

Towson UTeach Instructor Lesson Feedback

Date: 4-30-2018	School: Eastern Tech HS	Teacher Ms. Pahr
Student Name: Emily Trumble	Lesson: Solving Exponential Equations	
Grade/Class: 11 th and 12 th grade College Algebra	No. of students: 24	
Observer Name: Linda Cooper		

Lesson Plan Implementation – notes as the lesson progresses

You identified exponential problems that students had difficulties with and reviewed those with students.

Students determined missing steps to solve / rewrite exponential expression and posted their steps on Padlet. Nice collection method. Something to consider – By writing out the [partial] steps you are forcing students to follow a prescribed thinking pattern. Consider having fewer partial steps so that there is variation of solutions among the students. This could play well into the technology's sharing of student solutions. You asked students if the Padlet results changed their thinking and no one responded. You moved on. Consider some type of closure to the activity before moving on.

You returned to the problem of $(a)^{m/n}$ and showed a PP slide that expressed this as a to the n th root raised to the m power. You identified this as a problem of difficulty for the students as you prepared your lesson – nice anticipation.

You posed question “Is a^3 greater than a or less than a ?” and then asked table 8 to answer. They responded greater than. Instead of moving on (as you did) to “If $a > 1$ and $m < n$, then.... If $0 < a < 1$ and $m < n$ then ...” provide students with more wait time and have them ponder your question for more time. If no one responds ask what happens when $a > 1$? $0 < a < 1$? $a \leq -1$? (the last suggestion may deviate from your focus on a base)

Given $(1/3)^x = 81$ you asked students how to solve instead of presenting steps. Nice to have students express their thinking.

$2^{(x+4)} = 8^{(x-6)}$ You asked how to express 8 as an exponent and students offered 2^3 . Instead of writing $2^3(x-6)$ ask students to rewrite the right hand side of the equation. Let the students struggle with this step instead of giving them the step of incorporating $8 = 2^3$ for them. Gather more student thought before giving steps.

Students have started a new activity where one student is playing teacher. This is nice because now the students collectively have to solve this without someone prescribing the steps. The student “teacher” is doing much better with the second problem keeping the class going. This is a very nice activity for both the student playing teacher and his classmates who are working with him. It strengthens their mathematics skills, and for the student “teacher,” it strengthens his leadership and communication skills.

Throughout all problems ask if there are other ways to solve the problem. It's important for students to realize that there are multiple solutions. This emphasizes the importance of the method of reasoning rather than the answer itself.

Student “teacher” announced that he wasn't trying to call on “smart people.” You nicely gave him the spinner so that he could randomly call on students – nice!

Nice idea to relate exponential expressions to computer game Fortnite. You presented the text and then I believe you gave the function $d = (4/5)^t$. Did you ask students to define the variables and then write expression? If you did not, consider asking them to do so as this provides an opportunity to take a real-life problem and translate it to a mathematical equation. You then asked students to find amount of time played for various values of the diameter. A student asked why you have distance in km instead of m. This is a

question that you could pose and discuss with the class, or at the end of the activity return to and explain the advantage of your choice. I wonder if students are struggling with this as the level of difficulty has jumped with the use of decimals and changing to expressing as a fraction. [OK, using the calculator function to represent the decimal as a fraction is very helpful.] Consider checking in with the class after the first problem instead of having them work through all problems before regrouping. Also note that #1 and #2 (especially #2) is more challenging than #3 and #4.

I wonder if students are wondering what they would do if they could not find a common base. This is not the focus of the lesson, but encouraging such conversation encourages curiosity in general.

You've used three different software programs today: Quizziz, Padlet, and Socrative Student. Here (Socrative Student activity, I believe – I'm writing this well after the observation.) you've given them the time limit of 10 minutes – good. We should consider having you and other alumni come to Math Club next year to show various software that is available. There's lots to learn!

This was a successful lesson!

Lesson Mechanics:

Welcome & Engagement	
Closure	The closure was a repeat of the objective projected on the board. Discuss how that objective was met. You were silent on this.
Presence	You presented yourself as both confident and approachable.
Preparation	You gave a lot of thought to your lesson plan. Plan to have more student input rather than directed steps. And plan to ask and show multiple solution methods.
Classroom Management and Student/Teacher Interaction	Overall very nice. Students were engaged and on task. At times it would have been helpful for students to know the time limit of the activity.
Classroom Discourse (interaction and questioning)	Very nice choice to have student come to front and play teacher. The class was taking ownership of the solution methods.
Math Content	Solid, very clear understanding of how to solve exponential equations by expressing both sides of the equation in the same base and then equating the exponents.
Instructional Delivery & Pedagogical Approach	Your steps were clear and easy to follow. Try to incorporate more opportunities that allow students to think (struggle). There was little opportunity to share incorrect thinking as, at least in the beginning, you were directing the solutions.
Designing and integrating Assessment	You incorporated many opportunities to formatively assess student understanding.
Professionalism	strong
Time Management	Overall time management was good. Consider announcing more time limits as students are working on problems.