one period.

Another real world example that I designed for my Pre-Algebra students was a learning activity that I thought they would enjoy. Shortly after we learned about unit rates, the chapter dealt with conversions. I thought of an activity where we would go outside and the students would run a 40-yard dash. I timed each student and recorded his or her time. When we were finished, we went back to the class to work on converting their times from yards per second to miles per hour. What ended up happening was that we ran out of time and a lot of the students were confused by the end of class. This was obviously not my goal for the activity and as I look forward to the next implementation, I would change a few things to the design. Before we went outside, I would have the students convert 40 yards to 0.023 miles. Then, I would make up an arbitrary time (10 seconds) near what the average time should be and we would convert 10 seconds to 0.0028 hours. At this point, we would then use that information to determine the rate of 8.2 miles per hour. We could then have a discussion on what would happen to the mph rate if the 40-yard time increased/ decreased. This would be a nice build up to the activity of running the 40-yard dash because the students would look forward to coming to class.

I recently read an article from Educational Leadership titled Teach Up for Excellence by Carol Ann Tomlinson and Edwin Lou Javius. The article pertained to differentiation strategies for an engaging and rigorous curriculum. One of the strategies that relates to planning is to be an analytical practitioner. In doing this, "teachers who teach up consistently reflect of classroom procedures, practices, and pedagogies for evidence that they are working for each student – and modify when they are not. They are the students of their students. They empower students to teach them, as teachers, what makes students more successful." As I plan to teach a lesson, I try to give my students options for learning techniques and implementing math concepts. For example, some of my students were still struggling with adding, subtracting, multiplying and dividing fractions. After I taught them the conventional way of modeling several examples and noticed that it wasn't reaching every student, I decided to create a Fractions Operations study guide that we would fill in together in class. This study guide will provide a list of sequential steps that the students could follow every time as long as they utilized it properly. Being able to scaffold that basic math skill allowed my sped students to experience consistent success when computing fractions.

Another example of scaffolding a critical concept was when I taught Finding Percents. This section covered three types of questions: finding the percent, finding the part and finding the whole. As I taught my class the difference between each problem, I gave them a sequence that they could always apply to these types of examples. The sequence 'percent over 100 equals part over whole' is the most efficient way to solve these types of problems because the unknown quantity is easy to recognize. If the question asks 'what percent is one number of another?' then we are solving for the unknown percent. If the question asks 'what number is some percent of another number?' then we are solving for the part. Lastly, if the question says that a given percentage is a 'known quantity of what number?' then we are solving for the whole. As I reflected on the initial lesson, I saw that a lot of my

students were able to solve these problems independently, but some were still struggling. I was missing one more piece of information that would make solving these types of examples even more straightforward. That piece of information was the acknowledgement of the word "of" in each type of problem. Whatever number came after the word "of" in each of the three examples was always the whole number in the percent proportion. Being able to identify the whole immediately gave my students a 20% greater chance of solving the proportion because now there were only two unknown variables that needed to be identified instead of three. The assessment that ensued was a Chapter Test in which the students did very well across the board. The overall average was 85% with a majority of the distribution in the 80s and 90s range.

Another important resource that I have used has been my team colleagues. As a first year teacher, I am always bouncing ideas off of them and asking questions. Although most of my collaboration with my team science teacher has been informal, Mr. N and I discuss interdisciplinary connections a lot. In one example, Mr. N was teaching a lesson on freezing, melting and boiling points and graphing those events. He asked me how I taught the concept of slope to my students and I showed him a few ideas, like how to prove zero slope and undefined slope. Another time, I was planning to teach a lesson on scientific notation and I wanted to know how much exposure our students had with scientific notation in his science class in order to have a little background on my students' prior knowledge. In another instance, I had designed an experiment to simulate the computation of pi using measurement and Mr. N was patient enough to listen to me talk myself through the lesson's logistics. Being associated with a team has benefited me as much as it has benefitted my students.

Rigor is a popular term in education these days. I remember when I was interviewing for my first teaching job and at least three schools asked me what I thought rigor meant. There are multiple definitions of the word but I like to shy away from the strictness aspect and focus on the accuracy and thoroughness of the definition. My students were learning about the distance formula and I decided to demonstrate how the distance formula could be proved using diagrams and the Pythagorean theorem. This was not in the curriculum or textbook; I had just come up with the idea as I was planning the lesson. After I had showed them the proof, I challenged my students to recreate it on the Chapter Test that followed one week later (for extra credit). None of the students were able to do it accurately, and that is fine because this was a very high-level concept. My goal was to show them where the distance formula comes from and that there is a universe of math far beyond what we are studying.

Another proof that I like to show my students is how to prove the slope formula using the linear equation point-slope form. This activity is a nice follow up for my students who have become near experts at solving equations with variables on both sides because it takes numbers out of the equation and replaces them with variables. The students must get out of the frame of mind that math equations can be expressed without numbers and this application, at times, is useful because it

creates a generalization or rule that can be practical in many instances. At first, a lot of my students struggled with this concept, but as they continue to receive reinforcement, they become better thinkers of math.

As I continue to work on organizing and implementing coherent and relevant lessons, I experienced success with a recent activity. March 14 is Pi Day and to celebrate with my classes, we took a one-day detour to learn about Pi. I created 7 Smartboard slides about the history and significance of Pi and the culminating activity was an experiment simulating the approximation of Pi, similar to what the Babylonians did except with calculators. The purpose of the activity was two-fold: teach the students about the relationship that Pi has with circumference and diameter and let the students discover how close they can get to Pi using their own measurement techniques. I averaged all of the data that the students took and we had a competition between classes to see which class would get closest to Pi. The class that won had data that averaged out to be 0.002 away from Pi, which is impressive considering that the increments of our measurement devices were only 1/16" and 1mm. Reflecting back, I consider this activity a benchmark of engagement and interest from my students because it was a relevant, hands-on, group activity that was a discovery. Near the end of each class, I could hear my students arguing about which team got closest to Pi. Later on when they use Pi, they will have a greater appreciation for the number and how it came into existence.

A lot has happened since my first semester of graduate school. I remember that the final project of my Educational Philosophy course was to write my philosophy of education. After reading *Grown Up Digital* by Don Tapscott, *The Passionate Teacher* by Robert Fried, and *The Children in Room E4* by Susan Eaton, I was able to formulate an energetic outlook on my philosophy, which is summed up in these concluding paragraphs:

"I believe that educators learn more in their lives as educators than their respective children who they reside over. As difficult as it is to prove, there are many factors that need to be considered.

We must throw a lot of different techniques out there to engage our students, we must change up our pitch to suit each individual, and we must keep them guessing. In a rote classroom, students fall into a game of getting by on the minimum standards possible because they know what is expected. Switching up techniques is a requisite to charismatic teaching.

I believe that no skill can be mastered; we are always learning and striving to be better. Teaching will always remain an epic trial of conquests and failures in the classroom. The important stance is to remain jubilant and positive if we want students who are engaged. We have to make them intrigued to ask themselves, what is coming next?

To quote Robert Fried, author of *The Passionate Teacher*, 'students need us, not because we have all the right answers, but because we can help them discover the right questions.' Taking that one step further, by helping our students find the right questions, we are answering questions about our methods."

Two and a half years later, I read in an article that 'successful teachers are students of their students' and it invigorates that passion that I have always had for teaching. It is this passion that motivates me to extensively prepare and plan the way that I can. As I continue to grow as a teacher, I will only have more ideas to effectively utilize in the classroom thus allowing my students to experience success in a fun and meaningful way.